



Bob Jewett



More Spin, Less Speed

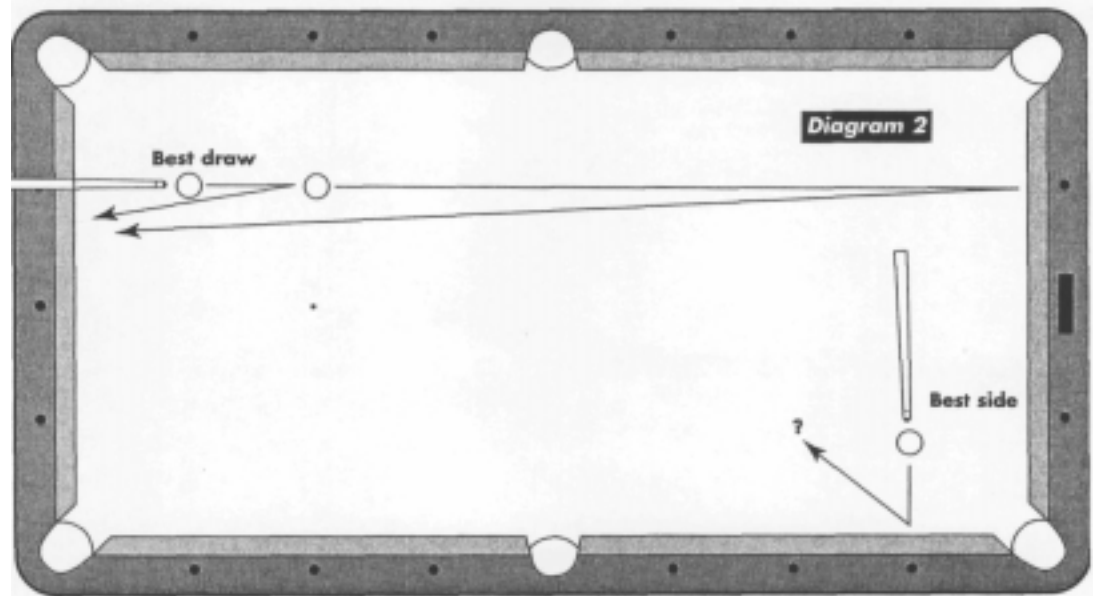
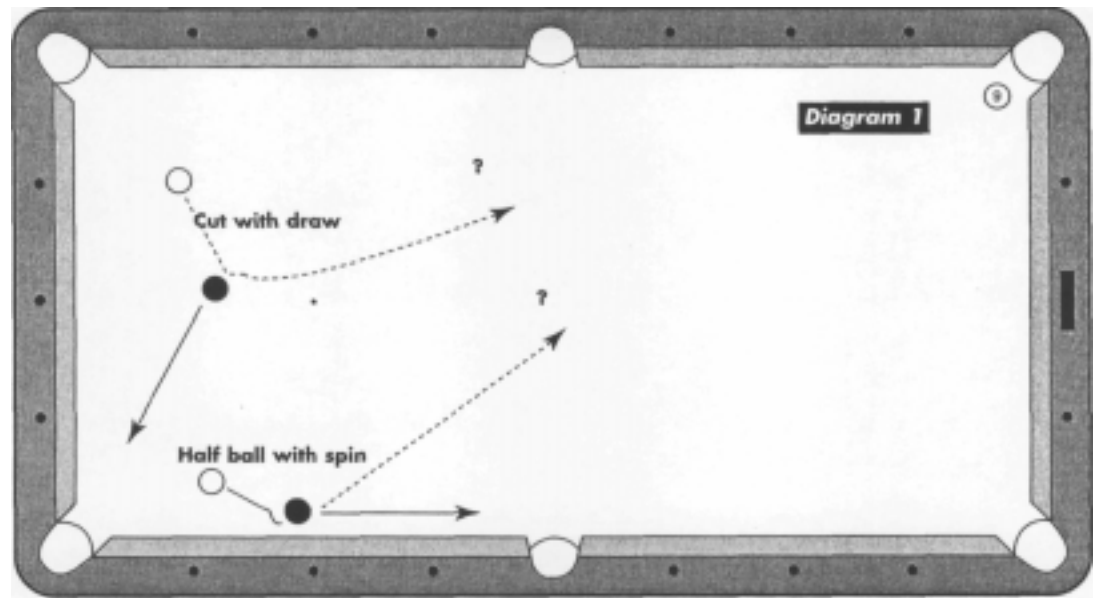
Know the ratio to get the cue ball to behave.

Do you ever find yourself wondering whether you can get the cue ball to take a certain path? Usually the question is whether you can get enough spin on the cue ball, or, more precisely, whether you can get a lot of spin for a given speed — i.e., can you achieve a high spin/speed ratio?

