SUMMARY TABLE: Slow-Burning Powders

		60,000 psi (49,100 cup)			65,000 psi (52,700 cup)			
Powder	Density	Burn Time	Velocity		Burn Time	Velocity	Charge	Volume
Hodgdon H-4831	16.0 gr/ml	546 ms	2,920 fps	62.5 gr	516 ms	2,990 fps	64.1 gr	4.0 ml
DuPont IMR-4831	15.9 gr/ml	555 ms	2,970 fps	62.6 gr	525 ms	3,040 fps	64.6 gr	4.1 ml
Hodgdon H-450	15.7 gr/ml	553 ms	2,960 fps	67.4 gr	526 ms	3,050 fps	67.4 gr	4.3 ml
Reloader 25	15.7 gr/ml	549 ms	2,940 fps	67.0 gr	527 ms	3,060 fps	70.0 gr	4.5 ml
Hodgdon H-1000	16.0 gr/ml	565 ms	3,020 fps	71.4 gr	537 ms	3,110 fps	73.8 gr	4.1 ml
Norma MRP	16.4 gr/ml	565 ms	3,020 fps	66.7 gr	537 ms	3,110 fps	68.8 gr	4.2 ml
Reloader 22	15.7 gr/ml	574 ms	3,070 fps	67.6 gr	545 ms	3,160 fps	69.7 gr	4.5 ml
DuPont IMR-7828	16.0 gr/ml	578 ms	3,090 fps	68.5 gr	547 ms	3,170 fps	70.3 gr	4.4 ml
AAC-8700	16.9 gr/ml	622 ms	3,050 fps	87.0 gr*				

*87 grains was a compressed load that occupied 5.2 ml, and produced a pressure of only 55,000 psi.
gr=grains of powder. ml=mililiters of volume. fps=feet per second. ms=microseconds. psi=pounds per square inch. cup=copper units of pressure.

quantitative data, just listed in sequence in a table. That doesn't give us any idea of the velocities expected while the "effective burning time" is directly proportional to velocity.

We have found that more powder, by weight, doesn't always mean that the powder burns slower. Some powders further up on the scale (faster) have given us more velocity at a lower peak pressure than the so-calculated slower powders. We also need to know the relative values, how much slower or faster a powder burns. For these reasons, we have developed our own scale of powder burning speed. We rated these powders solely on their burning time. They are listed in the summary table from fastest to slowest. We didn't report the cost of any of these powders because it's too small, on a per round basis, to consider.

Another problem with some rifle powders is their bulk. With such powders, there isn't enough room in the case to get enough powder in to produce the desired pressure. The specific density is too low. With others powders, the case isn't filled full enough. We didn't take this parameter into consideration in our rating, but we did list it in the summary table.

The specific density of the powders is provided in the summary table to help determine your loading density, or how full of powder your case is. First, determine the volume of your case with the bullet seated to its proper depth. An easy way to do this is to seat a bullet in a resized, unprimed case and fill the case with a measured amount of water. Use a 10 or 12 ml syringe to inject the water through the flash hole and measure the water required with the milliliter scale on the side of the syringe. (Buy your syringe at a veterinary supply shop rather than a drug store. It will be cheaper and won't have a Luer lock to get in the way.)

To find the loading density, first find the volume of your powder charge by multiplying the weight of the powder by its specific density. (See the summary table for the specific density.) Next divide the powder volume by the case volume. If your loading density is more than 1.00 (100 percent), you are compressing your charge. With AAC-8700, some compression may even be useful. But, if your loading density is less than 85 percent, you may have another problem. It's called Secondary Explosion Effect, and is due to too little slow burning powder in the case. It's caused by a sort of shock wave developing local high pressure zones in the case. That's why the loading manuals specify minimum loads of these powders.

The specific densities given in the summary table are with the powder settled as much as possible in the case. Using a funnel as a hopper will give you the least compaction. A two foot metal drop tube under your loading funnel will help compact the powder, a plastic tube won't help at all. Pouring the powder on the side of the funnel so the powder can swirl as it goes in will do almost as much good as a drop tube with much less fuss. You can settle it the rest of the way by holding the funnel on the case with one hand and rapping the case with your powder pan. If your powder load needs a little more volume to reach the 85 percent loading density, just don't settle it.

Compressing the powder a little as you seat a bullet won't hurt much. That crunching sound you hear with extruded powder is not, to any extent, powder granules being broken. Previous testing has shown that, for the most part, the powder granules are just being dented. While broken granules burn faster, and thus increase the burning speed, there aren't enough of them to make a practical difference. But too much compression can bulge the case just below the shoulder because most of the compression takes place in the first half-inch below the bullet. You may not be able to completely chamber a bulged case, and it will probably stick in the chamber if you do. Ball powders (H-450 and AAC-7800) don't have this problem. If you compress them slowly enough to allow the balls to realign themselves, the compression will be distributed uniformly throughout the case.

Seating the bullet at the cannelure may not always be a good idea. Allowing a little freebore, room for the bullet to advance before it hits the lands, helps a gun digest these slow burning powders. But, if