Webster defines an experiment as an operation carried out under controlled conditions in order to discover an unknown effect. The most unusual project covered here involves a rifle barrel with a functional chamber at each end, chambered and headspaced for two different cartridges. I had reasoned that the barrel grooves of precise bullet diameter, along with the tapered lands that form the leade, would impart full bullet stabilization upon its exit right through the unrestricted open chamber neck and larger chamber area. I remained quite convinced that the rifled leade, terminating at the open case neck mouth, would serve as a more than adequate crown, yielding complete bullet stabilization with good accuracy. This would be limited only to the rifling twist and load components used.

Moderate throat/leade erosion would have minimal effect on accuracy performance, particularly where throat free-bore was minimal, and little change in performance was anticipated as the barrel was switched from one chamber to the next. This presented a real issue in the minds of some shooters, who believed that even directional change of the bullet would cause real accuracy issues. Anyway, as a long-time experimenter, no further motivation was required in moving forward with this most unusual project. I would do all the gunsmithing myself.

The initial plan was to thread and chamber for the 6mm Remington at the normally used breech end, crown the muzzle end and actually try the barrel in
normal fashion before proceeding with the 6mm PPC chambering. This would allow for establishing accuracy at this early phase of the experiment. The barrel used was a six-groove, one-in-10-inch twist Green Mountain 416 stainless full-size, 1.20-inch diameter blank 27 inches in length, the only barrel immediately available at the time. First the nearly 9-pound barrel was turned down to just under an inch in diameter between the 3-inch chamber sections that would be turned to 1.145 inches, thereby reducing the barrel weight to a very manageable 5 pounds, 10 ounces. With the breech ends reduced in diameter to 1.145 inches from the original 1.20 inches, it would be the same diameter as post-1964 Model 70 target barrels. This left ample barrel shoulder surface after the tenons were turned to one inch diameter and a length of 0.710 inch for the 16 tpi thread pitch.

Dave Manson reamers were used to ream both chambers. I reamed and headspaced the 6mm Remington chamber beginning with the recommended breech end of the barrel. At this stage of the experimental process, I planned to temporarily crown the barrel and try it before chambering the 6mm PPC end.

A proven post-1964 Model 70 Winchester target rifle was chosen for the project. I had earlier converted this rifle to a switch-barrel, with two other barrels, and had precision pillar-bedded the action. To make extraction of the 6mm PPC case’s .441-inch rim diameter compatible, making and retrofitting a totally new extractor was necessary. A brass protective thread cap was then made to cover and protect the barrel threads of the front chamber.

A Talley one-piece Picatinny base and Talley rings were installed on the Model 70 receiver. Installation of a Picatinny mounting system adds measurable bridging rigidity to a rifle receiver, such as the Model 70 Winchester. This was borne out in earlier controlled tests on weaker, rail-type actions.
Inspection of the newly formed 6mm Remington chamber revealed a symmetrical chamber wall neck and lead as is the norm with my Manson reamer. The throat (lead) section of the barrel was lapped prior to the normal break-in session. A number of loads were tested with the 6mm Remington chamber, along with the shoot-and-clean routine for each shot. Accuracy was really quite good, with most groups at or near minute of angle. I learned, using a number of longer bullets in the 95- to 105-grain weight range, that this barrel, with its one-in-10-inch twist, would not stabilize them. A few other bullets up to and including 90 grains were tried before cutting the second chamber, and some surprisingly good groups began to appear. With a representative accuracy pattern established for the 6mm Remington cartridge with a single chamber, the 6mm PPC chamber was then reamed.

The 6mm PPC tenon prepping and chambering went well, and I was soon at the shooting bench again. Handloaded 6mm PPC cases chambered with good feel. So there I sat in anticipation, shooting the very first rounds through the other end of the dual-chambered barrel with at least some trepidation. I wondered just where, with respect to point of aim, the first group would arrive on target. Seeing it right in the midst of the previous 6mm Remington group settled a lot of harbored disquietude, along with the less than encouraging opinions of
Above, these two groups were shot following the switch from 6mm PPC to 6mm Remington using two different bullets – Berger 90 grain and Hornady 75-grain V-MAX. Not only was accuracy amazing, but also point-of-impact for the two cartridges was precisely the same. Below, this series of groups was made with the 6mm PPC cartridge and Berger 90-grain bullets while testing the forend bedding screw system. The four lower groups were all shot without forend screw pressure. The four upper groups were shot with varying bedding pressure, causing each group to rise.

