



Get to the Point

Practice tips for attaining the most precise position possible.

There are two contrasting styles of position play — long and short. In the long style, the main goal is to have some shot, even if you leave the cue ball quite a ways from the next object ball. You can see a lot of 9-ball players using this strategy. They don't care how long the shot is as long as they aren't hooked. I've seen Earl Strickland adopt this strategy.

The other style seeks to minimize the distance between the cue ball and object ball, down to something under 18 inches. The goal is to keep all the shots short so that not only is each shot easier to make, but it's easier to play position. The best example of this type of player I've run into at 9-ball is Paul Silva, a player from the Palace in San Francisco 40-odd years ago. Not only did he make every shot look easy, but it seemed that position on his next ball was always automatic — he made 9-ball look like straight pool.

You will probably play between these extremes, no matter what your game is. The plan this month is to work on the close-position part of your game.

In **Diagram 1** are two similar drills to work on control of both speed and direction. In Shot A, the cue ball and the object ball always return to the spots marked — you may as well mark them on the cloth with paper reinforcement "donuts" or chalk. The second object ball

is initially placed close by as shown. The goal on each shot is to pocket the first object ball and touch the second object ball. The precision part is to leave the cue ball within one ball's diameter of the second ball; you should just barely touch it.

Leave that second object ball where you bumped it. Gradually it will cross the line and then it is time to start over. Try to get at least five good shots in before the line.

Try to drive it as straight as possible toward the pocket labeled A.

Shot **B** in **Diagram 1** is similar, but the object ball starts more toward you so that you will need to draw the cue ball to make contact. The goal is to get at least five (or 10) soft contacts before the shot becomes too difficult.

A warning on this draw shot: If you don't get enough draw on your first few

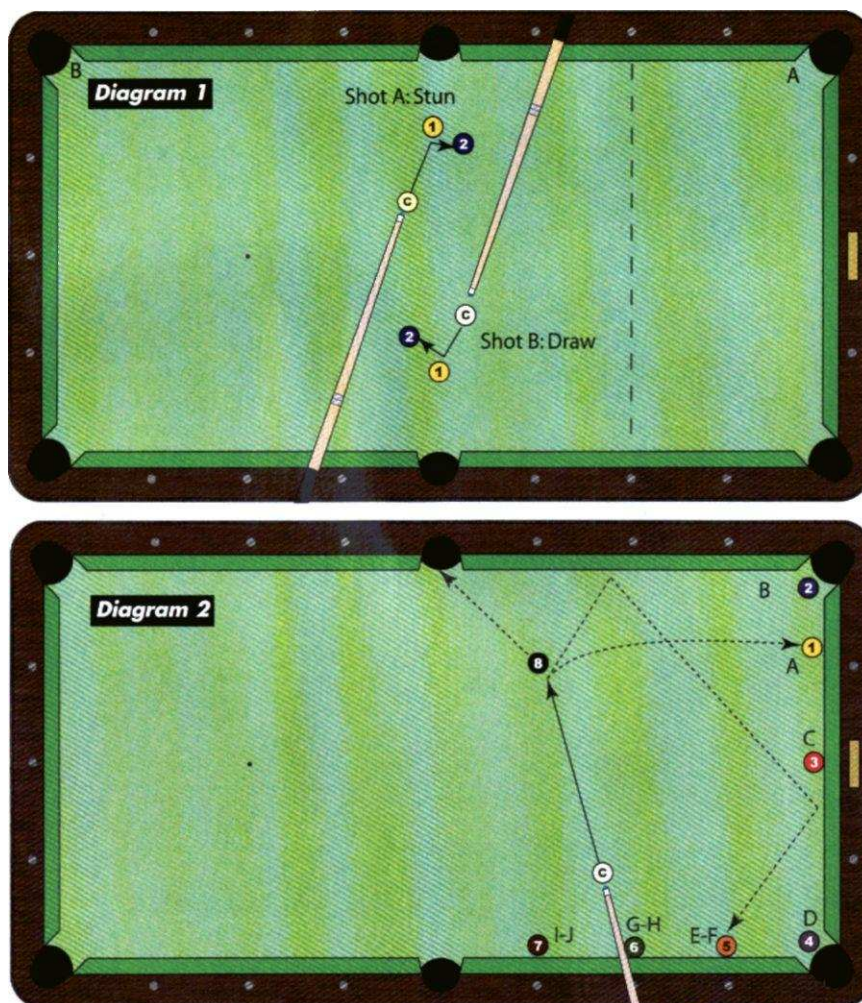
shots, you may hit the ball on the far side, which will tend to drive the ball straight toward you, making the shot increasingly difficult. A good goal is to drive the ball toward pocket **B**. If the ball goes along that line, the required draw will remain reasonable. In practice, I found this second form of the shot easier than the first.

In **Diagram 2** is an exercise using the cushions. The set-up is fairly critical: The object ball is one diamond from the long rail and the cue stick passes over the middle of the rail section at the diamond as shown.

The distance from the cue ball to the object ball is up to you. If it is closer, the shot is easier, so begin there. As you develop more control, try moving the cue ball back toward the cushion, but

always with the cue stick passing over the second diamond.

The goal here is to send the cue ball in turn to locations A through J. Shot A is a plain draw shot, and this shot is very tough if the cloth is sticky or the cue ball



If that's too easy, try for 10. Remember not to count any shot that either doesn't touch the second ball, or leaves it more than a ball's diameter from the cue ball.

It is useful to have a specific goal for the direction you are driving the second ball.

is heavier than the object ball. It will also become harder the farther back the cue ball starts.

With practice you should be able to leave the cue ball within a ball of the target at least one in three, but at first just try to hit the target. Shots A and B are direct, but C and D need to be played with one cushion. For the shots up the second side rail, there are two ways to get to them — go one rail and then two rails. For extra credit, try to get the cue ball out to the side pocket on your side of the table. Is it possible?

Next, see how the shots change if the cue ball is moved

up and down the table slightly. Which shots become easier and which harder?

Finally, **Diagram 3** shows an exercise for "killing" the cue ball in the middle of the table. This is a fairly common situation where you have a 20- to 30-degree

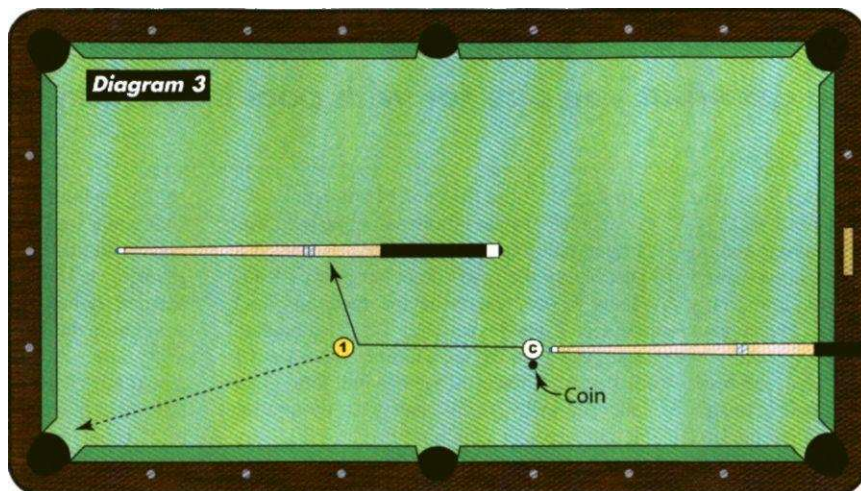
angle of cut and with the way the other balls in the game are sitting, you have to leave the cue ball on your side of the second cue stick. You need to decide between stopping the cue ball before it crosses that

the end rail and one diamond from the side rail. Put the cue ball where you are sure you can make the shot and mark its location with a coin. Try the shot, doing your best to keep the sideways motion to a minimum. Use your best soft draw to achieve a stun shot (stop shot with an angle). As you get the hang of the shot, move the cue ball and the coin to the left until you can't kill the cue ball in time.

Does soft follow work from the same position?

You should be able to shoot the follow shot so softly that the object ball just gets to the pocket.

Does that cut down further on sideways motion? How about sidespin? Finally, try moving the cue ball back two more diamonds to see how tough the shots become, and to get a little motivation for keeping the cue ball close to the object ball.



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Online Magic

[YouTube.com](http://www.youtube.com) brings Sayginer's masse wizardry to the masses.

One of the most amazing talents on any table is Semih Sayginer, the Turkish champion. His main game is three-cushion billiards, but he can also perform at ball-to-ball billiards and pool. His artistic shots are the stuff of legend, and now they are available online.

Before you read the rest of this article, you should visit www.youtube.com, and type "Semih Sayginer part one," into the search window. Click on the video that is 9:30 long. You may want to visit a friend with a high-speed connection if you have a dial-up. Once you've watched "The Magic Show," pick up your jaw and read the following for an explanation of what you saw.

Diagram 1 shows the first shot on the video; a masse shot I had never seen before. At first glance it looks like it might be impossible, but the action is actually straightforward. It is a four-cushion shot. If you show the position to someone and name the hits in order — side rail, side rail, end rail, side rail, both balls — it could be a long time before he guesses the path.

When shooting masse shots, the player has to blend initial direction, degree of elevation, amount of side spin and "masse spin," and amount of force to achieve a particular path. For example, in Diagram 1, the initial direction of the shot is along the "shot line." The stick is elevated and played with right draw. This produces both right side spin and a tendency to curve. We can assign a direction to this tendency to curve by imagining (or causing) the cue ball to run straight into an object ball, and then seeing which way the cue ball moves. For this shot, the "masse line" shows which way the cue ball wants to move. In addition, there is some right side spin, which is a necessary result of choosing a masse line to the right

— you cannot masse the cue ball to the right without putting some right spin on the ball.

Given the shot and masse lines and the right side spin, how does the illustrated shot result? First, the cue ball starts along the shot line. The masse line accelerates the cue ball toward the first rail and makes it curve. You

years of practice, and probably more than one take.

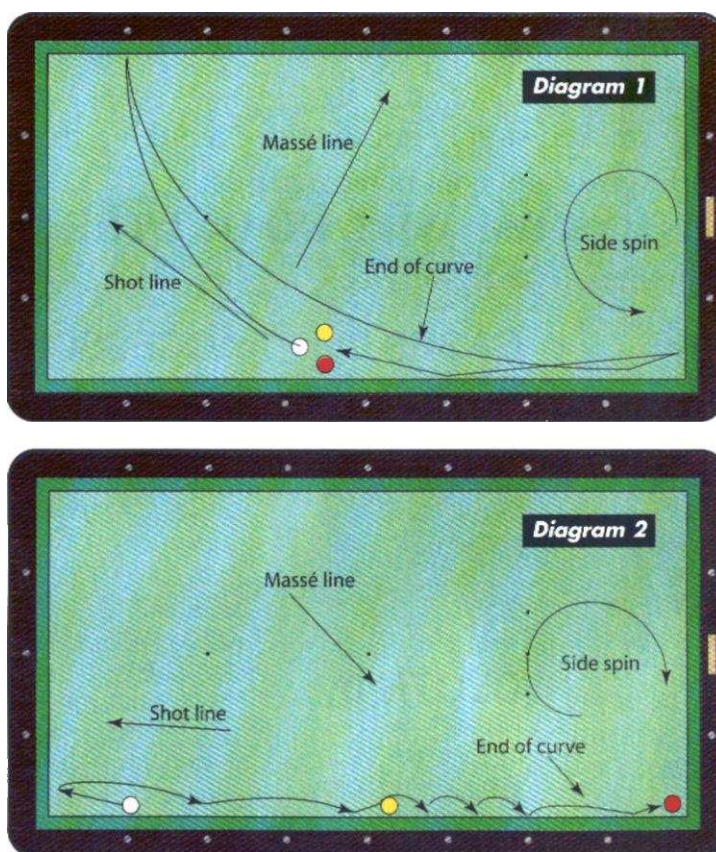
Note that at some point in the second part of the path — between the first and second cushions — the masse spin runs out, and the cue ball begins to roll smoothly on the cloth without slipping. After that point, the cue ball's path will be a straight line.

