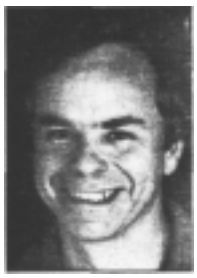
Two Interference Systems

by BOB JEWETT



HAVE YOU EVER found yourself in a situation like Figure 1? The cue ball is frozen to the 1, with a ball near a pocket. If you shoot the cue ball partly into the 1, and in the general direction of the 2 ball, the cue ball will go above the kiss line (KL), but where? The "two-times fuller" system gives the answer.

The situation in the first diagram is set up to make the needed arithmetic very easy. First look at the center line of the cue ball and the 1 ball, marked CL. This is the headstring in the diagram. Next, consider the line from the target (the 2 ball), perpendicular to that first line. In the diagram, that's the nose of the cushion the 3 ball is on. Divide that line in half and shoot at the midpoint; the 3 ball is conveniently placed as the target. In other words, shoot into the 1 ball twice as full as the line you want the cue ball to take, or twice as full as if the 1 ball wasn't there, hence the name "two-times fuller" system.

Some details: Shoot through the center of the cue ball with no draw, follow, English, or elevation, at least at first. The cue ball must be touching the 1 ball both for the shot to work properly and for it to be legal at pool. (This shot is not permitted at snooker or carom billiards.) You may find that a target slightly to the right of the 3 is needed, depending on how much the 1 ball throws.

Another way to aim this shot starting from the kiss line is used to hit the 9 ball. The kiss line (KL) is where the cue ball goes if shot tangent to the one ball. It is the familiar "right angle" line that is the start of all position play. In the diagram, it is the "long string" through the foot and head spots.

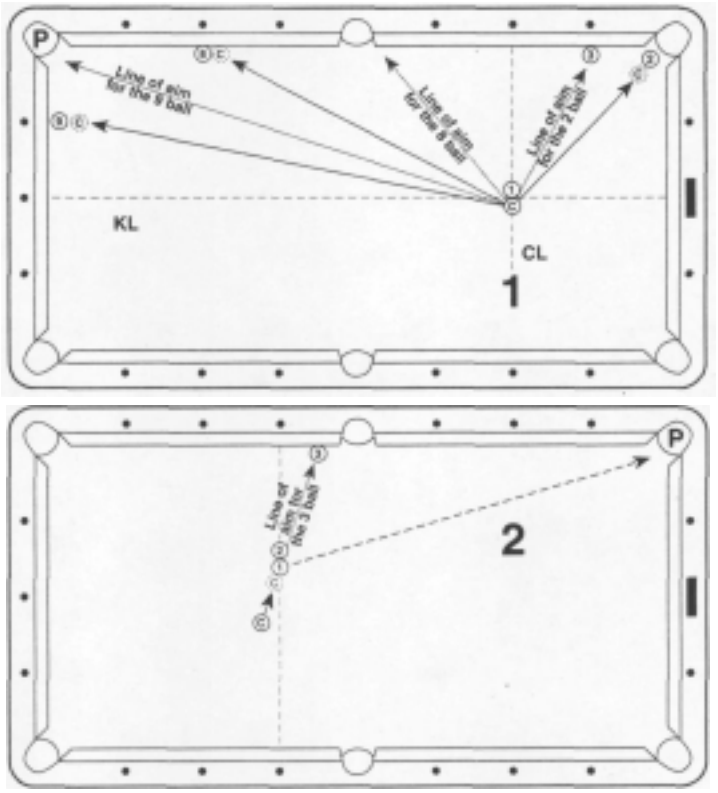
To make the cue ball hit the 9, shoot towards pocket P. That is just twice the distance from the kiss line as the 9 ball.

More details: The two lines used must be at right angles to each other, and the balls rarely end up in a configuration so geometrically perfect as Figure 1, where the rails can be used as the distance-measuring line. Practice making a right angle with your stick, and check it with a notebook paper or other square object.

This system is not perfectly accurate. Errors in measurement, throw, English, mismatched balls, and even hardness of the tip will each have a significant effect. With practice it is possible to make shots as tough as the 8 ball into pocket P. For this shot, the target will be somewhere in the side pocket near the edge of the pocket liner. With careful setup and execution, the shot is about 50% successful.

Proposition aficionados take note: any error either in placement of the cue ball-1 ball line-up or aiming is doubled in the cue ball line towards the 8.

A second interference system is useful when two object balls are frozen together like the one and two in Figure 2. I call this the "10 times fuller" system, and the geometry is nearly the same as the system above. If the goal is to make the 1 ball in pocket P, it must be shot 10 times as full into the obstructing ball than for a direct shot. In the diagram, a miracle has aligned the 1 and 2 balls kissing directly at a point five diamonds from the target pocket (P) with the 3 ball half a diamond — exactly one tenth the distance — towards the pocket. If you shoot the 1 ball towards the three and it goes toward pocket P.



Sometimes it goes into the pocket. Like the "two times" system, any slight error in aiming or shooting is multiplied in the final path of the 1 ball, in this case by 10 rather than two. In addition, all of the other minor factors have a much greater influence here. If you are using an old set of balls that has become mismatched with age, proceed with caution.

Contrary to popular belief, draw on the cue ball is not required for the shot to work. Draw will significantly change the angle and get more speed on the object ball, however. There are many situations at full-rack games where the ball striking the object ball is another object ball in a cluster, and then draw can't help.

As with any system, practice is required to make these two a solid part of your game. For the "two times" system, try it with more irregular angles and more difficult targets to see what accuracy you can achieve. Often theses system can be used for safety rather than pocketing a ball, especially when there is a cluster of balls to hide behind. When practicing the "10 times" system, pay attention to which balls are used — especially if the set is old — and whether the balls are clean.

