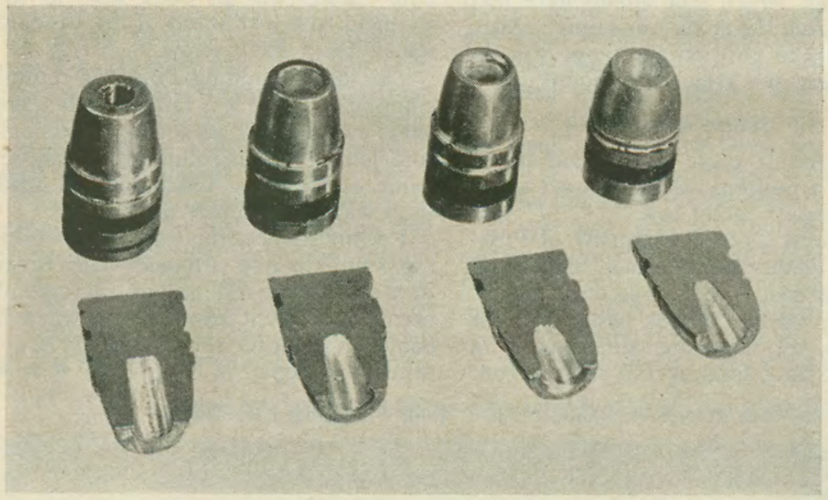
EXPANDING BULLETS FOR THE .44

By John W. Zlatich

What takes place when hollow points are fired in the .44 at various velocity levels? What are the effects of varying bullet hardness at these velocities?



The four bullets fired in the comparison test in the order they appear in the photos below: (L to R) Thompson 431244, Cramer bullets #7HP, #7HP Bevel, and #8A

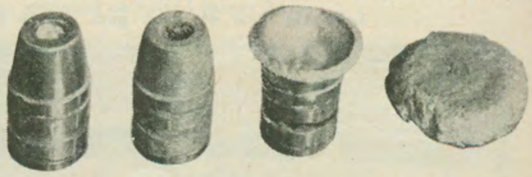
SINCE the .44 Special cartridge and the Smith and Wesson New Century revolver made their combined appearance in 1907, a great deal of experimentation has been done with expanding revolver bullets. Much of this testing has been done with the same .44 cartridge, as it was immediately recognized by pioneer handloaders as potentially the deadliest revolver cartridge made. Progress, however, was limited by inadequate powders.

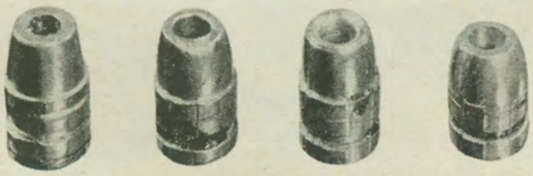
In recent years a lot of shooting has been done with the .44 Special, using expanding bullets and modern, more efficient propellants, and some very interesting information has been gathered from it. Most of this material has been assembled by ballisticians and other firearms experts, however, and hasn't found its way to the average .44 shooter, the man who puts it to widespread and practical use. Those who have tried to locate information on hollow point revolver and automatic pistol bullets know how true this is. Only a very few writers, among them Phil Sharpe, currently a contributing editor of the RIFLEMAN, in his monumental *Complete Guide to Handloading*, even mention this phase of the game. Nowhere is there a readily accessible source of useful, specific information.

The tests reported here, and the results of the firings recorded in the tables on 50 and 51, are for the .44 shooter who has fruitlessly searched existing arms literature for some faint glimmer of light on commonly asked questions: "Just exactly what will these hollow-point bullets do? Will they actually expand? Does hollow-pointing a bullet increase its deadliness? Do these bullets penetrate much after they expand?"

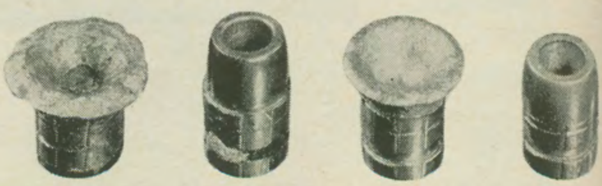
More experienced shooters, some of whom might want to reload for magnum performance themselves, will want to know:

Bullets of lead-tin 10 to 1 go through varying degrees of expansion at 600, 800, 1000, & 1200 f.p.s.





At 600 f.p.s. bullets did not begin to expand. Velocities varied to simulate effect of hits at a few feet, 100, 200, & 300 yards



At 800 feet per second expansion was definitely under way in the Thompson and Cramer #7HP Bevel bullets

"How fast does a revolver bullet have to be driven before it will expand? I have a mold and am ready to cast, but how hard or soft should hollow-point bullets be alloyed to open up properly? What difference is there, if any, between the different shapes of hollow point bullets now on the market? Does one bullet construction expand differently from others?"