Once the ball follows the path into the corner, the remaining right spin takes when the ball contacts the end cushion and the cue ball comes back to the side rail for a fourth cushion contact before hitting the two object balls. Simple.

Sayginer's third shot is shown in Diagram 2, and might be called a draw/follow masse. The shot line is more or less directly into the end cushion. The masse line is toward the cushion and back toward the second object ball, and there is some left side spin. The cue ball is shot hard enough that it mostly slides off the end cushion and to the first object ball. In the video, you can see that there are at least two different paths that will work, as the different angles were shot on two different takes. The shot that starts and ends the clip has the cue ball going first to the end cushion, then twice on the long cushion before it hits the

first object ball, then three big hops on the long cushion and then a straight path to a last contact on the long cushion just before the object ball for a total of seven cushion contacts.

The shot is not hard to understand, given the shot line and the masse line. The masse will tend to keep the cue ball on the long cushion between the end rail and the first ball, so the aim doesn't have to be perfect. As long as there is still some masse spin left on the cue ball after it hits the first object ball, it should return to the long cushion some more. In the shot on the video, the cue ball happens to be about half a ball off the



can think of the masse acting like gravity with the masse line saying "this way down."

The ball hits the first cushion and it bounces, more or less, straight back with the right side spin helping to bring the ball back down the table. As the cue ball comes off the rail, the masse line is almost unchanged, so the ball again wants to "fall" back to that same cushion and the path curves again. In theory, if there were enough masse on the ball, it could be made to return to that same long cushion. In Sayginer's shot, there is just enough masse to bring the cue ball to a path that grazes the other long cushion at a fairly shallow angle. How does he do that? By feel.

cushion when it hits the first object ball so the remaining hops are large and obvious. During those hops, the remaining left English on the cue ball helps to bring it down the table to the second object ball. The masse gives out about two diamonds from the second ball, and the last part of the path is a straight line to the score.

Diagram 3 shows the fifth shot Sayginer does on the video. It's a fairly standard shot in concept, but the action is not standard. The shot line is up the table, and the masse action is more or less straight back from the shot line. I think there is a little right English on the cue ball. If so, the shot line and masse line can't be directly opposite — that is only true for pure masse draw without bending to the side.

The cue ball hits the first object ball thinly and travels forward along the cushion. It gets four cushion contacts as the masse' fights to keep returning it to the rail and speeds it toward the second object ball. The cue ball gets a total of 11 contacts on the long cushion

before hitting the end rail and coming straight off the end rail to the second object ball.

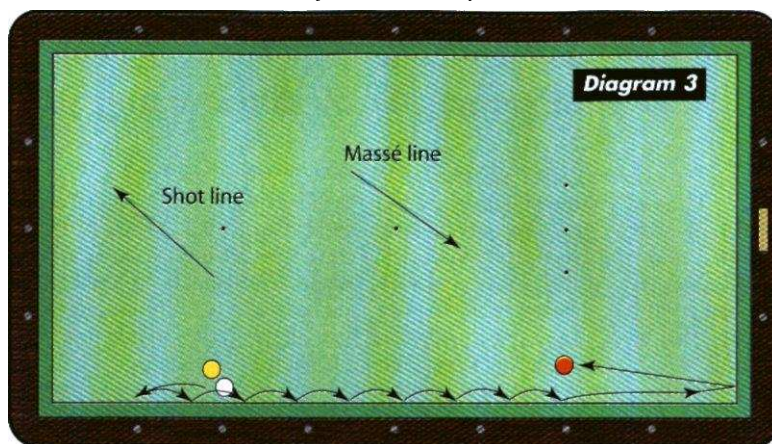
One remarkable feature of the shot is that the second object ball is barely more than a

quite small. The masse spin is again acting like gravity to cause the bounces, and the imperfect elasticity of the cushion causes the dying out of the bounces of the cue ball.

On the shot on the video, you can see that the first bounce is about the diameter of the cue tip, and on each subsequent bounce the cue ball leaves the cushion less and less. Since there are nine bounces before threading the gap, the cue ball is guaranteed to be very close to the cushion at that instant.

There is a similar shot by the great Japanese pool trick-shot artist Yoshikazu Kimura in which he has a line of balls near the cushion, he masses the cue ball off an object ball, and the cue ball passes between the line of balls and the cushion, not touching any of them. After the shot, he demonstrates that there is less than a playing card's thickness of margin for the cue ball to pass. On YouTube, search for "Kimura pool shots" to see some other great shots.

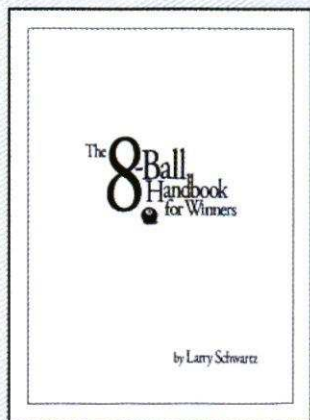
Are there points here to put into your game? Maybe, but not on my table.



ball off the cushion. As the cue ball passes between it and the rail, there looks to be less than a quarter-inch of clearance. The principle that makes it possible to pass through such a small gap is "dying bounce." Imagine dropping a tennis ball. If the first bounce is a foot, the second may be half a foot and the third a quarter foot, and so on. After a few bounces, all the subsequent bounces are

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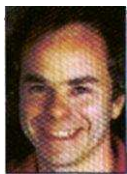
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Derby City Shootout

A few desperation shots were highlights in this 14.1 straight pool event.

Other articles in this month's issue should already have convinced you of this; If you're interested in pool in the U.S., you have to see at least one Derby City Classic in Louisville, Ky. It is a nine-ring circus. Besides the standard three events of bank pool, one-pocket and 9-ball, there are mid-night mini-tournaments, bar table competition, ring bank pool and 10-ball matches on the TV table, all-night action wherever you look, and even qualifiers for the National 3-Cushion Championships. It was ray privilege to help run the 14.1 Challenge for the second year.

The Challenge is strictly a high-run competition with just one competitor at the table at a time. You begin with a break shot of your choice (cue ball and 15th object ball "in hand"), and see how many you can run by standard straight-pool rules. A miss or foul ends your try.

The format was slightly changed from last year. A \$100 entry got you a total of 12 tries spread out over three of the four days of the preliminaries. A few players dominated the event last year when there were unlimited re-entries, so 12 was the maximum number of tries any one player could have. A budget option of four tries for \$50 was also available.

The eight players with the highest runs in the preliminaries advanced to the finals on Thursday where they had five tries each. This was also a change from last year, when the number of tries in the finals depended on your high run, and there were a lot of finalists with just one or two tries.

The prelims started off slowly with only 15 players on the first day. John Schmidt

took top honors with an 89, followed by Danny Harriman at 85 and Niels Feijen at 62. They got the daily prizes of \$300, \$200 and \$100 respectively. There were no runs of 100.

On Monday, the participation and performances got much stronger. Johnny Archer had a 107 and a 71; Ralf Souquet answered with a 137, plus an 84 and a 70 after scratching on the first of his four tries. Mike Davis took first prize for the day with

finals. Darren Appleton from the U.K. played surprisingly good straight pool for someone from a country with no known 14.1 tradition. Luc Salvas nearly made the cut, as did Fabio Petroni. Dennis Orcollo, the only Filipino entrant, snapped off a 93 to get a spot in the finals.

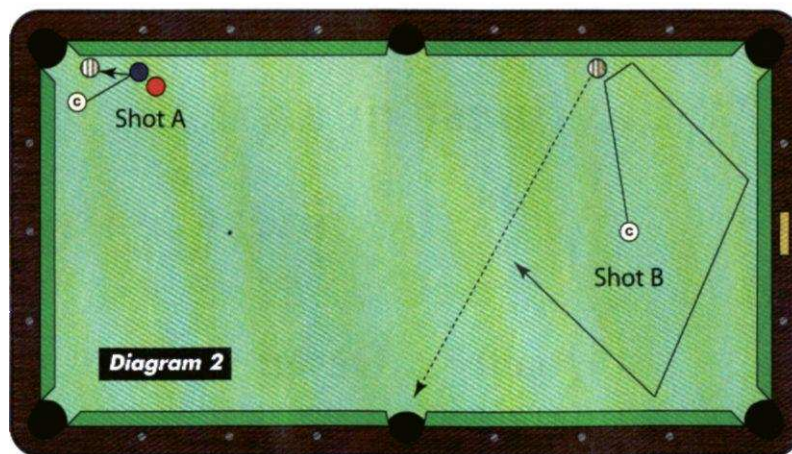
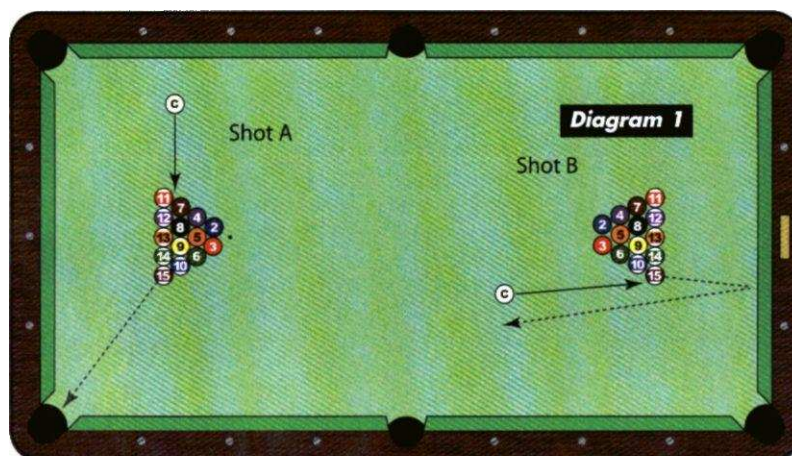
Disappointments in the preliminary rounds were Cory Deuel, who was one of the strongest players in 2006, and Thorsten Hohmann, who is the current world champion, having won the World 14.1 Straight Pool Championship in New Jersey in June 2006. Hohmann averaged 50 in the European straight pool championships but could not get past 43 in 12 tries in Louisville. He also dominated the New Jersey State Championships a couple of years ago with multiple 100-ball runs.