Bob Jewett (E-mail at jewetl@netcom.com) is a former ACU-l billiards champion and currently trains BCA Certified Instructors in San Francisco.

Bad Equipment

by BOB JEWETT

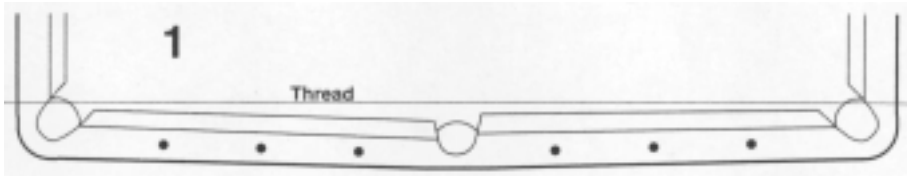
HAVE YOU EVER suspected that the equipment was conspiring against you? It sounds like a cop-out, but maybe you were right. Here is a rogues' gallery of inanimate enemies you may find on and near the table. Forewarned is forearmed.

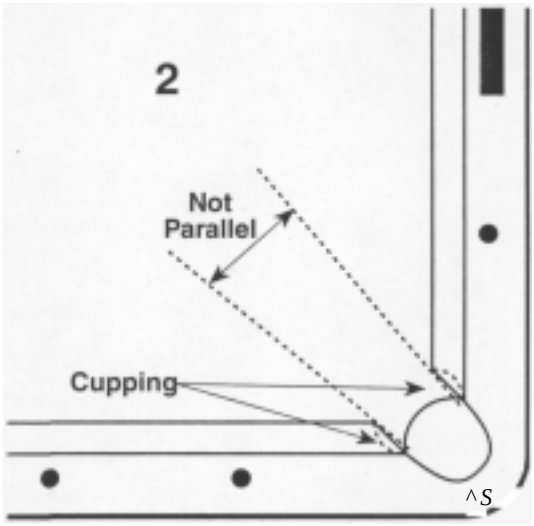
Defects in the rails can make some apparently easy shots impossible. A common problem is rail misalignment, which can be checked roughly by sighting along the noses of the cushions. For more precision, stretch a thread just in front of the nose of the rail as shown in Figure 1. (The error has been exaggerated to demonstrate. This figure is based on a table I play on frequently, and only recently checked carefully.) The pair of cushions is badly tilted. If a ball is frozen to the left cushion, it is almost impossible to make it in the right corner pocket since it is bound to hit the protruding corner of the side pocket. Playing a frozen ball from right to left along the rail has no such obstacle.

Since it's impossible to set up a table without any error at all, we need to know how much misalignment is too much. A simple test is to place three balls frozen together on one side of the side pocket and see if the combination gets past the side unscathed. Be sure to try the shot in both directions and at various speeds; the slowest is most likely to have problems.

The cushion rubber may have come unglued or the rail bolts may be loose. These will result in a "thud" or "clunk" when a ball hits the rail at speed. There may also be a delayed "thud" if the nose of the cushion is so low that it makes the ball hop.

One of the first rail deficiencies I learned about the hard way is the rail groove — the gutter in the cloth formed where the ball is forced down under the nose of the cushion. It is more pronounced on thick, nappy cloth than on thinner, napless cloth. Not only does the groove work to freeze up any ball that comes too close, it will suck in any ball rolling down the rail just off the nose. This can be beneficial, providing object balls a trail that leads them straight into the corner pocket, unless the extra friction from the nose stops the ball before the pocket. For the cue ball, this unexpected deflection can ruin the aim.





Everyone has played on a table that wasn't quite **level. This** can usually be fixed with shims under the legs, but this must be done uniformly to avoid twisting the table. A good level gets you close, but the final test is whether balls roll straight. Faster cloth magnifies any slope; conversely, covering with burlap will hide tilt.

Several things can go wrong with the slate. It can be "hump-backed" or "sway-backed" such that balls roll towards or away, respectively, from both side rails. Slate is formed from layers of mud and sometimes in a defective piece the layers **will** start to come apart, or de-laminate, perhaps aggravated by very dry conditions.

The two joints between the three pieces of slate can be misaligned, often resulting in strange rolls when a ball is rolling right along a joint (about two-and-a-half diamonds from each end rail). Usually a line will appear on the cloth where the balls bump against the raised joint.

If the plaster between the joints is broken, it can work its way under the cloth and produce amazing hops and rolls. Beeswax as a joint filler avoids this problem. Some very expensive tables are machined so accurately that their joints are left bare.

Pockets are ready targets for player hatred. My own pet peeve is the angle between the facings in the corner pockets which tends to reject near-perfect but fast shots. This problem gets worse when worn facings get "cupped" as in Figure 2.

When the ball hits the bottom of the pocket, the fun is just starting. The ball returns in the 1977 World 14.1 Championships were "spring loaded" with the ball-return guide wires extending right under the pocket opening. More than one perfect break shot jumped back onto the table. "Drop pockets" also can have this feature, but lack any obvious mechanism. It helps to have a ball or two in the pockets to act as shock absorbers.

Defects in balls are many and varied. Many balls in play are the wrong size, having gradually worn out of tolerance. The cue ball gets smaller from wear the fastest. To compare balls, freeze three in a line on the rail — say, the cue ball between two stripes — and place something flat — triangle or cue — on top. If the all three balls are the same height, each should touch the object.

A more accurate measure is a go/no-go gauge, a sheet of metal with two round holes drilled in it. The holes should have the diameter of the largest and smallest diameters permitted for pool balls (2.255 and 2.245 inches). Each ball should drop

through the larger hole but not through the smaller, no matter which way the ball is turned. A go/no-go gauge is also a much better test than calipers, which just measure diameters.

At one tournament where I had such a gauge, a third of the brand-new balls were within tolerance, a third were too small, and a third were too large.