Two tests are reported here to help answer these questions. The first compares the expanding characteristics of four bullets of different shapes and weights, and the second takes one of these bullets and casts it of four bullet metals, from very soft to very hard, to show how much softness or hardness aids or hinders expansion.

The four bullets in the comparison test were selected because each represents a class of bullets on the market today. The fact that three of these bullets came from Cramer molds has no bearing on the test; these are similar to bullets made by other concerns.

The Cramer 8-A was the lightest bullet tested, and represents the 200-grain class of bullets intended for use in .44-40 rifle and revolver cartridges and in the ultra-high velocity loadings of the .44 Special. This bullet actually weighs 205 grains, sized and lubricated, when cast of lead-tin 10 to 1.

The Cramer No. 7 HP is very similar to the long-famous and widely used Keith bullet, made by Ideal and listed by them as the Ideal #429421. Its cavity is tapered from a wide mouth to almost a point at the bottom. As in the Keith bullet, this slug has wide bearing bands, a single wide lubrication groove, and a relatively long, curved nose section. Weight is 225 grains, sized and lubricated.

The Cramer No. 7 HP Bevel is much the same as the 7 HP, except that its cavity is wider and shallower, and is shaped like a funnel at its mouth. It is so wide at the top that there is no flat nose surface surrounding the hole, as there is with all the others tested. Weight of this bullet is 230 grains, sized and lubricated and cast lead-tin 15 to 1.

The Thompson #431244 is representative of itself, largely, as it is perhaps the newest widely used bullet on the market. Equipped with a copper gascheck to prevent leading, it has a deep, straight-sided cavity of nearly the same diameter at bottom and at top. Bottom of cavity is flat. The hole in the nose of this bullet is the smallest in diameter of the four. Weight is 235 grains, sized and lubricated, when cast of lead-tin 10 to 1, 238.5 grains at 20 to 1, and 239.5 grains at 40 to 1.

Cramer bullets for this test were supplied by an ardent .44 devotee of long standing, Jack Henninger, president of the Santa Anita Engineering Company of Pasadena, California, which firm now manufactures the Cramer bullet mold. The Thompson bullets came from the author's mold.

Results of these two tests are presented graphically in the accompanying series of photographs.

Firings to test what effect metal hardness and softness had on expansion were all made with one bullet to eliminate confusion. They were cast in the Thompson mold, not because the Thompson bullet is considered better or worse than the others, but merely because this mold was most readily accessible at the time this run of casting was made.

The fact, also, that a Smith & Wesson revolver was used for all firings does not constitute an endorsement of this particular make of arm. Again, this was the author's gun and was most easily obtainable for shooting.

One factor influencing expansion was necessarily set aside in conducting both these tests, and that is the effect of the number of revolutions per minute a bullet makes in flight. At the 1,200 foot-per-second level, the .44 bullet is rotating at a startling 43,200 revolutions per minute—when fired from a Smith & Wesson revolver with a rifling pitch of one turn in twenty inches. In a Colt, with a twist of one turn in sixteen inches, the number of rpm's is higher, up around 54,000. To get an idea of how fast that really is, compare it with a midget racing auto's 5-7,000 and the World War II Thunderbolt fighter plane's 8-8,500. Naturally, this high rate of rotation imparts some centrifugal force to the bullet, and this force aids expansion by tending to throw the bullet metal outward once the impact has caused the bullet nose to spread.

Bullets lose forward speed much faster than they do rotational speed. At the extreme end of its trajectory, when a bullet will fall harmlessly to earth, its number of rpm's will still be 80 percent of what it was at the muzzle, though the forward speed has dropped to nothing. Also, during penetration and expansion in a target material that stops the bullet completely, the slug is still rotating, right up to the instant motion ceases altogether. Some bullets in these tests were loaded to lower muzzle velocities to duplicate at the muzzle the speed full-power bullets would have at varying ranges. A muzzle velocity of 600 f.p.s. is the same, roughly, that a similar bullet would have at 300 yards when originally dispatched at 1200 f.p.s. But, the bullet emerging from the muzzle at 600 f.p.s. has only *half* the number of rpm's the one traveling at the same speed out at 300 yards has. At this low *muzzle* velocity the .44 bullet will be rotating at around 21,000 revolutions per minute when it strikes the target, while the one

Bullets of lead-tin 20 to 1 begin expanding at 200 f.p.s. lower striking velocity than lead-tin 10 to 1. Bullets were fired at 600, 800, 1000, & 1200 f.p.s.