Archer continued the fast pace as he posted a 129 on the third day of prelims and a 114 on the final day. He clearly seemed to be the one to beat. He confided that most of his practice time these days is spent playing 14.1.

Then Mika Immonen got off the airplane. He was planning to play in the 9-ball event that was about to start up, but had some time to try the 14.1. He put his cue together and ran 127 on his first try. This was followed by a 1 (bad roll on the break shot), a 54

and a 99 for a 70.25 average.

As the finals began, Davis's run of 151 looked to have a good chance of standing up for the \$1,100 highest run bonus. The tables had the standard DCC tournament pockets of barely 4.5 inches at the opening with a deep shelf, and a light hit onto the near jaw ended a lot of runs.



an amazing 151. Mike had failed to get into the second rack on any of his first-day tries.

Other notable entrants included Larry Nevel, whose 14.1 game exudes power and confidence. His 38-ball per inning average was outstanding, but his highest run of 80 didn't meet the 85 needed to make the

In the finals, Harriman, Davis, Orcollo and Souquet all failed to get past 50 in five tries. Archer managed a 56, and Charlie Williams, who admitted that 14.1 was not his best game, got a 67. Steady John Schmidt had a 71 as well as a 69, 55 and 43, but only the highest run for each player counted. Surprisingly, his 71 won him second place.

One of the nice things about attending tournaments, as opposed to watching them on TV or DVD, is the fascinating people you get to meet. One of the many such personalities present at Derby City was 92-year-old George Rood, who was there to accept a lifetime achievement award from OnePocket.org. You may not have heard of George, since he stayed out of the lime-light during his heyday, but he played about even with Luther Lassiter at 9-ball. He also played straight pool and once ran 100 balls 11 times in one day when playing 50 no-count. (In no-count, you have to run at least the number specified or your run doesn't count at all.)

George was next to me watching the 14.1 finals. The shooter at the table was clearly not an expert at 14.1, and George was surprised he was in the finals. Then Mika Immonen started to play. Smooth stroke, smooth breaks just hard enough to scatter the balls well and get the cue ball loose but not too far away. George commented, "Now this is how straight pool should be played." He was proven right, as Mika proceeded to run 160 in his second try and an 86 two tries later. In his nine tries (prelims and finals), he had an average of 62.33 balls per inning. With the daily prize, the highest run bonus and first prize in the finals, he got a total of \$3,600. The only thing he missed was the special \$1,000 bonus offered by Diamond Billiard Products for the first run over 200. Maybe next year.

The players this year seemed more familiar with the rules than last year, when several ball-in-the-rack opportunities were missed. (See my April 2006 column available at http://www.sfbilliards.com/articles/BD_articles.html.) There were a few desperation shots that were notable. In this form of competition, the player might as well go for a shot that has only a 1 percent chance, if that's the only option. In Diagram 1, Shot A is a break shot that Charlie Williams made after failing to break the new rack at a count of 14. If you hit the two bottom balls on that side simultaneously, the corner ball on the other side has a chance to go in. It did. To go in, it needs to be struck by both of the balls it's touching. That happens only if the rack is pretty tight, so energy will be transmitted to both balls at the same time. Take 10 tries to see if this shot is worth playing when desperate.

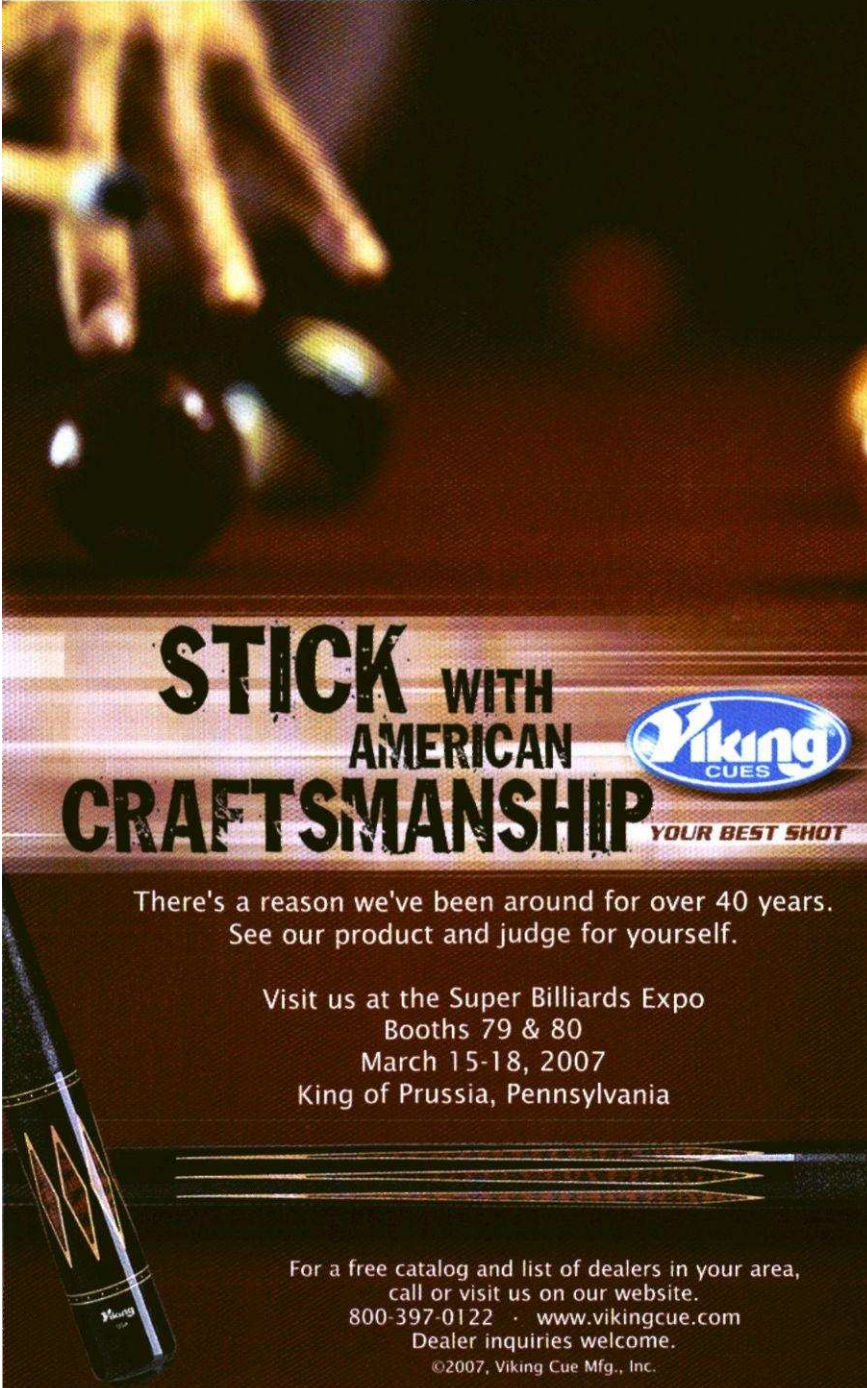
Shot B is a standard out-of-the-rack shot. The corner ball is banked straight back the long way. Hit as much of the ball as you can. Inside English may help, depending on the rack and the cloth. The one time it was played during the competition did not go well, due to a too-thin hit.

Diagram 2 shows two shots that you might not play if you had an opponent who was going to run a few racks on you if you missed. Shot A was at the start of John Schmidt's second-place run of the finals. After the break, he had nothing but the draw-carom, as the cue ball had gath-

ered with blockers by the corner. This shot is not as hard as it looks, if you take care about the angle and speed. There are systems to play this kind of carom.

Shot B was all that Immonen was left with early in his 160 run in the finals. The bank is not that difficult if you are in bank pool stroke, but it is not a shot most straight pool players would risk. Try it, but also play position by bringing the cue ball three cushions to the middle of the table.

I'll see you next year in Louisville. If you get there early you may get a chance to keep score for the straight pool.



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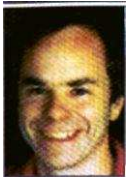
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Transferred Side

The controversy has existed since the early 1900s, and continues to "vex."

There is a controversy in the billiard world that has been simmering and sometimes boiling over for the last hundred years. You would think that in all that time, someone would have been able to get to the bottom of the matter and shut up the idiots on the other side, but the controversy remains: Is it possible to transfer sidespin from the cue ball to the object ball?

I think the continuing confusion is due to the fact that if the effect exists, it is weak. You can shoot the cue ball with heavy sidespin directly into an object ball and the cue ball will sit and spin like a top, so no one will deny that the cue stick can put sidespin on the cue ball. You cannot, however, make an object ball spin similarly. But can you make it spin at all?

The earliest reference I've found for the question is also one of the easiest early billiard books. "Daly's Billiard Book" was first published in 1913, but is now widely available as a Dover reprint. In it, Maurice Daly describes a class of shots in which an object ball is driven more or less straight into a cushion and is banked with precision back to where it started. (This is a standard shot at simple carom billiards.) Maurice comments: "In this shot (and its variations are numerous in close play near the end rail) one must pay strict attention to the *English on the cue ball*. That imparted to the driven object ball affects the course of the latter on its return from the cushion. This driven ball may be 'thrown' one side or the other as much as three inches."

This seems like a pretty clear statement, but the editor (W.W. Harris), had said earlier in the book: "Mr. C.C. Curtis, of New York, has made many interesting experiments with billiard balls, and contends that the spin of the

cue ball is not, to any appreciable degree, transferred to an object ball, not enough to 'throw' the object ball off a true angle from the cushion. The writer [Harris] is convinced he is right [...]"

It would have been helpful if the author and the editor had gotten their stories straight.