Another problem with balls is bulging eyes. The eye — the usually white circle where the number is — is made of a separate batch of plastic resin than the body of the ball, and frequently it noticeably sticks out of the surface of the ball. Where will such a ball go when hit near the eye? Hard to tell.

Some cue balls have a hidden problem. The may be perfectly round and the right size, but they are lopsided none the less. When I first started taking pool seriously, 1 had to have my own cue ball, just like the local pros had, and it had to be the brand that was unanimously considered the best. Practicing lags one day, I noticed that the ball would roll off first to the left, then to the right. The difference was a whole diamond of sideways travel. It turned out that the ball was heavy on one side and would roll towards where the weight happened to be. Years later I saw a cue ball of that brand broken open, and it had an off-center weighted core. Today you see the same problem with some metal-loaded cue balls for coin-operated tables.

There are two problems that manufacturers should have solved years ago. Some triangles refuse to keep the three apex balls together. Simple geometry, but it eludes some triangle makers. To get a tight rack, temporarily remove the head ball as in a 14.1 rack, and carefully replace it after removing the triangle.

More defective manufacturing is found in metal mechanical bridge heads where flashing — that thin, sharp edge made in casting or molding — is routinely left where it will put horrible gouges in your shaft. Although some of the modern plastic designs are better, some also have sharp edges. Some local pool halls have carefully glued felt to the bridge heads. Elsewhere, players spare their shafts and use house cues for all bridge shots instead.

Has your game ever suffered, or have you seen a remarkable shot missed because of equipment irregularities? Send it in, and it may be in a future installment of "Excuses for those who need them."

Bob Jewell (E-mail at jewett@nelcom.com) is a former ACU-I billiards champion and currently trains BCA Certified Instructors in San Francisco.

Chances Are...

What does it means to play the percentages?

by BOB JEWETT

BASEBALL FANS ARE fascinated by statistics; the neat columns of figures in the morning paper distill the essence of yesterday's games. Slumps, streaks and records are carefully noted. Why not at pool?

Ten years ago, Pat Fleming of Accu-stats published a monthly series of summaries of pro pool tournaments, including some inning-by-inning score sheets. Regrettably for those of us hooked on numbers, the pool world was not ready at that time for such detailed reports. They contained the life-blood of probability and statistics — real-life performance data.

The study of probabilities at pool is a difficult technical part of the game, but also one of the most interesting. A thorough treatment could easily fill a book; below are some highlights of how to put random events into a consistent framework.

A very common application of probability theory is to predict how often something will occur, for. example a run of ten racks of 9-ball, or a nuclear plant meltdown. Such things happen so rarely that it's hard to get a good handle on them. Usually statisticians will solve such a problem by making some assumptions, looking at history (like Fleming's data), and making a projection or extrapolation.

Let's make the following assumptions about the running a rack of 9-ball:

- Each rack is uninfluenced by previous racks, so it doesn't make any difference to the player if it's the first or tenth rack in a row.

(Reasonable for coin flips, but does it apply to people? That's why I'm calling it an 'assumption.') Further assume:

- That a player's skill doesn't vary much from day to day or table to table.

"Whoa! What about...?" you may be saying right now. I'll refine these assumptions later, but for now let's see where this leads.

Accu-stats has a specific category called "runout from the break." Top players like Earl Strickland keep their opponent seated from the break through the 9 ball about 25 percent of the time. To get the chance of two consecutive racks, just multiply that chance by itself to get one in sixteen.

$$\frac{1}{4} \times \frac{1}{4} = \frac{1}{16} = 6.25\%$$

For a third rack, multiply by a quarter again to get one chance in 64.

$$\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} = \frac{1}{64} = 1.563\%$$

For 10 racks, this works out to roughly one chance in a million.

$$\left(\frac{1}{4}\right)^{10} = \frac{1}{1{,}048{,}576}$$

Without more information, this is just a "best guess." For example, suppose we find out that a particular table is a little easier than average, and Earl runs out 31 percent of the time, instead of 25 percent. Maybe this is due to the 9 ball going in on the break 15 percent of the time rather than the more typical three percent. This apparently small improvement in single-rack percentages changes the 10-rack chance to roughly 1 in 100,000, a ten-fold improvement.

$$31\% = \frac{31}{100}$$

Running 10 racks:

$$\left(\frac{31}{100}\right)^{10} = \frac{1}{122{,}007}$$

In a race longer than 10 games, another factor comes in — it's possible to start the run of 10 after a miss in an early rack. It's mostly a matter of tedious bookkeeping to count up all the possible series of misses and runs that have a run of 10 in them. Using a statistical tool known as Markov's chain, it works out that in a race-to-15 match, the odds of running 10 racks improve to 1 in 22,000, and that's just for one player in one match.

In such a situation, the accuracy of the odds estimate is questionable because the conditions are so poorly known. When masses of good data are available, it's possible to estimate how close the observed averages are to the "ideal" long-term average. An everyday example of this is public opinion polls, where an estimated margin of error is often given. The more people you randomly poll, the closer the observed average will be to the national average, and the smaller your margin of error will be. A poll with a three percent-stated margin of error indicates about 1,000 people were polled.

For an example at billiards, let's look at Raymond Ceulemans' record-setting performance in the 1978 World Three-Cushion Championships.

- He scored 660 points in 393 innings.
- He made eight of 10 break shots.
- He had 145 "open innings," when he missed his first shot from his opponents' leaves.

With only 10 break shots, we might expect a normal variation from 6 of 10 to 10 of 10, for an 80 percent average. So there's a 20 percent uncertainty on this average.

$$\frac{6}{10}\ \pm\frac{2}{10}\quad \frac{8}{10}\ \pm\frac{2}{10}\quad \frac{10}{10}$$

60% ±20% **80%** ±20% 100%

Ceulemans' overall scoring accuracy was 63 percent with 660 points in 1042 shots. The margin of error is about three percent, so we can say his "innate" average* was between 60 and 66 percent. '

The runner-up in that tournament, Nobuaki Kobayashi, had a 55 percent scoring percentage, also with a three percent margin of error, so Ceulemans was clearly the best player in that tournament.