Bullets of lead-tin 40 to 1 expand fully at 800 f.p.s., flatten at 1000, and split up at 1200. Note lack of expansion at 600 f.p.s. in all hardnesses

At 1000 f.p.s. Thompson, 7HP, and 7HP Bevel expanded nicely. Cramer 8A shed nose on impact. Most uniform mushrooming occurred in this test

At 1200 f.p.s. Thompson and 7HP Bevel expand violently but remain intact. Cramer 7HP and 8A shattered. Bases penetrated paper and pine backstop

EFFECT OF BULLET HARDNESS ON EXPANSION, AT FOUR IMPACT VELOCITIES

Bullet	Metal (Ratio lead-tin)	Muzzle Velocity	Max. Expansion (in.)	Min. Expansion (in.)	Length of slug (in.)	Weight of slug (grains)	Expanded within (in.)	Diam. of open hole (in.)	Damage to paper (dia.) (in.)	Total Penetration (in.)	Notes
						(Total)					
Thompson	40-1	1200	.680*	.435*	.312	239.4	3	1.5	2.75	10	*Tore into 2 pcs.
"	20-1	1200	.886	.832	.329	236.8	3	1.25	2.5	10	Almost circle
"	10-1	1200	.830	.791	.376	232.0	2	.85	1.5	12	Pen. 12" of paper stopped base first against backstop
"	Type	1200	.431*	.431*	.405	122.5	1.5	1.75	3	12+	*Exp. explosive. Nose torn off, body of slug penetrated 12" paper, 1" pine backstop, 2" hard dirt
Thompson	40-1	1000	.863	.841	.335	237.1	2	1	1.75	8	Almost circle
"	20-1	1000	.879	.722	.430	237.5	4	1	1.5	8	
"	10-1	1000	.620	.603	.670	232.5	Uncertain	½" plus	1.5	10	No real expansion. Nose widely open, probably has great shock effect
						(Total)					
"	Type	1000	.431*	.431*	.412	141.5	1.5	1.5	2.75	12+	*See note at 1200 FPS
Thompson	40-1	800	.826	.793	.505	238.5	5	1.25	1.5	8	Gradual expansion
"	20-1	800	.685	.659	.601	238.0	4.5	.75	1.25	8	Nose spread but did not roll back. Similar to 10-1 at 1000 FPS
"	10-1	800	None	None	Normal	Normal	None	Normal	Little	13	Penetrated 12" paper, 1" pine board. Found on ground
"	Type	800	None	None	Normal	Normal	None	Normal	Little	13	See 10-1 above
Thompson	40-1	600	None	None	Normal	Normal	None	Normal	Little	10	Very slight distortion, no expansion
"	20-1	600	None	None	Normal	Normal	None	Normal	Little	8	No expansion
"	10-1	600	None	None	Normal	Normal	None	Normal	Little	12	No expansion
"	Type	600	None	None	Normal	Normal	None	Normal	Little	12	No expansion

out at 300 yards, while having the same forward speed, will have nearly 43,000 rpm's. The assistance given expansion by spin and centrifugal force could conceivably be noticeable here, although this is strictly a matter of conjecture. The bales of paper used as target material might better have been set out at the various ranges and fired into from a distance; either that, or the slower bullets should have been fired through a bore with a much quicker rifling twist. Chances are that the net result wouldn't be materially, or even noticeably, different.

All firing was done uniformly according to this procedure:

1) All shots were fired at 15 feet range, with powder charges carefully varied to give velocities of 1,200, 1,000, 800, and 600 feet per second. These velocity levels correspond to the normal drop in velocity a bullet goes through at a few feet, 100, 200, and 300 yards, approximately.

2) Bullets were fired into bales of tightly-packed, soaking wet newspapers. This material was used because sopping wet paper pulp has an effect on expansion and penetration very similar to that of animal tissue. Papers were soaked in barrels of water for five days prior to the tests, and were taken right out of the water for firing.

3) Four measurements were made at each shot: maximum total penetration; maximum diameter of bullet channel, to indicate how much 'wounding power' each slug had; depth of penetration at which bullet began to expand, and the amount of paper pulped and torn around the bullet channel. Only one shot was fired at a time, each bullet

Cast of unalloyed type metal, bullets tend to shatter. Velocities are, respectively, 800, 1000, and 1200 f.p.s.

being recovered and the four measurements taken before the bundles of paper were retied and restacked.

4) All firing was done from a Smith & Wesson M1926 Military model revolver with 6½-inch barrel.

5) As nearly as could be determined, all shots entered the bales of paper at an angle of 90 degrees.

The tables list measurements and notes taken.

Table on page 50 includes the data gathered from comparative firings of the four bullets described above, each firing separated according to velocity level.

Table below records the effect of varying degrees of bullet hardness on expansion, listed two ways, by bullet metal and by velocity.

