



# Tricky Business

Underneath their flashy exterior, trick shots offer useful principals.

**Do you collect** trick shots? You may have some hidden treasures if you look below the flashy surface. Within many good trick shots are useful ideas struggling to get out.

Shown in **Diagram 1** is a classic shot that has been in print for at least 50 years. Two object balls are frozen on the long cushion near the side pocket. They are aimed straight across the table. A third ball waits in the jaws of the opposite corner.

To play the shot, place the cue ball as shown and shoot with left follow, hitting about half of the outside ball. The cue ball completes a three-cushion circuit on its way to the hanger. In the mean time, the ball the cue ball struck goes into the corner, while the ball on the cushion banks cross-side.

What's wrong with this picture? The shot is not as simple as it may seem at first.

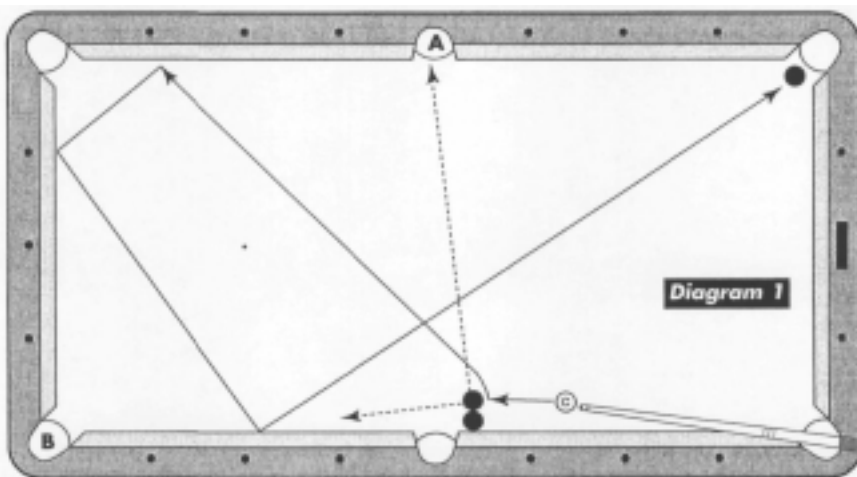
First, the ball that goes in pocket B has violated the standard rule of kissing balls: it should travel along the kiss line, that is to say perpendicular to the line of centers of the balls. Since the two balls are lined up straight across the table, the ball should go straight up the table and land one ball to the right of pocket B. If you hit the shot about as shown, the ball goes into the heart of the pocket. What's up?

The explanation is that the kiss line doesn't exactly apply when the cue ball hits two balls that are touching. The combination of all three balls being together at once causes the ball in the middle to be shoved slightly ahead of the line expected by the simple theory. In **Diagram 2** are the details of the shot.

The shot is shown at the instant the cue ball arrives. There are three lines. The first is the kiss line, or the commonly expected path of the middle ball. The line of centers shows the path the middle ball would have followed if the other ball hadn't been behind it. The final line shows the actual path of the middle ball. It is close to the kiss

line, but the path is about one-tenth of the way from the kiss line to the line of centers. (The ratio of the distances shown is therefore 1 to 9.)

In order to calculate how to hit the middle ball to get it to move over a ball from the kiss line on its way to the pocket, it's useful to remember that a diamond is about five ball diameters, or ten ball diameters is two diamonds. If you shoot the middle ball to a point about two diamonds to the left of the corner pocket — that would be out in the air on an imaginary extension of the end rail — the ball will go towards the corner



pocket. If you miss the aim a little, and shoot the ball towards a point three diamonds to the left, the resulting error will be only half a ball at the pocket, and the ball will still probably drop.

This 10-to-one relationship of the paths was discussed here more fully in February 1996, when it was called the "ten-times -fuller" system. You may not have realized then that you had already seen it applied in nearly every trick-shot exhibition.

To test the theory, try separating the two object balls by a tiny gap. The prediction is that the ten-times-fuller system will not work, as it depends on the object balls touching.

Another puzzle is, what makes the ball on the rail go into pocket A? You might say off-hand that the English on the cue ball throws it in, but the cue ball has left side-spin to carry it around the table to the hanger, and if you work through the balls like gears, that should translate to left side-spin

on the cushion ball as well. This would throw the ball in the wrong direction.