The arithmetic for calculating the "margin of error" for a percentage that's roughly 50-50 is to take one over the

square root of the number of shots or people polled.

$$1/\sqrt{1000} = 1/31.62 = 0.03162 = 3.162\%$$

There is about a 1 in 20 chance that the true value is more than the margin of error of the observed value. (1 won't explain all *that* arithmetic.)

In their head-to-head encounter in the final match of the tournament, Ceulemans made 72 percent of his shots, while Kobayashi slumped slightly to 52 percent. The match to 60 points was only 25 innings long, so a large fluctuation in percentages is not too surprising.

One other thing we can check from the score sheets is how well Ceulemans plays position. To do this, compare his scoring percentage from his own leaves versus the shots his opponents leave him. Having seen him play position and his opponents do their best to leave him nothing, I'd guess 75 percent and 50 percent for the two accuracy percentages. Here are the raw numbers so you can do the calculation yourself as homework: his own leave, 414 of 639; his opponent's leave, 238 of 383. Don't forget to calculate the margins of error, too.

(If you want your homework graded, send it to me c/o *Billiards Digest,* or via E-mail at *jewett@uelconi.com.)*

Where's the practical application of all this theory? That's why you've waded through all this math, isn't it? The main point you can use in your own play is that you shouldn't jump to conclusions from a small number of observations. Missing five shots in a row that are 50-50 for you does not constitute a slump. The odds of that happening are 1 in 32 — not that uncommon.

$$= (1/2)^5 = 1/32 = 3.125\%$$

Miss 15 straight and you may have a problem to work on. The odds of 15 in a row solely because bad luck is 1 in 32,768.

$$= (1/2)^{15} = 1/32{,}768$$

Check my two earlier columns on "progressive practice" for an efficient way to measure your pocketing accuracy.

Similarly, in an evenly matched race-to-five match, one of you will be on the short end of a 5-0 score about six percent of the time purely by chance. Do the math yourself and you'll see.

Relax, don't let the luck — good or bad — get to you, and look at each new game as a fresh beginning.

* "Innate" average should not be confused with what most three-cushion players call their "average." That average is determined by dividing points by innings. For example, Ceulemans' average at this event was 1.679.

$$= 660 \text{ points} \div 393 \text{ innings} = 1.679 \text{ Points/Inning}$$

Bob Jewett is a former ACU-I billiard champions and ***currently*** *trains BCA instructors in San Francisco.*

Create Your Own Drills

by BOB JEWETT

DO YOU HAVE the time and inclination for serious practice — but can't decide what you should work on? The suggestions below will help you develop drills to improve the particular shots that keep you from running racks. The method is explained for 9-ball, but can be applied to other games as well.

Let's assume you're an intermediate player with some chance to run out the table shown in Diagram 1, starting with ball in hand. Can you spot the major hurdles? There are no clusters, but three shots require good position play to get on the next ball. These problem shots can be converted into drills that will help you to focus on your weak areas and quickly improve your run-out percentages.

For our intermediate player. I'd guess the three main road blocks are the 2 to 3, 4 to 5, and 5 to 6 position plays. Precise speed is needed to get position on the 3 ball because of the 8 ball. Accurate speed will also be needed to get on the 5 because of the very long run from the 4 ball. Maneuvering from the 5 to the 6 will likely take some inside English — a perfect angle is too much to hope for — and reasonable speed control. The other shots are easy if these three are done well.

Now that we have the problem shots — and these may be different for your own level of play — let's create the corresponding drills. The first is shown in Diagram 2, where the goal is to get from the 2 ball to the marked position zone. It helps to have something on the table, so the goal is clear.

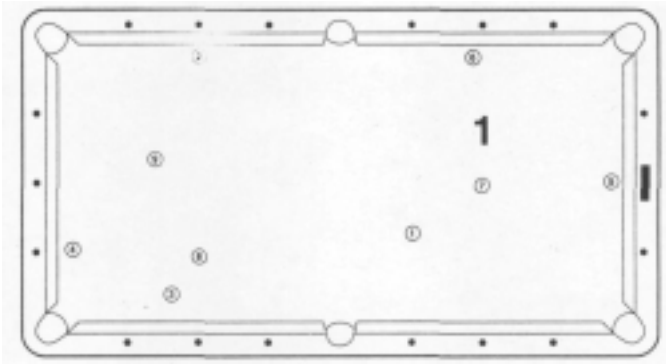
First, find the cue ball location that makes the position (and the shot, of course) easiest. Now, turn the drill into a progressive practice by shooting from a more difficult position (more angle) until you miss the shot or the zone. When you miss, go back to an easier shot. By the time you have this drill wrung out, the position needed from the very first shot of the rack should be clear, and may make you choose a different shot with ball in hand on the 1.

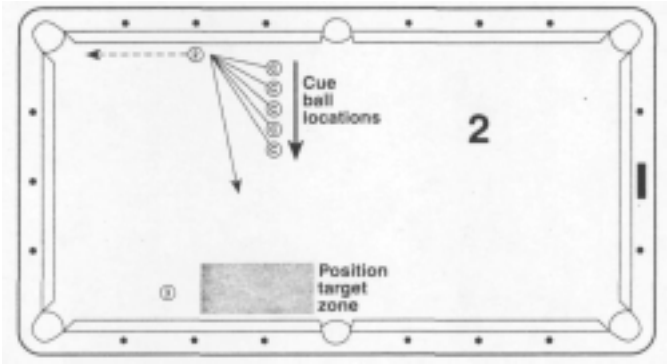
Diagram 3 shows the drill for the 4 to 5 transition. To make it a progressive drill, start with a close target zone, and work up to the full length. Where's the best place for the cue ball to start? I like a 45-degree, cut since a large fraction of the speed will stay on the cue ball. Again, this will suggest how to play the previous shot.