In each table, where maximum and minimum expansion is recorded, is listed the micrometer reading at the widest and at the narrowest portions of the expanded bullet 'umbrella'. Length of slug measurements were taken from the base of the bullet to the highest projecting portion of the nose area. Each bullet was finally weighed to show if there had been any loss of metal not detectable by visual examination. The shooter who wants a clear picture of what expanding .44 bullets will do need only make his own particular listing of the measurements in these two tables to see what a change takes place.

A careful sifting of all this test data turns up a couple of points that bear stressing.

As regards bullet metal hardness, one doesn't want anything much harder or softer than lead-tin 20 to 1 if he is after widest possible expansion with greatest achievable exposed surface area. This type of expansion gives one a uniformly large diameter wound channel, but somewhat less total penetration than is afforded by hard bullets. Hard bullets, like the lead-tin 10-1 and the lead-tin-antimony 15-1-1 mixtures, are brittle and blow to pieces at high velocities, creating an explosively large but shallow entrance wound, coupled with a deep penetration by the solid bore-diameter base portion of the slug. Both types of wound are very extensive and both would be tremendously damaging to pot meat on the hoof.

As regards expansion itself, the soft bullets behave in the same fashion most American hunters like to see in their rifle bullets. They open wide, stay in one mushroomed piece, and lose little weight. The hard ones act like the German DWM Strong Jacket and RWS Torpedo and H-Mantel bullets so popular in Europe—they shatter violently upon impact and shed their nose portions, leaving a bore-diameter projectile of considerable weight to penetrate deeply. With this type you get a large initial wound, plus a small, deep penetrating channel, while in the other type you get a smaller initial wound area but a larger one throughout the depth of penetration. Which is the best performance is left to the preference of the individual shooter.

Velocity at impact must be pretty close to 1,000 f.p.s. if reliable expansion is to take place. Much below that, hard bullets fail to open up with certainty, and soft ones do not upset completely. At 1,200 f.p.s., the highest velocity a .44 bullet of around 230 grains weight can be driven with safety, the bullet has its full momentum, energy, and revolutions per minute, and the tendency to expand is irresistible, even for the hardest bullets. Where the revolver is to be used for protection only, there is little difference what metal the bullet is cast of, because at the few feet range at which most defensive firing is likely to occur all bullets fairly rip themselves and things to pieces. Only the hunter who will take shots at long ranges is concerned with bullet metals, for the velocity drop over given distances materially lessens the bullet's chances of opening up properly, and soft metal must be relied upon to make up for the loss in impact, speed and energy.

RELATIVE EXPANSION OF FOUR TYPES OF HOLLOW POINT BULLETS, AT FOUR VELOCITIES

Bullet	*Metal (Ratio lead-tin)*	*Muzzle Velocity (f.p.s)*	*Max. Expansion (in.)*	*Min. Expansion (in.)*	*Length of slug (in.)*	*Weight of slug (grains)*	*Expanded within (in.)*	*Diam. of open hole (in.)*	*Damage to paper (dia.) (in.)*	*Total Penetration (in.)*	*Notes*
Thompson	20-1	1200	.886	.832	.329	236.8	3	1.25	2.5	10	Almost circle
Cramer 7HP	15-1	1200	.455*	.455*	.360	123.7	2.5	2	2.5	11.5	*Nose blown off.
Cramer 7HP Bev.	15-1	1200	.835	.775	.595	189.0	1.75	1.5	2.75	12	Greatly expanded, but recovered intact.
Cramer 8A	15-1	1200	*	*	...	100.0	3	1.25	3	..	*Shattered
Thompson	20-1	1000	.879	.722	.430	237.5	4	1	1.5	8	
Cramer 7HP	15-1	1000	.754	.718	.429	222.1	2	1.25	2	12	"Mushroom"
Cramer 7HP Bev.	15-1	1000	.740	.692	.456	224.7	1	.60	1.5	13	Beautiful exp.
Cramer 8A	15-1	1000	.520*	.478*	.448	164.4	..	..	..	11	*Shattered, body of slug found
Thompson	20-1	800	.685	.659	.601	238.0	4.5	.75	1.25	8	Nose spread, no expansion
Cramer 7HP	15-1	800	.4305	.4305	.718	222.2	Uncertain	.50	1.5	18	Nose bulged, expansion beginning
Cramer 7HP Bev.	15-1	800	.595	.580	.642	227.0	Uncertain	.75	1.75	11	Exp. just beginning
Cramer 8A	15-1	800	None	None	Normal	Normal	None	.50	.75	19	Bullet undamaged
Thompson	20-1	600	None	None	Normal	Normal	None	Normal	Little	10	Bullet undamaged
Cramer 7HP	15-1	600	"	"	"	"	"	"	"	12.5	" "
Cramer 7HP Bev.	15-1	600	"	"	"	"	"	"	"	10	Bullet undamaged keyholed in 7"
Cramer 8A	15-1	600	"	"	"	"	"	"	"	12	Bullet undamaged