Transferred side was quite a heated topic in England during the 1930s. The game being discussed was English Billiards, which is a

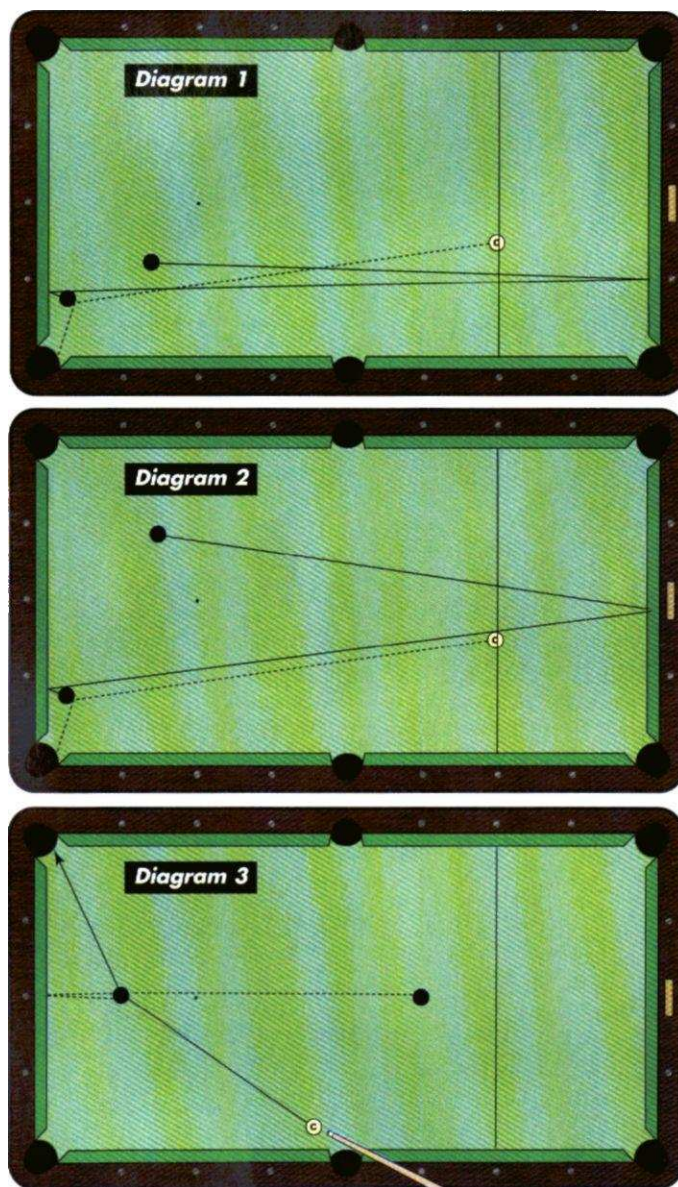
lot like carom billiards but is played with small balls on a 6-by-12-foot table with pockets. In his 1923 book, "How to Play Billiards," Tom Newman, who was a six-time world champion, firmly staked out a practical, middle-of-the-road position:

"[...] Last, and least, I propose to touch upon the vexed question of the transmission of side. Enough has been written to fill a book bigger than this, simply to prove that a side-laden cue-ball can or cannot transmit side to the object-ball. I am not disposed to argue about it, but if anyone can show me how to transmit an *effective* amount of side from the cue-ball to the object-ball, I shall be very much indebted to him: it will help me to solve many little problems [...] Please mark my words carefully, I do not wish for 'proof' that side can or cannot be transmitted. I want to see such measure of effective transmission of side as may be of real playing value. Until I see this, I shall not bother about the transmission of side when playing billiards."

Newman's approach is quite reasonable: He is asking for specific examples that will help his game, and is withholding his judgment on the matter until then.

Slightly later, we find two proponents of the phenomenon claiming to show such shots. The two authors were Walter Lindrum and Willie Smith. Lindrum was the best English Billiards player who ever played, and arguably the best cueman of all time. In one championship, he had to give the other three players a head start of about 30 percent in weeks-long matches and he still won. Smith was twice a world champion.

Diagram 1 and **Diagram 2** are from Lindrum's 1930 book "Billiards." The goal is to scratch off the black ball from behind the line. The sub-goal is to control the return point of the black ball. Lindrum claims that



Smith, in his 1934 book "Billiards in Easy Stages," shows the shot in **Diagram 3**. Again, the goal is to scratch off the black ball and to control the path of the black ball off the cushion. You can try it yourself on a pool table with the object ball about two balls off the end cushion and the cue ball near the side pocket. Adjust the cue-ball position so that a

In his 1935 book, "Billiards for All Time," he said: "I have written so much in the past on the question of transmitted side — I was the first to treat the subject at all exhaustively — that I thought I had done with it forever. Willie Smith has, however, revived the question in his latest book, "Billiards in Easy Stages," and though I have a great liking for him as a man and a tremendous admiration

Frankly, I don't think I would have liked to be around Riso. But was he right? Mull on this a while. You may want to refer to David Alciatore's recent articles in *BD* that discuss the physics of spin transfer. Can you come up with better demonstrations than Lindrum's and Smith's? Next month I'll propose some shots that should clear things up, since Levi doesn't seem to have finished the job.

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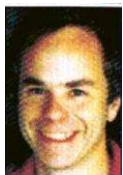
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Let's Twist Again

Putting to rest a controversy that has existed since the early 1900s.

Last month I went over some ancient history of this controversial question: Can sidespin be transferred from the cue ball to the object ball? Even though this point has been debated for more than **100** years, there still seems to be no general agreement. I hope that 2007 will finally end the debate.

First, let's look at the mechanism that purports to transfer sidespin from one ball to another. In Diagram 1 is a collision between the cue ball and an object ball. During the collision, there are two kinds of forces. Forces have to act at the contact point, since that is the only way the cue ball can influence the object ball. The two forces act in two separate directions.

The first is the usual force that acts to push the object ball away from the cue ball. It's called the "normal" force by physicists, but this is not the normal "normal." In this case, normal means perpendicular to the surfaces of the balls or along the line joining their centers at the moment of impact. The force is quite high, and very short — perhaps **1,000** pounds of force for **200** millionths of a second.

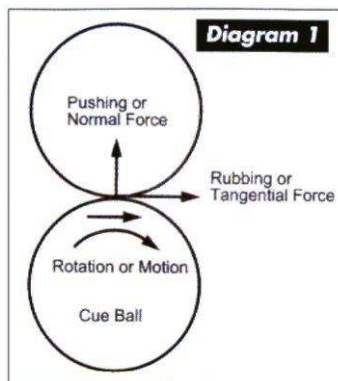
If that were the only force during the collision, playing pool would be much simpler than it is. For better or worse, there may also be a tangential force. This acts along the tangent line between the balls at the instant of contact, and it's a result of the surface of the cue ball rubbing across the object ball. Since the two balls are not perfectly slippery, there will be some friction and, consequently, some force at the edge of the object ball.

The tangential force is fairly complicated, and can take quite a while to completely understand. In a future article, I'll show you some related shots that I only learned in the past month, after **40** years of playing the game.

A first complication is

how the surface of the cue ball comes to be moving on the surface of the object ball. If the cue ball is not spinning at all but is cutting the object ball, its surface will be moving relative to the object ball at the point of contact, and the friction will tend to drag the surface of the object ball in the direction the cue ball ends up moving as it leaves the collision.

A second way to have the surface of the cue ball moving relative to the object ball is for the cue ball to be spinning. There are several cases for this. The cue ball might hit the object ball full, but with sidespin. It could be cutting the object ball with inside English (left sidespin for a cut to the left), which would increase the relative motion



compared to the case above with no spin on the cue ball. Or, there might be outside English on the cue ball, which could perfectly cancel the friction due to the motion of the cue ball across the object ball, or it might even be enough to reverse the direction of the rub on the surface of the object ball.

To complicate things a little more, you also have to consider any follow or draw that the cue ball might have.

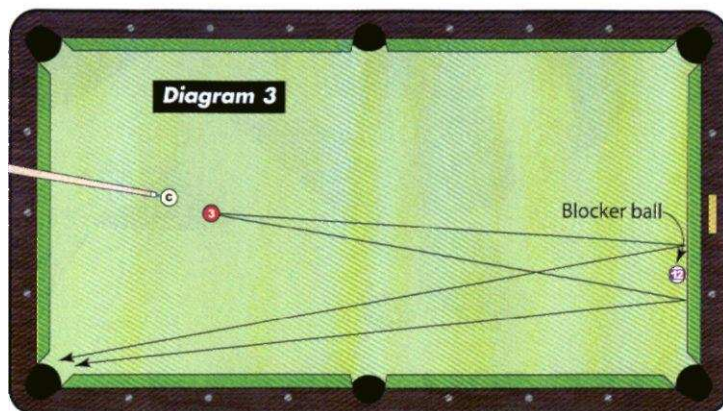
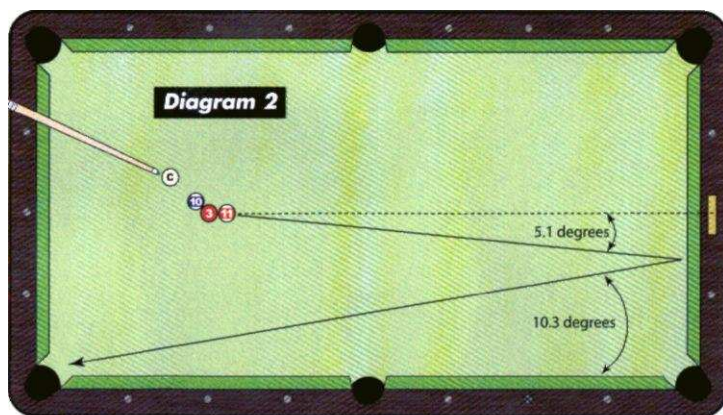
The first effect of this rubbing sideways of the cue ball on the object ball is throw. If there is throw, the object ball will not travel away from the collision along the line joining the centers of the two balls at the instant of the collision, but instead will

move at an angle of up to six degrees for reasonably common conditions. (If you have brand new, waxed balls, you likely won't see that much throw, but you will see some.)

Throw is not unexpected if you agree that the cue ball can rub sideways on the object ball. If there is a rub to the right, there pretty much has to be some corresponding motion to the right. In normal collisions, the "normal" force is much larger than the rubbing or tangential force, so while there is throw, it's small enough that the careless player might not notice it.

Conversely, if you observe throw, there must have been some rub to the side of the surface of the cue ball on the object ball. The two are perfectly tied together. You cannot have one without the other. If you see no throw, there was no rub.

What is not so obvious is a point that escaped me for about 35 years. If there is throw, there must also be



transferred side. Further, the amount of side will be directly proportional to the amount of throw. Both of them come from the same sideways force of the cue ball rubbing on the object ball. You can't rub sideways on the cue ball and not make it spin. Physics can tell us how many RPM of sidespin we will have if there is one degree of throw (for a particular speed), but that is not as interesting as the following measurement.

Spot two object balls on the foot spot, as shown in Diagram 2. Put a third object ball near them so it forms a line with a spot about two diamonds from a far corner pocket, shown as spot X. Place the cue ball along that same line, so that you are shooting the third ball straight into the second ball. The ball on the spot will be driven to the end rail, but not the middle of the end rail. It will be thrown to the right, thanks to the second ball rubbing across its surface. Shoot the shot a few times until you get the speed right to drive the ball to the head rail and back to the foot rail with a little bounce. Take several shots to measure where the ball hits on the head rail and where it returns to the foot rail.

When I did the test, and converted the distances to angles, it turned out that the object ball initially threw off the centerline by 5.1 degrees for the conditions I had. The

rebound angle off the far cushion would be equal to that, but I measured it as 10.3 degrees. The angle out was twice the angle in! As it turns out, this angle causes the banked ball to go into a corner pocket at the foot of the table. Spin has clearly been transferred to the object ball, but can it be done from the cue ball?

Some readers will think it's pointless to set up a test with the cue ball, since the object balls are expected to have the same reactions with each other as they do with the cue ball, but let's be complete and figure out a way to test with the cue ball transferring side directly to the object ball.

A first test has already been done. In December 2002, I proposed a test to see if sidespin on the cue ball could throw the object ball. In April 2003, I reported the results as done by you readers. The largest amount of throw reported was slightly more than five degrees. The test happened to also be set up from the spot, and the object ball happened to also go in the corner pocket when it came back down the table.