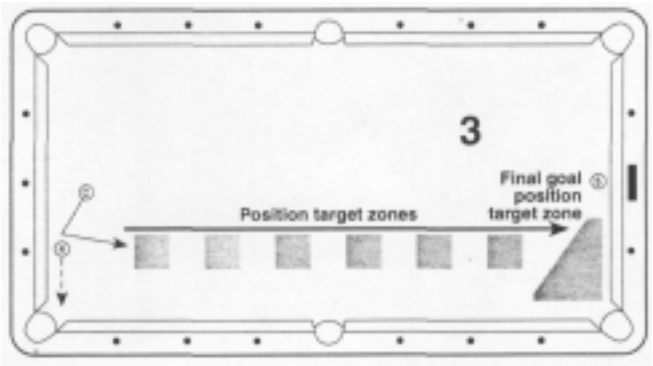
Diagram 4 will help you decide how small the final target zone in Diagram 3 should be. As the cue ball gets farther from the rail, can you still reach one of the shaded areas? At how steep an angle do you have to send the cue ball to the other end of the table and back? Note that in Diagram 1, the 7 and 9 may interfere with an end-to-end shot. Use this drill to perfect your soft inside English shot. In Diagram 4, the acceptable target zone on the "long side" (nearer the side pocket) is larger than on the "short side" (closer to the corner pocket), since the shot is much shorter.

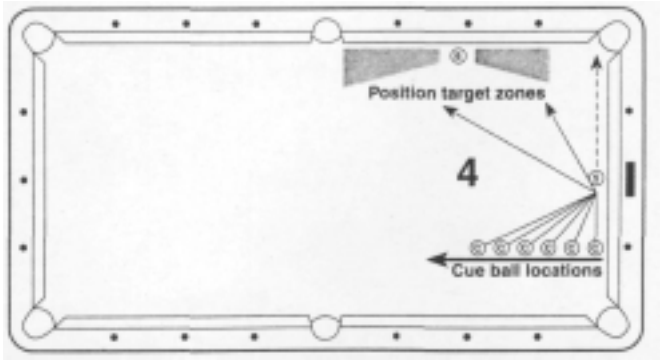
The drills above are just three examples of problem shots that you might need to work on. It's best to select problems to turn into drills from your own play; maybe you should pick a shot you often flub. Next, devise a way to make the practice progressive, so at the beginning it's easy, but becomes tougher. Two easy ways to do this are shown above: move the cue ball to a harder angle, or make the position harder to reach.

Bob Jewett is a former ACU-I billiard champions and trains BCA instructors.





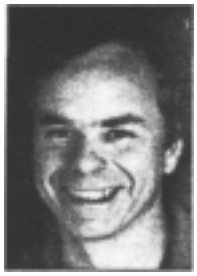




Mirror Systems

Mastering kicks and banks.

by BOB JEWETT



DON'T READ THIS column in the comfort of your easy chair; take it to a pool table. You will also need a bar stool and a small mirror. I'll wait while you get ready.

Ready? Good.

The mirror system is the first system to learn for kicks and banks. The fundamental idea behind it is that the angle of reflection of a ball coming off a rail is the same as the angle of incidence of a ball hitting a rail.

First, see how true your stroke is. The mirror system requires absolutely no side spin on the ball. Test yourself by placing the cue ball on the head spot and shooting softly straight into the side rail. Does the cue ball come back straight onto your tip?

Some hints for practice: shoot with follow; draw will amplify any accidental side spin. If you can get the cue ball back to the tip easily, make the shot longer until you can come straight back from a rail seven diamonds away. Vary your speed, slow to fast. This drill will force you to stay down while the ball rolls back to the tip.

