

# My bullets flight

By Dr Carlson

Yes, I know my title is sort of making fun of Franklin Mann. I've got Dr. Mann's book, *The Bullets Flight, The Ballistics of Small Arms*, and reading it was a chore, believe me! It's a daily diary type of bullet testing that's a dissertation that can put you to sleep real fast. Unless you're into ammunition experimentation with a real passion, it can be like reading an algebra textbook for the fun of it. But we need people like Dr Mann to help clear up the pitfalls encountered in our own limited shooting experiments. After all most all of us cast bullet shooters are experimenters.

One morning I woke up at 3:00 and I couldn't get back to sleep thinking about something. Very new to me. The wheels started turning about a theory that popped into my head after the previous day's shooting session ended. I couldn't stop thinking about the appearance of the Chrony. It's the chronograph that sets 15 feet in front of my shooting bench. There were lube spatters all over it. In some places big chunks of lube that had to have come off when the bullet passed over it. I've had the opportunity to briefly use other peoples instrument. This was my first practical experience using one for an extended shooting session.

Last summer while attending a Trapdoor black powder cartridge shoot, at Wagner, South Dakota, I walked down to the 200 yard line to watch the guys check their scores. I've been at these matches before, but it wasn't until this time I noticed some yellowish coloring on the paper around the entrance holes. Most all shooters use SPG lube or something similar for black powder cartridge shooting. This lube is a very soft lubricant that is soft but almost liquid when the temperature gets warm. It's intent is to soften up the powder fouling after firing so the shooter can continue shooting and not have to stop and wipe the bore. The last event at the shoot is a pistol shoot. While checking the targets in this event, I took note of the yellow streaks of which almost all targets had in abundance. Shooting from a closer distance, the centrifugal rotation of the bullets still hadn't had a chance to spin all the remaining lube off the bullet.

Now back to my theory. Is it possible that some of our flyers are caused by the inability of the bullet to purge itself of remaining lube in an efficient manner upon exit of the bore? Once the bullet has left the barrel, the lube really has no function. The hard lubes that you need a heater under the lubricator-sizer to apply must be really subject to this if only a small portion of it exits in-flight. That's what I was seeing with the lube splatter on my chronograph. Even the sunshades, and rods that hold them up had evidence of varying amounts of flying lubricant. The dynamics of a bullet as it races through the bore is only theory. Ponder this if you will; the pressure on the lube as the bullet accelerates in the barrel is tremendous. Think of it this way: a partially filled balloon gripped in you hand will ooze out between your fingers as you add pressure to it. Now push your hand into a tight fitting cylinder then imagine what happens. The ability of the lead to contain this lube pressure must strain harder and harder as we try to push for more velocity. In some cases the bullet temper upon acceleration causes it to shorten as it is fired. This would up the pressure on the lube even more. The very instant the bullet hits the muzzle is one key to accuracy. It must be like a steam pipe from each groove as it exits. That's the reason for the star on the crowns when we shoot slower velocity bullets. At higher velocity the pressure is greater, hence the hot high-pressured lube would pass so fast it couldn't stick to the crowns metal surface. Do you really believe that you can drive this lubricant into the barrel steel? If you do you better go back and talk to your high school science teacher.

I've tested my theory several times without even thinking about it. Shooting side-by-side comparisons with loads that are lubed and un-lubed. Using two targets and the same gun and load; I've found many times the un-lubed groups are smaller. These loads are in the 1600 feet per second range or less. I've done this with .22 calibers on up to .50-70. My contention is the ash from burnt powder primer and lube is all the lube you need at those velocities. This tells me that somehow the presence of lube isn't all what it appears. Non-believers won't understand until they try themselves, and then maybe not even then because you're not supposed to shoot bullets without lube. After all isn't that why the rings are there? Well yes, but!! And the tests go on.

The invisible accidental voids on and in our bullets cause the bullet to become very slightly unstable. Our groups open up on the target as our inability to see these imperfections. The bullet becomes ever so slightly unstable in proportion to the imperfections. Incomplete fill of the driving bands makes for unstable bullets. Lack of diligent culling during

casting, weighing and lubing, also increases the problem. It's always been tough to throw our reject gems back into the pot while casting. After all the work you go through to make them who wants to melt them back to liquid state and start over! All these things we do to make the best bullet we can do its intended job fails if all along the lube leaving the bullet unevenly on its way downrange is the culprit. Wow I can't believe I said that!!

Tom Gray, the resident guru of the Cast Bullet Association, has presented a theory about lubes and the causes of flyers. In essence he thought that every so often a bullet purging the excess lube out of the barrel causes flyers. I couldn't quite swallow his idea. He is in a group of shooters we call "Benchies". Bench rest cast bullet shooters that strive for the very smallest groups possible with mostly heavy barreled guns that cost thousands of dollars. I couldn't I just can't see lube building up in the bore to the point where all at once you get a flyer. It's like your car engine puffing out excess oil every 1000<sup>th</sup> revolution. It just doesn't happen that way.

Just for a test, one should take a long sheet of paper and place it on boards just below the bullets flight path to catch the downward flying lube. The lube of course will be flying 360 degrees as it exits the bore. The Loverin designed bullets have many driving bands with narrow lube rings. Casters consider Loverin designed moulds to be some of the most accurate. Some shallow groove moulds would also be able to shed lube quickly. Black powder cartridge shooters look for moulds that have deep and square lube grooves just so they can get as much lube on the bullet as possible on the bullet to soften fouling. Think back on your own experiments and rethink if your mould/lube combination you're using isn't impairing the best groups possible.

OK, now for all of you that haven't read Dr Mann's book, that's the next assignment. There just might be a pop quiz in the morning!!

**George Carlson**