Two example shots are shown in Diagram 1. To provide motivation, the goal in each is to pocket an object ball and also pocket the 9 with the cue ball. The side-spin shot is about a half ball cut. Follow will help a little, but the angle off the rail is mostly determined by how much side spin you can get.

Just side-spin is not enough, though. Suppose you shot very hard and just a little off center. There will be a lot of RPMs on the cue ball, but the high speed into the rail will make the cue ball rebound relatively straight across the table. Instead, you need to move the tip as far to the side as possible without entering miscue territory. This increases the amount of side-spin relative to the forward speed, and when the ball strikes the rail, the spin has a chance to dominate. When you try the shot, use just enough speed to pocket the 9, and gradually make the cut harder until the cue ball will not take the right path even with maximum side.

In the draw shot, the goal is also to make the 9 with a carom. The problem with too much speed on the cue ball is obvious — the cue ball will not have time to draw back. What's needed again is a lot of spin (back-spin in this case) relative to the speed of the cue ball. This shot gets a nice hook on the cue ball that startles novice specta-



tors. When you practice this shot, gradually move the cue ball to a thinner cut while lowering your hit on the cue ball. Remember to shoot just hard enough to get to the 9.

In both these examples, speed hurts rather than helps. What you want is lots of spin but not much speed — a high spin/speed ratio. Hans de Jager, the former European champion of Artistic Billiards, refers to this

as the "quality" of the shot. What does it take to have a "quality" stroke? How can you measure this "quality"?

According to a simple physical analysis, "quality" is determined by how far from center you hit the cue ball. The more eccentric the hit, the more "lever arm" you have to turn the ball. This analysis also predicts that if you hit the ball 11.43 millimeters above center, the cue ball will start with

Bob Jewett

exactly enough follow to roll smoothly on the cloth. Let's call this a spin/speed ratio of 1. Is it possible to get more "quality" than this in a shot?

In *Advanced Technique in Pool and Billiards* (page 42), Robert Byrne describes an experiment to test this for follow. It compares a "best" follow shot with a smoothly rolling cue ball to see whether "overspin" can be put on the cue ball. You should try the experiment for yourself, but the answer seems to be, you can't exceed smooth rolling by much.

In my last column I briefly mentioned a series of pool experiments done with high-speed video. The experimenters included Mike Shamos, Jim Buss, Hans de Jager, Walt Harris and me. We refer to the week of tests as the "Jacksonville Project" since that was where they took place. There were several surprises and some interesting measurements, including some related to the spin/speed ratio.

In a side-spin experiment, 19mm of tip offset was used. (This means that the shaft was 19mm away from where it would be for a center-ball hit.) With left-side spin, the camera was focused on the right side of the cue ball. The surprising result was that the side of the ball actually moved backwards at the start of the shot. This means

that the spin/speed ratio was greater than one. But by how much?

It turns out that if you look at the point on the cue ball that starts nearest the camera — the eastern-most point as the shooter would see it — and note how far it moves backwards before the forward motion on the cue ball takes over, you can immediately — after a little geometry — determine the ratio. The backwards movement is about 1.7mm, which gives a spin/speed ratio of about 1.2.

Does this result agree with the simple physical theory that says spin/speed is directly proportional to tip offset? If you multiply the 11.43mm mentioned earlier by 1.2, this gives an estimated contact point of the tip from the center of the ball of 13.7mm. This should be compared with the 19mm shaft offset. The apparent discrepancy is due to the fact that it is not the center of the tip that hits the cue ball on spin shots but rather the shoulder, which is about 5mm closer to the center of the cue ball. Thus the measurement agrees with the theory within the accuracy of the data.

In another scene on the tape of a soft by extreme draw shot, the distance the cue ball moved while it rotated backwards 90 degrees was measured, and the spin/speed ratio was again found to be about 1.2.

You may want to test your own stroke without renting \$40,000 worth of video equipment. Two reasonable ways to compare tips, sticks and strokes are shown in **Diagram 2**. In the "Best Side" shot, shoot on the equator and straight into the rail and notice where the cue ball lands on the other side rail. Try different techniques and see what it takes to maximize the angle off the rail. Try to use a consistent speed in any comparison.

In the "Best Draw" shot, the idea is to see how little speed you can get on the object ball and still draw the cue ball back to touch the end rail. On most tables, it's possible to get the cue ball to the rail without the object ball touching that same rail. This is a great shot to know at one-pocket.

Another version of this test is to move the object ball to be even with the side pockets and to see how far it moves when the cue ball draws back four diamonds to just touch the end rail. Try it as a challenge shot. Who has the best draw?

Of course you should try to minimize your use of spin — it can lead to misses and miscues — but when you need a "quality" shot, be ready.

Bob Jewett is an advanced level BCA instructor with the San Francisco Billiard Academy — one of seven BCA master academies.