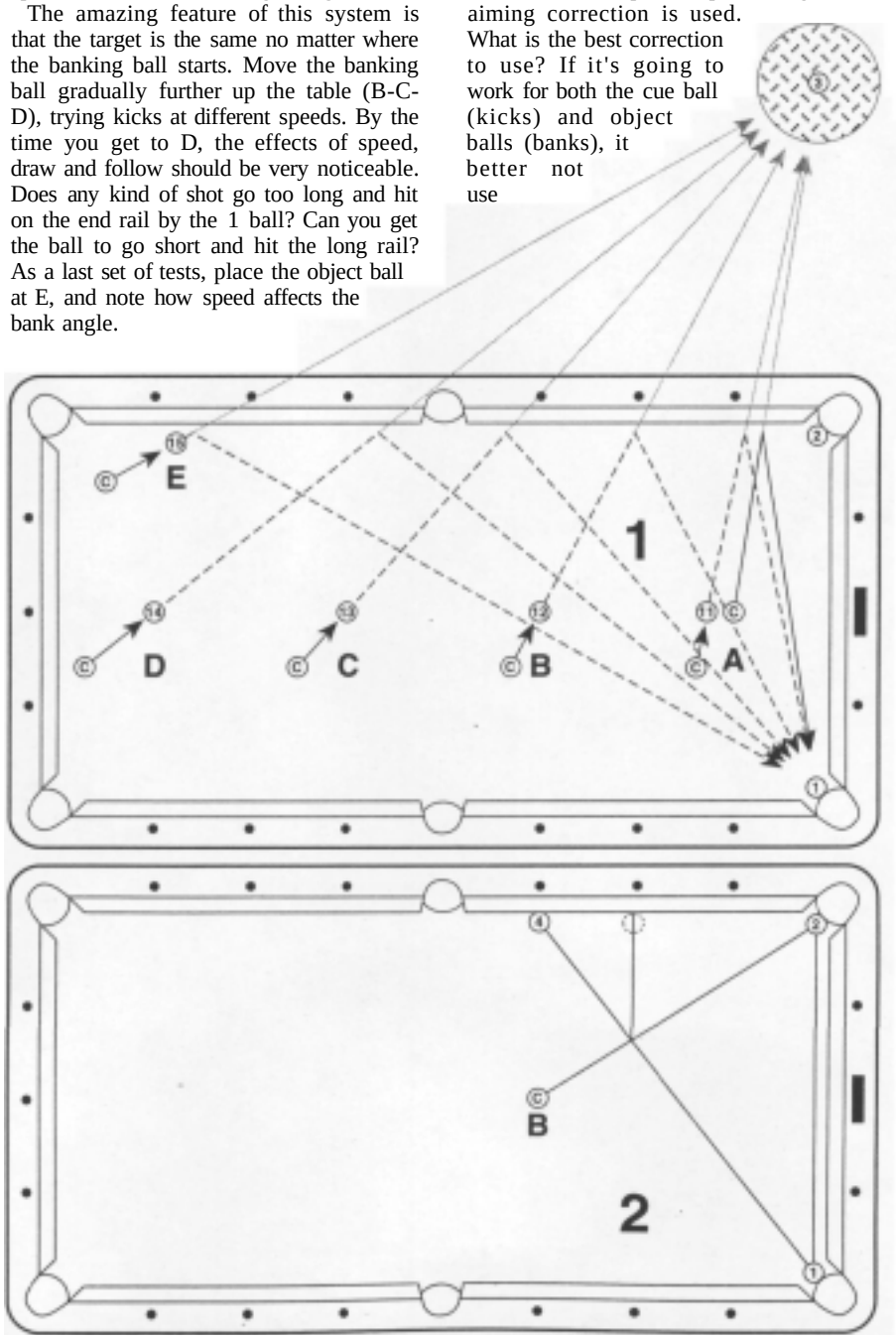
Now that your stroke is calibrated, you can test the system's accuracy. Place two balls on the brinks of two corner pockets as shown with the 1 and 2 balls in Diagram I. Place the bar stool about four feet away from the table, and place a ball — the "target ball" — on it. Now for the hard part: making sure the target ball is in the correct position within half an inch, with the target ball the same distance from the 2 as the 2 is from the 1, and all three balls in a straight line parallel to the end rail. Ideally, the target ball will be at the same height as the table balls.

Place the cue ball at about A and shoot it directly at the target ball with the intent to kick in the 1. Do you hit the 1 ball full? Can you aim to hit the target ball half full and hit the 1 on the corresponding side? Try shooting softly, then near full speed, but never with side spin.

Bank an object ball from A to the 1 by shooting it towards the target ball, using the cue ball for a normal bank shot. You may find that this shot is easier since there's less chance of unintended spin on the ball that hits the rail. Try different speeds and with left and right English.

The amazing feature of this system is that the target is the same no matter where the banking ball starts. Move the banking ball gradually further up the table (B-C-D), trying kicks at different speeds. By the time you get to D, the effects of speed, draw and follow should be very noticeable. Does any kind of shot go too long and hit on the end rail by the 1 ball? Can you get the ball to go short and hit the long rail? As a last set of tests, place the object ball at E, and note how speed affects the bank angle.

By now, it should be clear that this simple system won't come close on a lot of shots unless a special speed, English or aiming correction is used. What is the best correction to use? If it's going to work for both the cue ball (kicks) and object balls (banks), it better not use



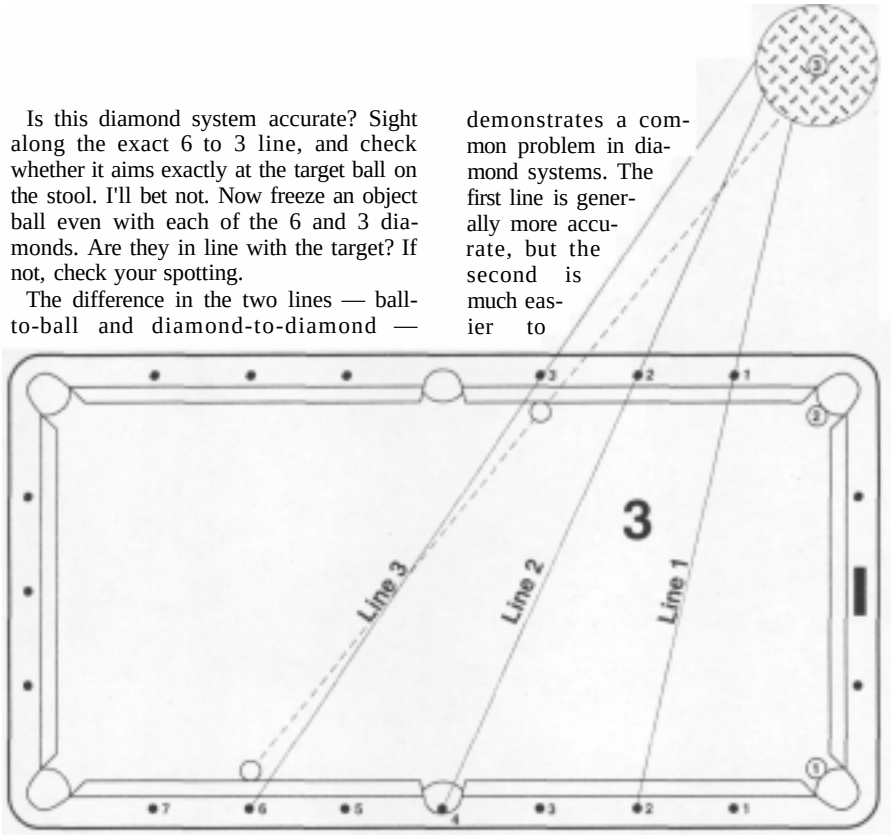
much side spin, draw or follow. Try to find a good speed.