In this case, the answer is that the motion of the outside ball is what throws the other object ball and puts the necessary right side-spin on it. In studying any throw or transferred English situation, the important thing to note is how the surfaces of the two balls will rub. While the outside ball may have some small amount of right side-spin, it certainly has a lot of motion up the table, and that motion will dominate the rubbing. Imagine how much right side-spin the ball would have to have for the surface at the

point of contact to be moving backwards.

Now we have explanations for the first object ball going towards pocket B and the second object ball throwing forward to pocket A. Both of these effects will tend to make the kiss more likely. Why don't these balls kiss? The reason here is the softness of the cushion. If the

cushion was very hard, the banking ball would return immediately, and the middle ball wouldn't have time to escape up the table. What happens instead is that the ball sinks into the cushion — perhaps a quarter-inch on this shot — which takes time and allows the other ball to move out of the way.

The last part of the shot worth study is how consistently the hanger can be made by taking the cue ball three cushions. As long as you have a reasonable amount of left spin and hit about the right place on the first cushion, the shot seems automatic. Try varying the shot parameters to find the shot's "sweet spot," which is probably a moderate amount of follow and side and about a half-ball hit on the object ball.

Also, try playing the shot with extreme side and a fuller hit on the first ball. The idea is to have lots of spin for the third rail so it really picks up speed and sets the eye-balls chattering. You may have to take off

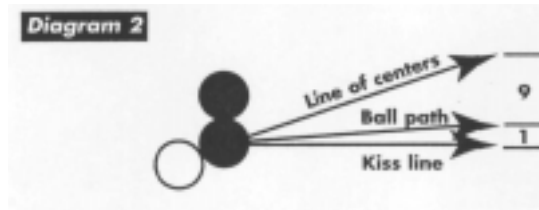
some of the follow to get this shot to work best.

A very important idea is involved in the path of the cue ball. If you play about a half-ball hit with follow, the cue ball's trajectory is nearly independent of how full the contact is. Start with the path for a half-ball hit with normal follow. If you hit the object ball a little fuller, the initial carom angle of the cue ball will be straighter across the table, but the speed will not be as great, and the follow will be more effective at taking the cue ball forward. The result will be a final path for the cue ball that is nearly the same as before. Now consider hitting the shot a little thinner than half-ball. The cue ball have an initial path more forward, but will not give up as much speed to the object ball. That means that the follow will be less effective in taking the cue ball forward. Again, the result is a final path nearly the same as in the initial shot.

Why is a half-ball hit the angle that gives this nearly perfect repeatability of follow carom angle? The details are in the physics, and too complicated to go into here. A few results that are useful in play: Some cue balls have heavy centers. They will tend to

follow less well than a uniformly constructed ball, and the final angle will be a little wider. Also, the best fullness to aim at will be a little fuller than for an ideal ball. On new cloth, the angle taken will be the same, but the cue ball will slide to the side more before it finishes its curve.

Here is a modification to the shot that



relies on the very predictable path of the cue ball. Set up the shot, but be very careful to place the cue ball exactly one ball diameter off the cushion and exactly one diamond from the side pocket. Make sure the frozen object balls are in the same place each time you try the shot by tapping them into place. Now, shoot the shot and notice exactly where the cue ball lands on the first cushion. Move the hanger just in front of that point. It will now be made in the upper right corner pocket. This version is tougher,

and will impress the more knowledgeable members of the audience. Practice it on the table before trying to show off so that you will know the best place to put the third object ball.

Of course there are many "trick" shots that depend on something outside normal play. They are of limited practical use, but they can be amusing. For example, place a bridge across the table and claim you can roll the 10 ball under the bridge without touching it. Pocket the 10 in a head pocket, and it will roll under the bridge via the ball return. If there is no ball return, roll the ball on the floor. If you try to place bets on such shots, take out thumb insurance.

Several collections of trick shots — useful and otherwise — are readily available in print. Mosconi's "Winning Pocket Billiards" was my first exposure as a raw beginner. It has a few shots at the end, and I practiced each one until I felt fairly sure of making it. For a monthly dose of fancy shots, check out Willie Jopling's column in this magazine.

Whenever you watch trick shots in an exhibition or see some in print, keep an eye out for the useful principles hidden within them. Your game will be the better for it.