But that's not something that's likely to make you money. Here's a proposition shot that might. Put an object ball on the foot spot and, with the cue ball in hand, bank the object ball back to the foot pocket hitting it full and without side spin. Find the spot on

the head rail that you have to hit to make the ball. Put a blocker ball at that exact location, as in Diagram 3. Now, bet that you can bank a ball off the spot, back to the foot pocket and land either to the left or the right of the blocker ball. Of course, the only way this can be done is by getting some sidespin on the object ball. I hope you know which side to use for each side of the blocker.

Why do so many people get this stuff wrong? I think the main problem is that the effect of the transferred sidespin is fairly small, and it's only really visible on bank shots. Most people know banks so poorly that they are willing to write off five degrees of unexpected increase in banking angle to their own erratic stroke or a funny rail. Another factor is that you don't always see that much twist (that's what bankers call transferred sidespin). If the balls are worn or dirty, you will see quite a bit more throw and twist than if the balls are new and polished or waxed.

Is five degrees important in play? In the length of the table, that's almost nine inches, or well over half a diamond. If you are going to shoot long banks, you have to compensate for this effect. Short banks too, since 4.5 inches (half of the long way for the shorter travel to the pocket) is about the width of the pocket.

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Degrees of Difficulty

The laws of physics were meant to be broken. Here's how.

If you hang around poolhalls — and what well-educated, adventurous person does not? — you will hear about proposition shots that seem to be impossible. Efen or Clem or Wimpy is said to have made the cue ball dance in a star pattern or to have jumped an object ball over five tables to go five more cushions into the side pocket.

If you run into someone claiming to be able to do such a shot, if the money's right and attempts plentiful, you should be fairly certain that the shot is to be made. The only question is whether the entertainment is worth the price. Keep a firm hand on your wallet and remember the advice Sky

Masterson recalls his father giving him in "Guys and Dolls":

"One of these days in your travels, a guy is going to come to you and show you a nice, brand new deck of cards on which the seal has not yet been broken. This man is going to offer to bet you that he can make the jack of spades jump out of the deck and squirt cider in your ear. Now son, do not bet this man, for as sure as you stand there, you are going to wind up with an earful of cider."

One such shot that could be used to bankrupt anyone who understands a little physics is outlined in Diagram 1. The cue ball is frozen to the side cushion on the head string. The 3 ball is frozen to the same side cushion just past the side pocket. The goal is to bank the 3 ball one cushion into the other side pocket.

Any physicist will tell you that the shot is impossible — any careless physicist, that is, and that's the kind you can bankrupt. In terms of cut angle for the shot, this clearly requires a cut of more than 90 degrees. (It's about 95.58 degrees, depending on how far below the side the object ball is.) Any cut angle greater than 90 degrees is — supposedly — physically impossible.

A cautious physicist will ask a few questions before putting down his money. Is the cue ball going to be jumped off the table to hit the back edge of the 3 ball? No, the shot will be played with a nearly level cue stick, and there will be no apparent jump.

Maybe something is not right with the cushion, or it has been tampered with. Will the object ball be well past the side pocket on the flat part of the cushion, or will it be partly on the corner of the pocket where it can be deflected back up the table? The 3 ball will be frozen to the cushion so that point nearest to the cue ball will be even with the edge of the pocket. It can only hit

change the banking angle. (This little trick is said to be very effective when playing one-pocket, leaving an opponent a relatively easy bank that has to hit a needle previously placed in the rubber.)

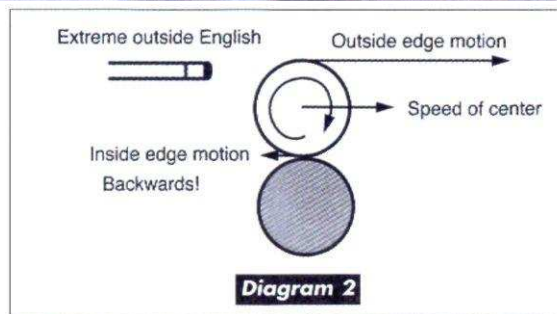
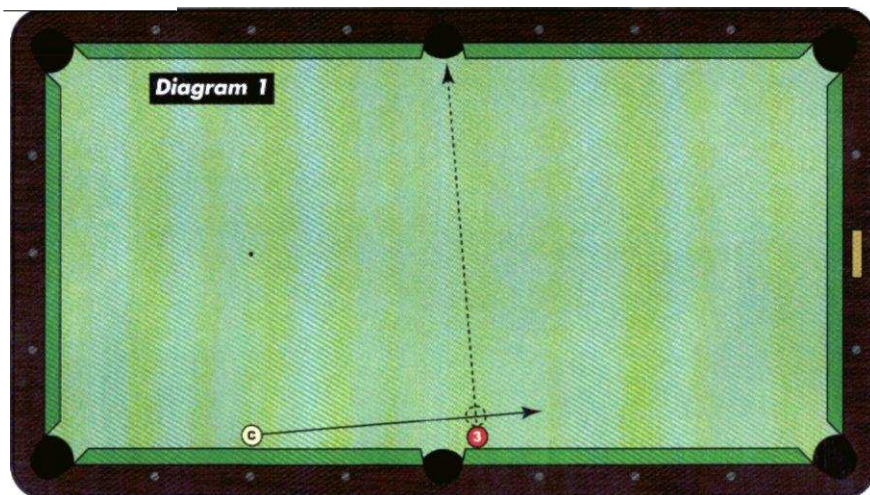
The shot requires more than one try, as is usual with many proposition bets that require skill. Vernon Elliott, a great road player who was recently inducted into the One-Pocket Hall of Fame, is said to have accepted 20 tries. I don't play as well as Vernon, so I would need an hour.

If you want to try it yourself, you will need a lot of sidespin to overcome the "impossible" angle. The technique is to

just brush the object ball with the cue ball, which has so much outside spin that the surface of the cue ball is moving backwards as it touches the object ball. This is illustrated in Diagram 2. The spin does two things: First, it changes the angle of the cut. Perhaps it can bring an 84-degree cut to 90 degrees — six degrees of throw is not

impossible with old, dirty balls. I would not want to shoot this shot with newly polished, waxed balls. The second effect is transferred sidespin onto the object ball.

In my May article, I measured the relationship between throw and the effect that transferred sidespin has on the cushion. Turns out, if you have 5 degrees of throw, the bank angle will also change by about 5 degrees, because the action of throwing the ball puts sidespin on the object ball. This means that if you have 6 degrees of throw on the object ball, you would get an additional 6 degrees of change in angle from the rail. The result is a net change in the direction of the object ball of 12 degrees. The original 84-degree cut turns into a 96-degree bank. The object ball goes into the



the proper part of the cushion, not the corner of the pocket.

But the thorough physicist might not trust this table. Maybe this particular cushion has problems. Are you willing to play the shot on any table in the poolhall? Yes, and you can check the cushions for the old trick of imbedding pins or needles to

heart of the pocket, and the physicist scratches his head and hands over the money.

If you are going to offer proposition shots, you need to have several available, because you might not harvest all of the loose cash with just one. Diagram 3 shows another shot that can be played using the same technique as the cross-side bank. This time, the 3 ball is on the foot spot, and the cue ball is straight out from one of the foot pockets. Be sure the cue ball is directly in the middle of the line between the pocket and object ball. The shot is to sink the object ball straight into the other foot pocket.

This is another cut angle greater than 90 degrees. It would be exactly 90 degrees if the 3 ball were moved one ball diameter toward the intended pocket, allowing the cue ball to be on the foot spot when it con-

tacts the object ball. Since the cue ball has to be shot about one ball away from the foot spot, the cut turns out to be about 94 degrees.

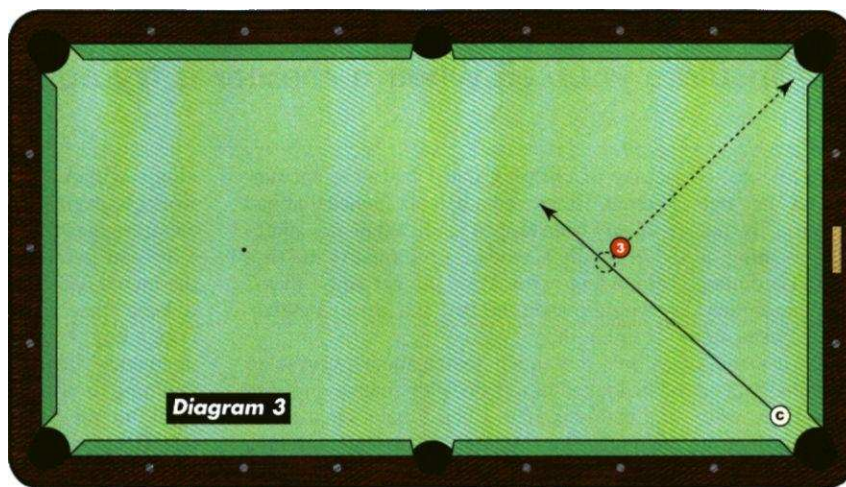
As with the first shot, you will need more

tries, I'd prefer to have an hour with it as well.

For shots like these, seeing is believing. Joe Tucker has offered a video on the YouTube Web site in which he shoots the bank shot four times and makes it three. On one attempt the object ball is placed a full ball lower than in Diagram 1 and misses on the hard side of the side pocket. (Note that Joe is using a special aiming fixture he invented.) Also, he is shooting the cue ball into the cushion, which may help with the amount of sidespin. Regardless, it is a good example of how to execute this trick. If you would

like to see the video, search for Joe's handle, "JT10BALL," on YouTube.

Proposition shots vary from simple trickery to remarkable skill to amazing miracles. If you choose to bet against them, remember to keep within your entertainment budget.



sidespin than most pool players are normally willing to put on the cue ball. The shot does not have to be played with great speed, but the extreme sidespin is essential. Also, remember that clean, polished balls are not helpful with shots like these. Although I have made this shot in two

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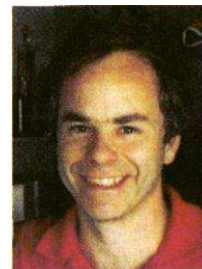
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ONE OF the oldest and most common ways of aiming shots is the fractional-ball system. The idea is that for any particular shot on a pool or billiard table, you imagine the cue ball overlapping the object ball by a certain amount as seen from the tip's eye view, and then you make the cue ball match that overlap.

A recent book that covers the idea very well is Freddy Bentivegna's "The Gos-Pool of Bank Pool." Diagram 1 is an illustration from that book. The fraction being discussed is the five-sixths full shot. Freddy gets a lot of things right in his description that other authors tend to do badly. He shows the two-dimensional overlap picture, which is standard, but he is careful to shade the overlap and show the centers of the two balls. The smaller view from above the two balls also shows the overlap as the shaded area on the object ball. Finally, he shows a very specific shot for which a five-sixths full hit is needed to pocket the object ball.

Freddy also covers full, three-quarter, two-thirds, half, one-third and one-quarter hits with similar diagrams. Willie Hoppe, in "Billiards As It Should Be Played," divides the ball into eighths. For both Freddy and Willie, a major reason to talk about fractional-ball contact is that neither has a target to send the object ball toward in the normal sense. Hoppe is talking about three-cushion billiards, and the exact path of the first object ball is not as important as the path of the cue ball. Bentivegna's book on banking often has no direct target for the object ball.