Test of forend bedding screw system with DUO-CHAMBER on 6mm PPC CHAMBER

TARGET BY 7X DATE 2-13-15 YDS
GUN/CAL. 6MM PPC 6.5 G7 KEEN
BARREL INF. GREEN MT. 110 DUO-CHAMBER
BULLET OR AMMO 90 BERGER 75 V-MAX
CASE W/B PRIMER RED MATCH
POWDER & WT. 83 Grain GROUPS VELOCITY
WIND 25 M.P.H. TEMP. 78
SCOPE MOUNT 4X4 SIGHTER TALLEY PIGATIMY
REMARKS

Test of forend bedding system DUO-CHAMBER on 6mm PPC

TARGET BY 7X DATE 2-11-15 YDS
GUN/CAL. 6MM PPC 6.5 G7 KEEN
BARREL INF. GREEN MT. 110 DUO-CHAMBER
BULLET OR AMMO 90 BERGER 75 V-MAX
CASE W/B PRIMER RED MATCH
POWDER & WT. 83 Grain GROUPS VELOCITY
WIND 25 M.P.H. TEMP. 78
SCOPE MOUNT 4X4 SIGHTER TALLEY PIGATIMY
REMARKS Test of forend bedding system
The Winchester Model 70 target/varmint rifle with dual-chambered barrel (6mm Remington and 6mm PPC) is fitted with a Sightron 6-24x scope mounted with Talley rings and a Talley Picatinny scope base.

some critics. Looking upon the demands for precision in turning the entire barrel down, forming the tenon and threads, barrel joint/shoulder, chambers at axially opposing ends, it seems little short of a minor miracle the bullets would strike this closely to point of aim from a different chamber at the reverse end of the barrel. Odds are overwhelmingly against an occurrence of this nature. Shooting the remaining bullets into a very respectable group was a satisfying experience. Proceeding with the second stage of testing, it would have been unmindful not to consider some of the comments solicited. More than one pundit thought accuracy would be dismal as the barrel was reversed.

I had admittedly anticipated the unknown quality of the barrel, along with the effects bore fouling stria and friction coefficient reversal may have on grouping performance, and the reverse chamber serving as a crown might also enter the equation, but such was not the case. Many very encouraging groups resulted, depending on the bullets and load used. I continued to clean the bore regularly, but found it shooting even better after about 300 shots. The bore particularly liked some bullets and powders over others and did very well with the Berger 80- and 90-grain bullets, the 90-grain Lapua, the Hornady 75-grain V-MAX and Sierra 80-grain Blitz. A number of other bullets will be tried later, but at this stage the greater concern was to see just what the dual-chambered rifle would do. Excellent accuracy was really happening.

The one-in-10-inch twist barrel, which turned out to be one in 10.5 inches, would not regularly stabilize bullets over 90 grains, not even 95-grain Bergers or match grade 105- or 107-grain weights. I quite suspected this from the outset, however, and would have preferred a one-in-8-inch twist. I have sent for some of the Berger 88-grain FB varmint bullets, which should fare very well in these chambers, but they have not arrived in time for inclusion in this work.

As the dual-chamber experimentation was furthering in its evaluative process, I switched between the two chambers, compiling all the information. I didn’t
make a big issue of monitoring velocity with a close correlation between those loads chronographed, but while vacillating between chamberings, performance actually showed improvement with both cartridges, and the bore no longer showed copper fouling. The leads of both chambers demonstrated no significant erosion, nor did the proximal peripheral margins of each respective chamber neck, which, of course, serve as barrel crowns.

While drawing closer to the early stages of development on this project, both cartridges were delivering a level of performance quite beyond that originally anticipated. It was a bleak February day with a temperature of 10 degrees as I decided to try a couple more loads through the 6mm Remington, chambered with two Berger bullets. The first two groups at 100 yards, with 90-grain bullets ahead of 42 grains of H-4831, each displayed groups of .535 inch. All 10 shots would have stayed within the 10-shot group. Then two loads with Berger’s 80-grain flatbase bullets ahead of 42 grains of Redder 17 and 43 grains of H-4831 were tried. These loads were just over .5 inch as well. Then, just in time for inclusion here, some Lapua 90-grain Senar bullets arrived; four, five-shot groups averaged .301 inch with these.

Now I see the dual-chambered barrel from a broader perspective. Converting such an unusual plan to successful reality clearly speaks for itself. A bullet of proper stability would not be disturbed in its final exit through the terminal chamber neck serving as a crown, nor its exit through the open chamber. The major outcome of this experiment hinged on these very premises.