Since your opponent is unlikely to let you park bar stools at convenient locations, you'll need another way of finding the aiming line. The system in Mosconi's *Winning Pocket Billiards* is illustrated in Diagram 2. To kick from B to the 1 ball, draw lines from the cue ball to the 2, the cue ball to the banking rail (4 ball) and the 1 ball to the 4. Where the two diagonal lines meet, draw another line to the banking rail. The spot on the banking rail is your target for the kick at the 1. Is it on the same line as the bar stool target ball, or does accuracy suffer due to the complexity of the construction?

"Matching the diamonds" is another common way to visualize the mirror angle. In this system, a ball shot along line 1 in Diagram 3, which goes from the second diamond on the "origin" rail to the first diamond on the "destination" rail, should go to the pocket. Similarly, line 2 joins diamonds 4 and 2, and line 3 joins diamonds 6 and 3, always in a two-to-one ratio. You have to use an "in-between" line, such as 3 to 1 1/2.

Is this diamond system accurate? Sight along the exact 6 to 3 line, and check whether it aims exactly at the target ball on the stool. I'll bet not. Now freeze an object ball even with each of the 6 and 3 diamonds. Are they in line with the target? If not, check your spotting.

The difference in the two lines — ball-to-ball and diamond-to-diamond — demonstrates a common problem in diamond systems. The first line is generally more accurate, but the second is much easier to

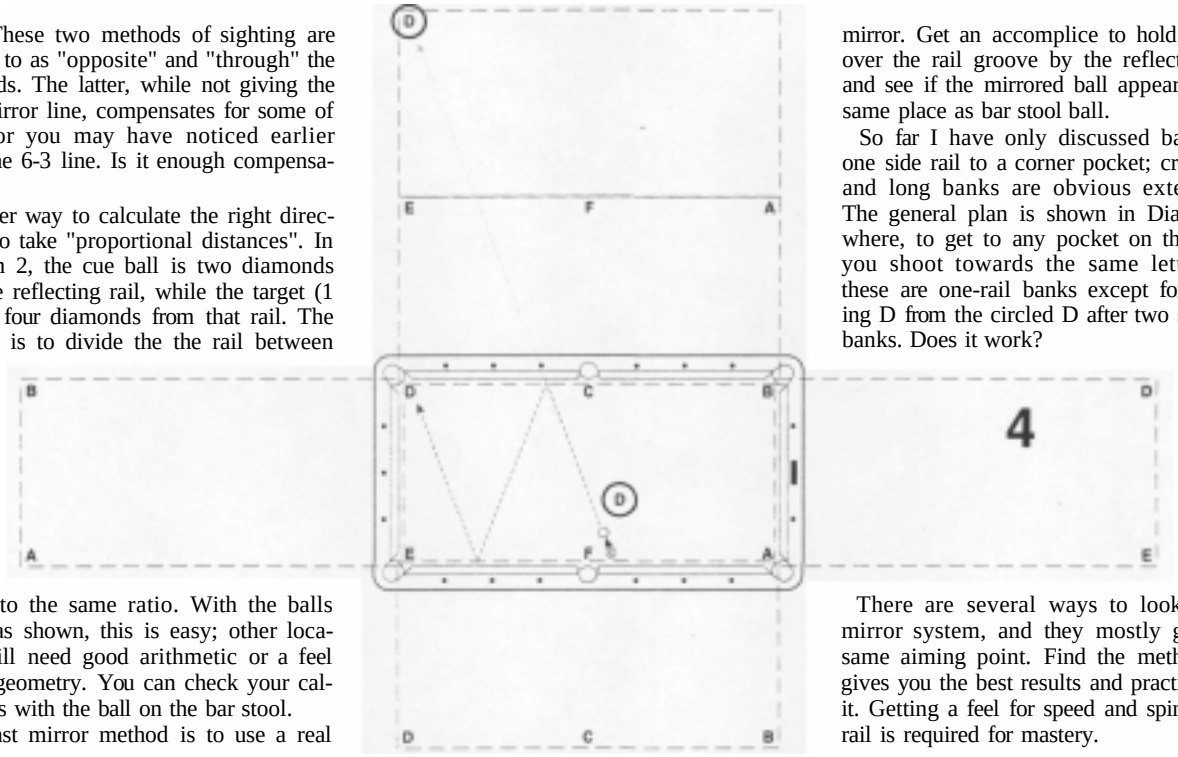


sight. These two methods of sighting are referred to as "opposite" and "through" the diamonds. The latter, while not giving the ideal mirror line, compensates for some of the error you may have noticed earlier along the 6-3 line. Is it enough compensation?

Another way to calculate the right direction is to take "proportional distances". In Diagram 2, the cue ball is two diamonds from the reflecting rail, while the target (1 ball) is four diamonds from that rail. The solution is to divide the the rail between them into the same ratio. With the balls placed as shown, this is easy; other locations will need good arithmetic or a feel for the geometry. You can check your calculations with the ball on the bar stool.

The last mirror method is to use a real mirror. Get an accomplice to hold it right over the rail groove by the reflecting rail and see if the mirrored ball appears in the same place as bar stool ball.

So far I have only discussed banks off one side rail to a corner pocket; cross-side and long banks are obvious extensions. The general plan is shown in Diagram 4, where, to get to any pocket on the table, you shoot towards the same letter. All these are one-rail banks except for reaching D from the circled D after two side-rail banks. Does it work?



There are several ways to look at the mirror system, and they mostly give the same aiming point. Find the method that gives you the best results and practice with it. Getting a feel for speed and spin on the rail is required for mastery.