The most complete drawing I've seen of fractional-ball hits is Diagram 2, from Charles Maximilian Western's book, "The Practical Science of Billiards and Its

'Pointer'" which was published in 1911. In this diagram, he shows the incoming paths for the cue ball in increments of one-sixteenth of a ball. The object ball is at the center of the double-fan shape. Two cue balls are shown, one for a hit two steps from full ball and the other two steps from barely grazing the edge of the object ball. Those two cue balls are traveling along lines S-A and T-B in the diagram, coming up from the bottom of the page.

Western numbers his fullnesses opposite to the standard way of naming these

hits, since hitting half the object ball is the same as missing half the object ball.

The upper left fan of Western's diagram represents the exit angle of the object ball. For a one-eighth cut with the cue ball coming in along line S-A, the object ball leaves along line R-C, and for the T-B shot, the object ball is driven along line R-D. For small amounts of cut, each increment causes nearly the same angle of cut on the object ball. You can see this for the cuts from zero to one-half.

The modern versions of fractional-ball aiming systems have several pitfalls you

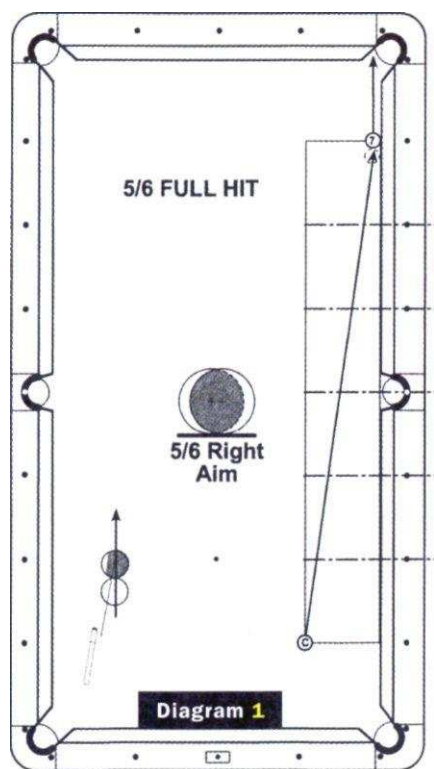


Diagram 1

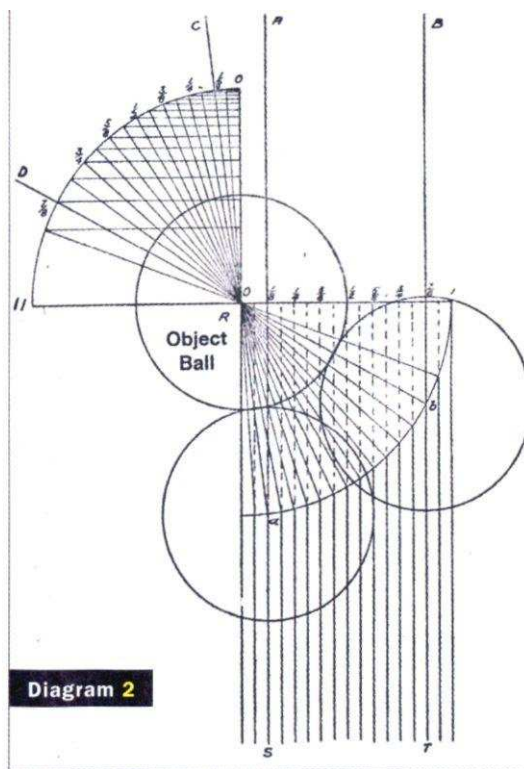


Diagram 2

shots. His numbers correspond to the cut rather than the fullness of the shot. Thus his zero shot has the cue ball hitting the object ball full, or with zero cut. A cut of one corresponds to barely grazing the edge of the object ball. This way of numbering is more natural as far as the geometry goes, but it's against tradition. The two systems match for half-ball

need to look out for. The first is being able to project the cue ball forward onto the object ball to get the right overlap. This is made harder because the cue ball, being closer to you, appears to be several times the size of the object ball, while the system wants you to overlap equal disks. This can be overcome by aiming the cue ball along a particular line, as

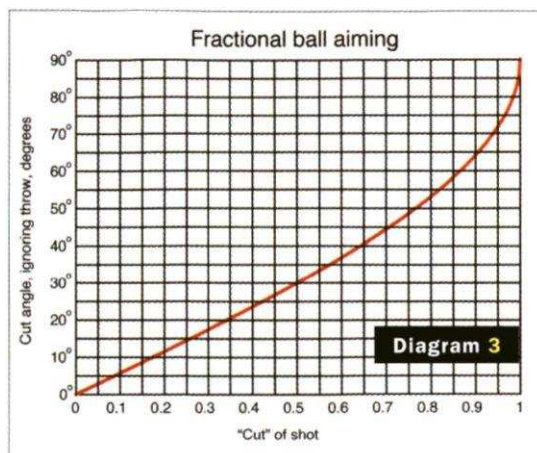
shown in Diagram 2, rather than trying for a particular amount of overlap.

A second problem is the accuracy of the angle. The systems are nearly always stated without accounting for friction. The typical amount of throw on a half-ball shot is two or three degrees, but this depends on spin and speed. I think that this will mostly take care of itself. Shots may vary a few degrees from the exact measurements in the system, but you learn to compensate for throw.

With some systems, the statement of the angle may not be exact. For example, some systems state that a quarter-ball full hit (or a three-quarters cut), results in a 45-degree angle. That's not quite right; without throw, the angle is 48.6 degrees. Is that difference really important? Maybe not, but it doesn't hurt for system promoters to speak accurately. Since Western has the numbers down to about one-hundredth of a degree, he doesn't have this problem. Fie does, however, ignore throw, and even states that it doesn't exist.

Sometimes fractional-ball systems are

offered with a very small number of angles, with the justification that the pockets allow several degrees of slop in either direction. While this may be true for object balls that are within a diamond of the pocket, if the ball is four diamonds from a corner pocket, the margin of error



to either side is only 1.3 degrees — that's the most you can cheat the pocket and still hope to make the ball. Diagram 3 is a plot of the cut angle versus the fractional cut, and you can see that between

a half-ball and a quarter-ball cut, there are about 15 degrees, only about two of which can be accommodated by sloppy pockets. A practical and complete system needs several cuts from a quarter to a half to work.

One thing to notice in Diagram 3 is the same thing that was noted in Diagram 1: For shots near a full-ball hit (small cuts) the angle changes nearly proportionally to the cut. But around an 80-degree cut, a very small variation in cut fraction or hit fullness causes huge changes in the cut angle. This is the main reason that thin cuts are so hard; any error is greatly multiplied compared to errors with nearly full hits.

I think that fractional-ball systems can be very useful to beginners and intermediates who are just beginning to learn how to aim. They put shots into a reference framework, and give you a way to compare the current shot with shots you've played before. But because there is so much they don't cover, you will need to supply the corrections — some of which I've pointed out above — by feel.

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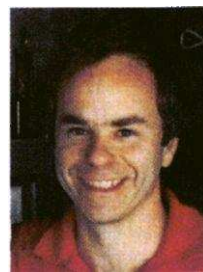
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BY Bob Jewett

MANY QUESTIONS?

Solve the riddle of close combinations with these experiments.



WHEN I was first learning to play, combination shots were quite a puzzle. If the two object balls involved were a fair distance apart, the shot seemed more or less normal except greater distances made it more difficult to pocket the final ball. But when the balls were close together, strange things started to happen.

The main effect, throw, is most easily seen when the two balls are touching. This makes the apparent "cut" mechanics work backwards. See Diagram 1. If you hit the 1 ball full, the 2 ball is not cut to the left, but instead is thrown to the right, as in the Shot A. If the object balls are separated by an inch, as in Shot B, and you play the same full hit on the first ball, the balls behave "normally" and the second ball is cut to the left.

To repeat: When the object balls are touching, throw dominates and the second ball is thrown to the right. At an inch apart, cut dominates and the second ball is cut to the left. What happens in between? Is there a distance between the object balls where the two effects cancel? Let's find it.

For this experiment you will need to set up the balls at very repeatable distances. You can tap the balls into the table, but the craters don't last long on thin cloth. You can use self-adhesive paper reinforcements — those white donuts from the office supply store. A third way that allows you to repeat distances across sessions is to get a paper hole

punch and some thick paper or a sheet of transparency film and punch holes at various distances apart. Tape or just place the punched sheet on the table pointing in the direction you want, and roll balls into the holes.

The experiment is to place the object balls apart at a certain distance and then see how much off-line and in which direction the second ball goes. In the preliminary stages, shoot the 1 ball with a full hit so it arrives at the 2 ball for

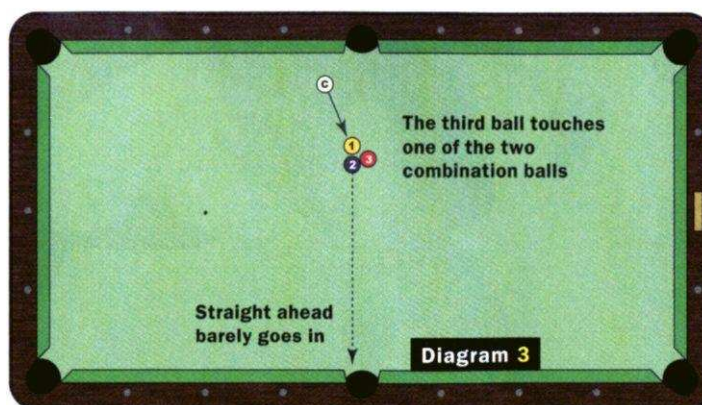
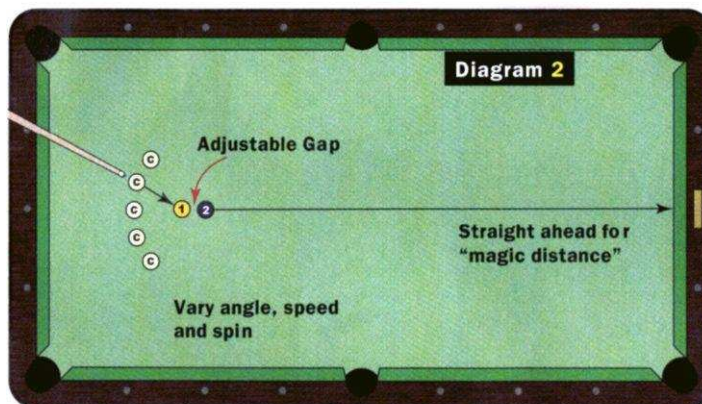
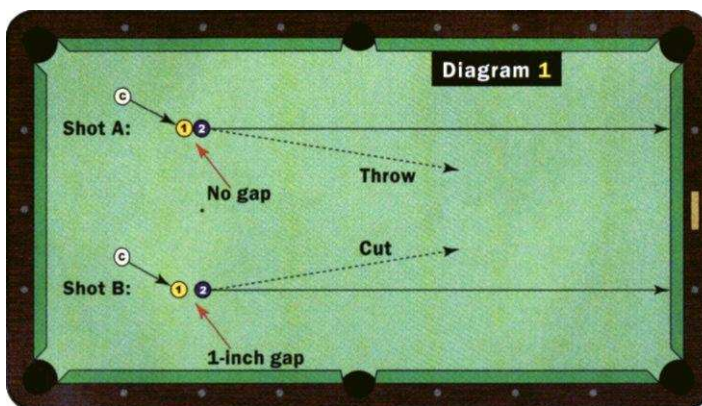
a half-ball hit, as shown in Diagram 2. That's about a 30-degree angle of approach. Use medium speed, so the ball banks back to about where you start.

