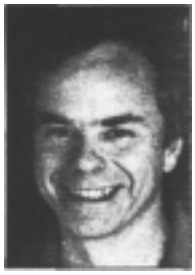
TECH TALK

Hidden Hangers

by BOB JEWETT



SOME SHOTS ARE much easier than they first appear, *if* you can recognize how a particular principle of physics can be applied. The examples below each demonstrate some physical principle that you can use to help you approach perfection, or at least help you win some games you would have lost, if you learn how to recognize them.

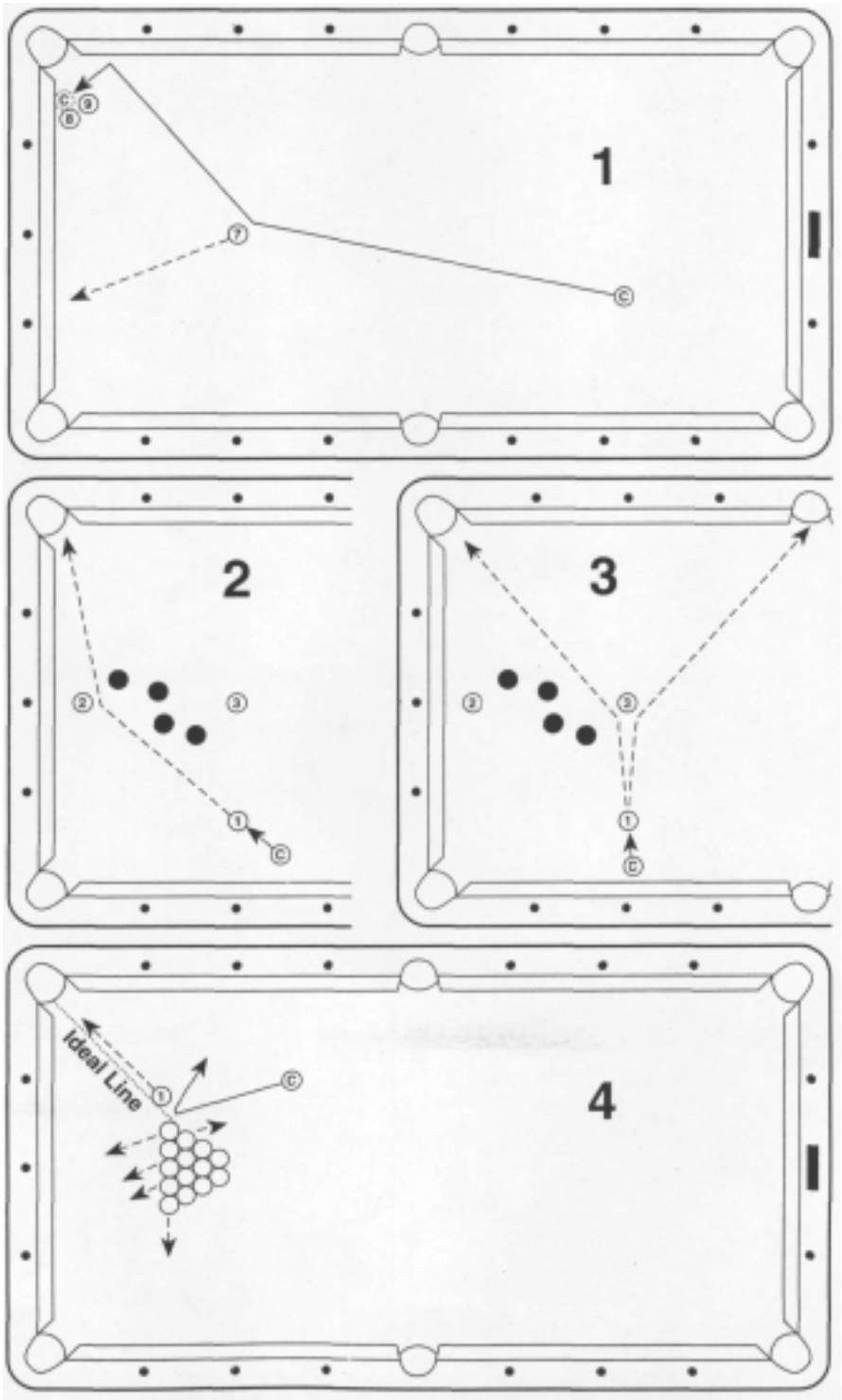
Diagram 1 is a position from 9-ball, with only grandstand shots available to pocket the 7. Freeze the cue ball behind the 8 and 9 for a safety, and the game is yours, but it looks like the needed control is improbable. In fact, the shot is easy if you hit half the 7 on the right side, half full.

The "half-ball" shot is the single most important shot to understand for position and safety play. It's defined as a shot in which the cue ball is rolling smoothly on the cloth when it hits the object ball half full. The resulting cut angle is 30 degrees. The important thing to remember is the angle the cue ball is deflected is nearly constant for a wide range of cut angles. This is a useful tool for cue-ball control.

In Diagram 1, the half-ball principle will take care of the angles after the 7 is hit, so you should concentrate on the speed. An additional aid from physics on this shot is that the cue ball looses energy rapidly when it hits the rails, so the two rail hits in the corner "kill" the ball right behind the 8.

Suppose that the cue ball starts only two inches from the head spot instead of a diamond. Now the shot is guaranteed to scratch unless you get just the right amount of stun to widen the angle, and that's tough at long range. The half-ball angle can be changed a little with side. Try outside English (in this case right English) to see if you can widen the angle when the cue ball rolls away from the 7.