Handicaps

Levelling the field.

by BOB JEWETT

IMAGINE THE FIRST two pool players — let's call them Willie and Barney. On the first day...
Willie: "Let's play some."
Barney: "Sure! Love to."

On the second day...
Willie: "How about another match?"
Barney: "I need a spot."

These days, the second scenario seems much more common. Since that first match may have seemed too one-sided, many ingenious ways to slow down Willie or prop up Barney have been devised.

Games played to a number of points are particularly easy to handicap. Barney begins with a head start, or only has to reach part of Willie's goal. A common scheme a century ago was to count each of Barney's points double or triple, which makes it easy to see who is ahead with the spot included. The most extreme cases of point spot I've heard of were a 12-3 game of one pocket and a 100-1 spot at straight pool. The 99-ball sport was offered by Irving Crane to a beginner I knew, and illustrates the huge difference in abilities between pool players. Crane won most of the time.

Another general technique is to physically hinder Willie's play: Willie has to play one-handed or one-handed without resting the stick on the rail. Willie must shoot all shots behind his back. Willie must make all shots using the mechanical bridge. Willie must play left-handed (assuming Barney doesn't know Willie is left handed).

"No-count" can be used in point-based games like straight pool and caroms. If Willie is playing "20 no-count," he must run 20 or more for any of the points to credited toward his score. A similar, but seemingly opposite handicapping strategy is "and stop." At "three and stop," Willie has to leave the table after any run of three. Both of these handicaps can be used between equally-skilled players to emphasize offense or defense respectively.

At 9-ball, there are more spots than you can shake a Balabushka at: The winning 8, where Barney wins at any time he sinks either the 8 or 9 ball; the called 8, where Barney wins only if the pocket is called first; safe 8, where if Barney makes the 8 and Willie the 9, the game is void; the winning 7, winning 6 etc., where Barney wins if he sinks the the winning ball or any higher-numbered ball; the break, where Barney always gets the break even if he loses a game. Among the more bizarre games: if Barney gets the 9 ball to hit the head rail, he wins; Barney gets to move the cue ball a hand span (about nine inches) before each shot. The "orange crush" is the winning five and the break. The "Rainbow" is the winning everything; all Barney has to do win is legally sink an object ball.

Some handicaps are sharks in sheep's clothing. Willie may say something like, "Let's play 8-ball. I'll take five of your balls off the table right at the start." Sounds good, but Barney will soon discover that he only gets to shoot at clusters or balls frozen on the rail, while Willie has clear sailing with all the obstacles removed. Barney should respond, "No, I'll take three of mine off whenever I want."

The most straightforward way to handicap either 8- or 9-ball is for Barney to start with some games to his credit, for example three games in a race to seven. Ball spots become more or less significant as the table is easier or harder.

A second field of handicapping is for league and tournament play. Many players will not enter a tournament or scratch league where they feel they have no chance to win, and many rating systems have been developed to allow roughly-even chances. Usually a player with a higher rating must score more points to win a game, or win more games to win a match.

The hardest problem in designing a system is adjustment of the ratings. A common method is to develop a per-inning score, for example noting how many balls are sunk per turn at the table and whether safeties are played. This has the advantage of giving comparable ratings to players who have never met, so a national tournament is possible. There are two main disadvantages: score keeping can be difficult; tables and style of play can vary, producing imbalances in the ratings.

A third problem was evident in an inning-based system for a three-cushion match I played in. Each player was only expected to score his per-inning average, and some players had hit on the strategy of only playing safe and rarely trying to score, bringing their averages down. One player about my speed had manipulated his rating so we played with a 2:1 handicap. Tournament and league officials often face such situations, and the bylaws of the system should provide remedies.

Another common problem in handicapping systems is that the divisions are too coarse. If there are only A, B and C players, a low A and a high B player should really play even, while two B players at opposite ends of the range should play with a spot.

Jewett's Rating System

In 1980, I worked out a rating system for an in-house league. It has since been used in a regional league in the San Francisco area. Its advantages are simplicity and fairness, but it has no provision for inter-region leveling. Here is all you need to start your own local handicapped 8-ball or 9-ball tournaments:

Each player has a rating; better players have higher ratings. Beginners will have ratings around 20, while professional players will have ratings around 100 or higher.

Matches are handicapped by requiring the better player to win more games to win the match. The size of the handicap is determined by the difference between the ratings of the players according to the table below.

For example, if a player rated at 55 played someone rated at 25, the difference would be 30 rating points and the match length would be six games to three.

Use the "Quick Sets" table to reduce the delay from slow players if both players have ratings under 45 or if the whole tournament is waiting on one match that hasn't

NORMAL SETS

Rating Difference	Match Games
0-5	5-5
6-14	5-4
15-21	6-4
22-28	5-3
29-36	6-3
37-46	7-3
47-56	6-2
57-Up	7-2

QUICK SETS

Rating Difference	Match Games
0-6	4-4
7-18	4-3
19-29	5-3
30-39	4-2
40-48	5-2
49-UP	6-2

started yet. Use of the shorter matches is at the tournament director's discretion.

The ratings are adjusted after each tournament. For each match a player wins or loses, his rating goes up or down one point. New players are adjusted faster than that, moving three rating, points for each of their first 10 matches and then two points for their next 20 matches.

If the better player is giving up half or more of the match, he has choice on the first break, otherwise lag for first break.

One good format is to play a 10-week season. Each week, three rounds of a round-robin are played by whomever shows up. At the end of the season, awards are made to those with the most wins. This rewards good attendance, as well as good pool playing, while anyone with a minimum number of matches can play in a single-elimination final tourney.

Have you run into — or been run over by — an interesting handicap? Send it in. If you are interested in more details of this system, contact me via Billiards Digest or e-mail me atjewett@netcom.com.