(Before you start each test, it's good to find out where "straight ahead" is by placing the cue ball along the line of the object balls and shooting full into the combination so there can be neither throw nor cut. Mark on the far rail where the object ball arrives — that's your reference.)

At a certain distance between the object balls, you will find that the second object ball goes exactly along the reference line. This is the "magic distance," as one on-line personality has described it. (The balls' behavior will depend on how sticky they are. I hope the balls you have been using are in standard playing condition.)

Now that you have found the magic distance, let's try a few other variables. The first is to vary the angle of approach. What happens when the first object ball approaches the second at 15 degrees? How about 45 degrees and 60 degrees? At some point the "magic" will go, and cut will dominate. Of course, at large angles, you could bring back the magic by lessening the gap.

The second thing to try at



the magic distance is to vary the speed. From previous tests we know that balls throw less for hard shots. Does that hold up here? For four-table-length speed, how much cut can you get? How much do you have to decrease the gap to get back to the magic? Do soft shots show more throw than for your reference speed?

Next, try something other than a full hit on the first object ball. Put the cue ball in line with the combo, but hit half-ball on the left or right side. Is the magic still there? You might expect that the first object ball would pick up a little spin from having been struck on the side, and that spin might move the second ball over a little, but does it?

The next thing to try is sidespin on the cue ball, using either a full hit from an angle or straight on, or with a cut shot on the first object ball.

Finally, you can mess with the friction between the two object balls. Saliva is a handy — if not a bit too natural — substance to reduce the friction. Just apply it to the second object ball at the contact point. Chalk the pad of your finger and then roll your finger print — just like when you've been booked — onto the ball. How much do these change throw? Finally, if you are in the habit of occasionally waxing your object balls, try doing the test before and after waxing.

So much for the basics of throw and cut in combinations. Now for a wrinkle. In Diagram 3 is a combination with the 1 and 2 balls very close but not touching. A third ball (the 3 ball) has been added to the mix. The exact position of that third ball is critical. The 1-2 combination is lined up so that it just barely goes into the right side of the pocket with no throw.

First try the shot with the 3 ball touching the 2, with a larger gap between the 1 and 3 than the 1 and 2. Does a half-ball hit on the right side of the 1 ball put the object ball close to the center of the pocket? It does on my table. Throw is critical here for the shot. If the balls are pointed a little farther to the right, you must have throw to make the shot.

Set the shot up just as before, but now move the 3 ball so it is touching the 1 ball and is a small gap away from the 2. One millimeter is sufficient to make a big difference on a shot like this. Try the shot again. I think you will find that the combination throws in the wrong

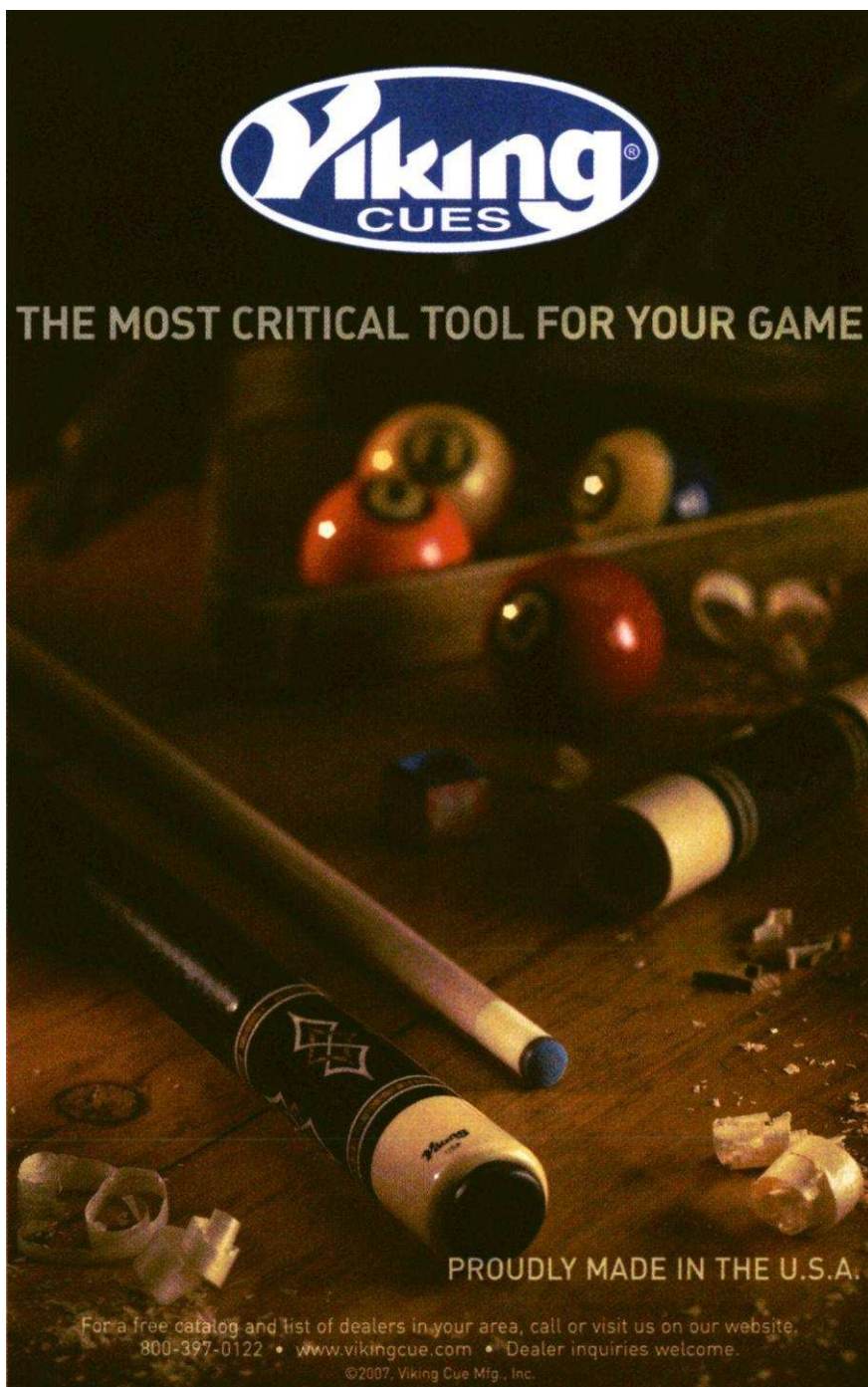
direction. Can you see why? How does the throw react if all three object balls are frozen?

This particular shot has baffled me and has cost me more than a few games over the last 40 years. I take pride in the fact that I've learned a new trick, but that's tempered by the fact that it took me 40 years to see what was right in front of me.

An important thing that this "interfered with" combination points out is the major influence even small gaps can

have in the reactions from clusters of balls. The most common such cluster you encounter is the break shot. Every gap is important, so rack tightly.

If you reread the above, you will see that I've asked a lot more questions than I've answered. That's intentional. You have to get to a table and do the experiment to get the answers for yourself under your conditions. Trying these sorts of shots is the only way to get a feel for them, so you'll be ready to use them in competition.



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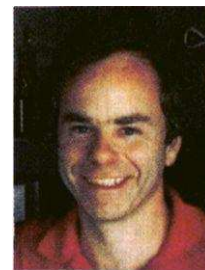
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The "Semicircle of Death" can help you avoid cue-ball peril.



LONG-TIME READERS of *Billiards Digest* may remember a series of technical columns by George Onoda, who did research for IBM. In February 1992, he covered a neat geometrical concept about scratching that deserves a new viewing — with some extension.

In Diagram 1, Shot A shows a typical problem. The object ball is on the head spot, and the cue ball has a good chance to scratch in the side pocket. Remember the first principle of position play: When the cue ball hits an object ball, the initial path of the cue ball forms a right angle with the path of the object ball.

Because the object ball will be going at a 45-degree angle toward the pocket, the cue ball will continue at a right angle from this line, which happens to be directly toward the side pocket. If the cue ball has either follow or draw, the spin will pull it off that initial path. If it has neither, which is called a "stun" shot, it will continue straight and scratch. The starting location of the cue ball is not important; you can scratch on any cut to the left, as shown. When you see the object ball in this position, red flags should fly that you need to take some kind of evasive action to avoid scratching.

Drawn with Shot A is a semicircle with its "feet" at each of the two pockets. The amazing result — thanks to geometry — is that if you shoot the object

ball into either pocket, the cue ball will scratch in the other pocket, as long as the contact point between balls is on the semicircle (assuming you use stun and cut to the appropriate side).

An example is shown in Shot B. The object ball is off the spot, but it's still on the semicircle. Again, the right angle formed by its path to the pocket puts the cue ball into the other pocket.

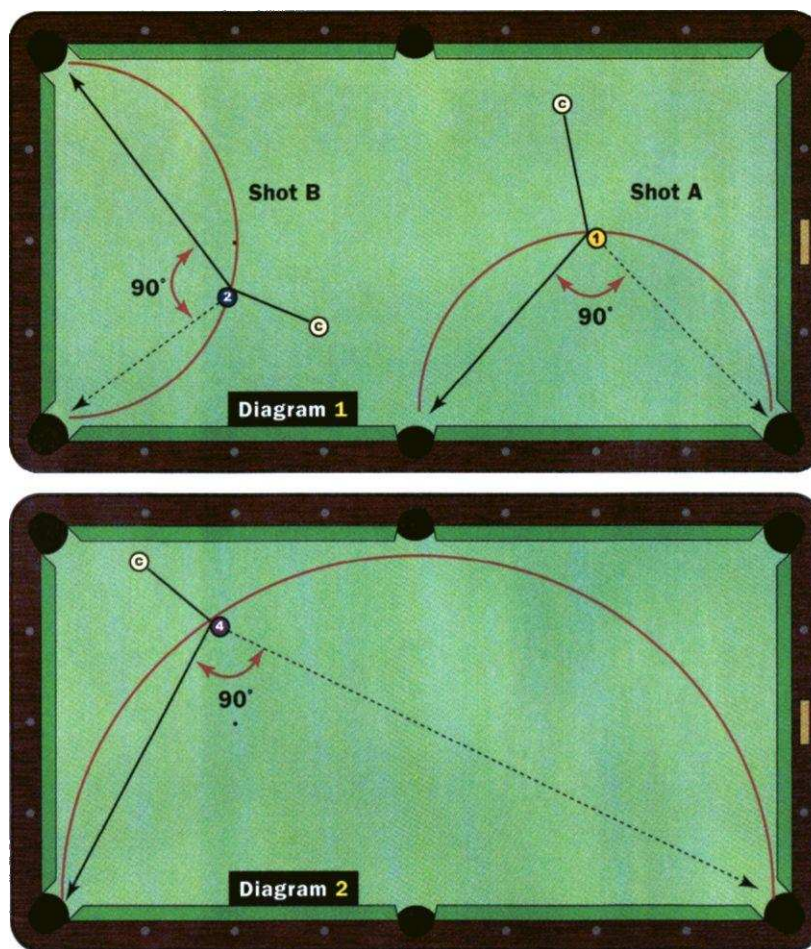
two side pockets. Can you draw this for yourself and place the cue ball and object ball appropriately?