The half-ball angle can also be used for some amazing offensive plays. The shots in Diagrams 2 and 3 are to make the 1 ball from the two cue-ball positions. In Diagram 2, if the 1 hits the right side of the 2 ball, it easily goes in the corner pocket. Be careful to play the shot just a little faster than you may think necessary to get the 1 to the pocket. Be careful; if the 1 ball is slid-



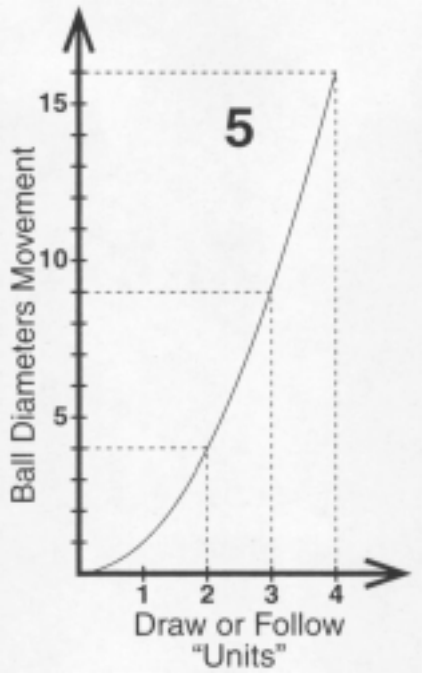
ing, rather than rolling, when it hits the 2, it will take a wider, unpredictable angle.

For Diagram 3, the 1 goes in off either side of the spotted 3 ball. On this shot, it's a little harder to get the ball rolling smoothly before the collision, so favor a somewhat thinner hit than half-ball on the 1-3 hit. Shots like this come up frequently on crowded straight-pool, one-pocket and 8-ball tables. Learn the angles by heart.

To really get a feel for half-ball shots, try English billiards, a three-ball game played on a snooker table. Half-ball shots are an integral part of making caroms, which is one of the ways to score in that game.

Diagram 4 is an all-too-familiar scene from straight pool. It's not a bad break shot, except for the very thin cut angle. A much easier shot is the short carom, playing the cue ball off the corner ball to the one.

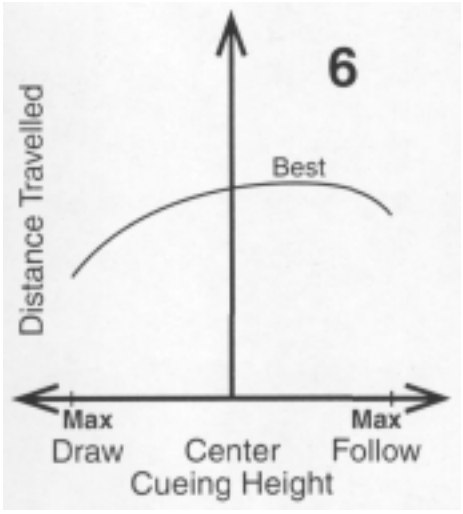
What makes this shot easy is that the cue ball travels a very short distance on the carom. In fact, if the distance is less than a ball's width, the carom is easier than a straight — in shot of the same length. Before you try this, check the "ideal line," which touches the edges of the two object balls. If that goes to the pocket, the shot has promise. The "feel" of the shot is like scratching off the first ball with a stop shot.



This shot needs practice, both to get the aiming down for shots that aren't sitting so perfectly, and to learn how side spin can fix the angle if it's a little off. Get something to set the balls in the same place each time, so you can repeat a shot exactly. I like self-adhesive paper reinforcements used to protect the punch holes in binder paper. A warning about playing the cue ball off a middle ball in the rack: if the rack is tight, the cue ball will carom at a wider angle unless the hit on the first ball is thin.

Everyone likes to shoot stop-shot position; there are few things more satisfying than smacking the object ball full in the face and stopping the cue ball absolutely dead. It turns out that the shot is easier than it looks, and is far easier than getting the cue ball to drift forward or back a diamond. The "trick" to stop shots is to collide when there is no draw or follow on the cue ball. The problem is that you need to start with some draw for the cloth to rub off on the way to the object, ball, and you may arrive with a little spin, one way or the other.

In Figure 5, a perfect shot is shown by zero ball movement for zero units of draw or follow on the cue ball at the instant of contact. If one "unit" of follow is on the cue ball, it will roll forward a ball diameter, and exactly replace the object ball. (How many



RPMs are in a "unit" depends on details we won't discuss.) Thus, an error of one unit **of** spin when trying a stop shot means the cue ball will be off by only 2.25 inches.

In comparison, suppose you want to pull the cue ball back 20 inches or nine ball diameters. This takes three units of draw. If you are off by one, the cue ball is either five balls short of position or seven balls past.

How is this useful in play? It means that precise stop shots are easy to learn and play, but moving the cue ball exactly a diamond will be much harder and frustrating. The result also applies to stun shots — stop shots at an angle — which are easier to control than "half follow" or "half draw" shots.

A final physics gem is in Figure 6. It answers the question "At what height should a shot be cued for maximum accuracy of travel distance?" The lag shot to see who breaks is a simple example. The curve supposes that the cue speed is constant, but the bridge height varies (perhaps randomly) giving varying amounts of draw or follow. While any height can get the job done — for draw, just shoot twice as hard as for center ball — the point with least effort is about half way between center ball and a miscue.

Notice that if you're a little away from that best tip height, there is very little change in distance travelled, while if you start farther away, you must be more and more accurate on the height to achieve the same distance accuracy. What might cause you to hit at the wrong height? Does your elbow drop?

When you see one of the shots above, get Newton on your side and shoot it the easy way.

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