One thing to note is that the geometry is valid for exact points, but the balls are quite a bit larger than points. If the object ball is exactly on the semicircle, the cue ball will be outside the semicircle at contact and will tend to be slightly outside the path to the pocket. But take caution, the geometry is still close enough to tell you that you have a problem, since a little spin on the cue ball may still put it into the pocket.

Besides warning you of possible scratches, this rule can also assure you when a scratch is impossible. In Shot B, for example, if the object ball is within the semicircle, any cut shot with either stun or follow cannot scratch since the cue-ball path must go to the short rail. Similarly, if a ball is on the spot, as long as you shoot with anything but stun — a naturally rolling cue ball is the easiest choice — there is no way to scratch. Try a few spot shots from anywhere on the table. As long as the cue ball is rolling when it hits the object ball, you can't scratch.

You could also avoid scratching on a spot shot with draw on the cue ball, but if the cue ball has a long way to go to the object ball, keeping backspin on the cue ball takes a good stroke.

The concept of a "semicircle of death" can be extended to draw and follow shots. The challenge is to know the an-



A third situation is shown in **Diagram 2** where the semicircle is twice as large. This usually presents less of a problem, since the pocket you might scratch in is a lot farther away. A fourth situation (that is a lot more common) is for the two feet of the semicircle to be in the

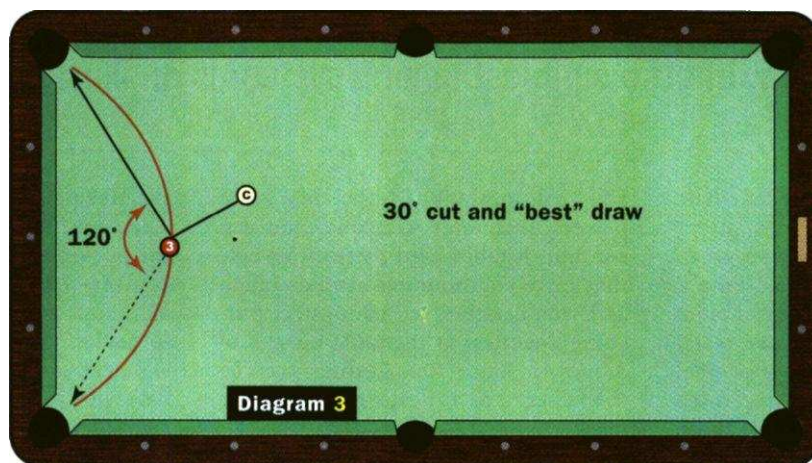
gle formed by the path of the object ball and the path of the cue ball, since draw or follow will make it larger or smaller than 90 degrees.

One good example was mentioned in another of Onoda's articles. If you shoot a 30-degree cut shot with the "best" draw, the cue ball ends up going at a right angle to its own original path, not to the path of the object ball. That is, the cue ball — with plenty of backspin — will make a 90-degree turn after a half-ball hit on the object ball. Since the object ball

is being cut 30 degrees and the cue ball is turning 90 degrees the other way, the angle between the two balls is 120 degrees. Is there a semicircle that works for this case?

There is, though it is slightly different from the first examples. In all the semi-

circles drawn above, the hypothetical center of the circle was in a convenient place, such as the middle of a rail. For the part of a circle that gives the scratch



locations for a 120-degree spread, the center is about a diamond off the table. The resulting arc between the two corner pockets is only about a third of a circle. Try the shot shown in Diagram 3. Before you shoot, make sure that the cut is 30 degrees by moving the cue ball

as needed, and that you use your best medium-speed draw.

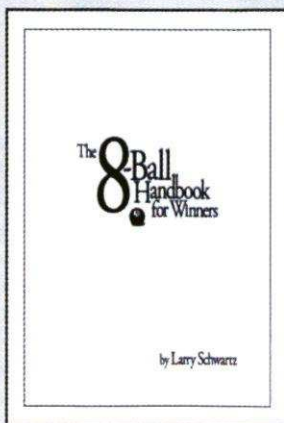
The hard part about using this extension of the idea is to make the angle between the paths of the two balls 120 degrees. While this can be done with a half-ball hit and your best draw, it's also possible to get that angle with a fuller hit and less draw. Here's a drill to practice this idea: With the 3 ball as shown (a diamond and a ball from the end rail), try to scratch as shown from various approach angles. Can you get to a cut of much more than 30 degrees? To make the shot more reward-

ing, put the 9 ball in the jaws of the cue ball's pocket.

While the object ball will not always be on one of the arcs described above, it is often fairly close. Being familiar with the danger zones will help you decide on the best way to move the cue ball.

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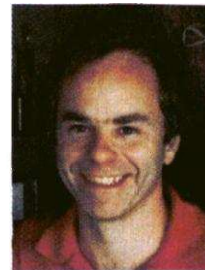
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ACTIVE SPECTATING

Learn from watching how top players approach the game.



HAVE YOU ever watched the players at a tournament? If you have, you are in the minority of spectators. In my experience, people watch what the balls are doing and rarely watch what the players do. They check the goal — ball into pocket — and ignore the method.

The next time you go to a tournament, start watching what the better players do. And, if you are going to do this properly, you have to be methodical and detailed. Prepare a notebook for your observations. One page per player ought to be enough with spots for the date and location of your observations. You might as well include the standard biographical and equipment information available, such as name, birth date and residence. Under equipment, include cue brand, weight, length and style, type of wrap, shaft brand and diameter, tip brand and anything that seems unusual about the stick. Does the player wear a glove?

The meat of the matter is in how the player approaches and executes shots. Is there a consistent pre-shot routine, or PSR? This can include viewing the shot from the line of the object ball to the pocket, chalking in a specific way and at a particular time in the PSR, stroking a particular number of times before shooting, and adjusting the aim or English in a particular way.

Some top players are very methodical in all of the motions that occur before the final power stroke. Others are far less consistent in what happens before they hit the ball. You may also discover that some players are some of each — which way do they play better?

What kind of bridge does the player use? In pool, most top players use both open and closed bridges. Are there specific kinds or speeds of shots where one kind of bridge is preferred? How good is the player's closed bridge? There

are lots of variations, and some are far more stable than others. Is the heel of the hand on the table? For the open bridge, is there a sharp "V" groove to guide the stick?

Where is the player's head? That is, does the player have one eye over the shot or is it the nose, or is the stick outside of the span of the eyes? In particular, notice whether the left eye is over the stick for a right-handed player, and vice versa. That combination can cause stroke problems.

One part of a very methodical PSR that I noticed a few years back at the Reno Open was the way Corey Deuel approached the table for each shot. His cue would always be vertical and in

front of him, like a soldier doing "present arms" on a drill field. His stick was along the line of the shot from the cue ball to the ghost ball from the time he stepped up to the table until the shot was finished.

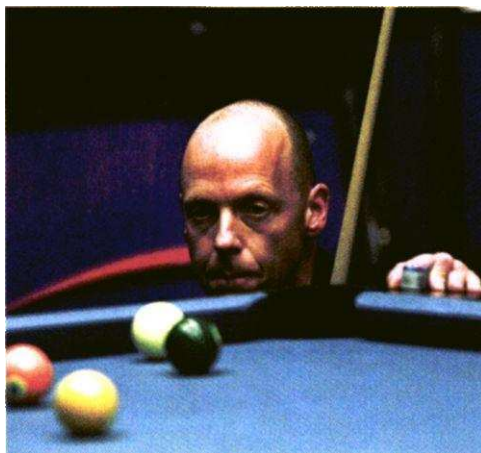
Another major part of the PSR is adjusting one's aim. In an earlier column, I suggested that you should stop with the cue tip near the cue ball after some warm-up strokes, and then decide

whether you should change something in the shot. Does the player you're charting have any obvious time to make corrections? Some players pause at the cue ball, and some are a continuous blur of motion until the shot is done.

When addressing the cue ball — that is, with the tip stopped near the cue ball — does the player have the tip at the final intended contact point? That's the common way, but some players have a habit of lining up one place and hitting another.

Notice the speed and number of the practice strokes. Some players have none. Some match the speed to the speed of the final stroke. Some players vary the number, and some stick with a single number, regardless of the difficulty of the shot.

On the final power stroke, there are many things to watch for. Is there a pause at the start of the final stroke with the tip near the cue ball? How much of a gap is there? I know one player who left less than a tenth of an inch between tip and ball — he must have had better depth perception than I have. If you see a pause at the cue ball, try to notice where the player's eyes are. I think most



Routine: Souquet prefers the ball's-eye view.

NOTE WORTHY

Look for the following information when watching your favorite player:

- > **EQUIPMENT:** Cue brand, weight, shaft diameter and tip brand.
- > **PSR:** Consistency in viewing the shot, chalking, getting into position and practice strokes.
- > **STANCE:** Type of bridge and where the player's head is over the cue.
- > **SHOT MOTION:** Where the tip is before the final stroke, pauses before or after the backswing and any elbow drop after contact.
- > **RECORD YOURSELF:** Now look for these things with your own PSR.

will be focused on the cue ball while deciding whether the spin is right or not. Do you see why a small gap is better than never getting the tip closer than five or six inches from the cue ball during the warm-ups?

As the player brings the stick back, is the motion always the same speed or is it matched to the speed of the shot? Does the stick come straight back? There are many players who will come to one side as they bring the stick back and then return to "centered" as they bring the stick forward. How much swerve is there? This is most easily seen when you happen to be sitting directly along the line of the stick and behind the player.

Is there a pause at the end of the backstroke? For Allison Fisher, that is the time that her eyes move from the cue ball to the object ball. Other players have no noticeable pause at the end of the backstroke; their arms become motionless only for an instant, like a pendulum at the peak of its swing.

With or without a distinct pause, where is the player looking when the tip hits the ball? The orthodox teaching is that you must be looking at the object ball except for some very special shots.

On the final, forward stroke there are lots of things to check. Does the stick come straight through? Some players have learned to put sidespin on the ball by swerving to the side of the intended English at the last instant. Can you find a top player who does this?

Does the elbow drop, and if so at what point in the stroke? Most players have a perfectly still elbow on very soft shots, but many will drop the elbow a bit as a natural finish to power shots. What does the subject of your observations do? You will need to check this over a range of speeds and positions at the table. This is one of the most difficult things to observe, because, if there is a drop, timing is critical.

Is there motion of the upper body during the shot? The first time I saw Raymond Ceulemans, the great three-cushion player, my impression was of an oak tree. All that he moved during the stroke was his right arm.

Does the player stay down on the shot? Does the stick stay out in the follow-through position or is it jerked back after contact?

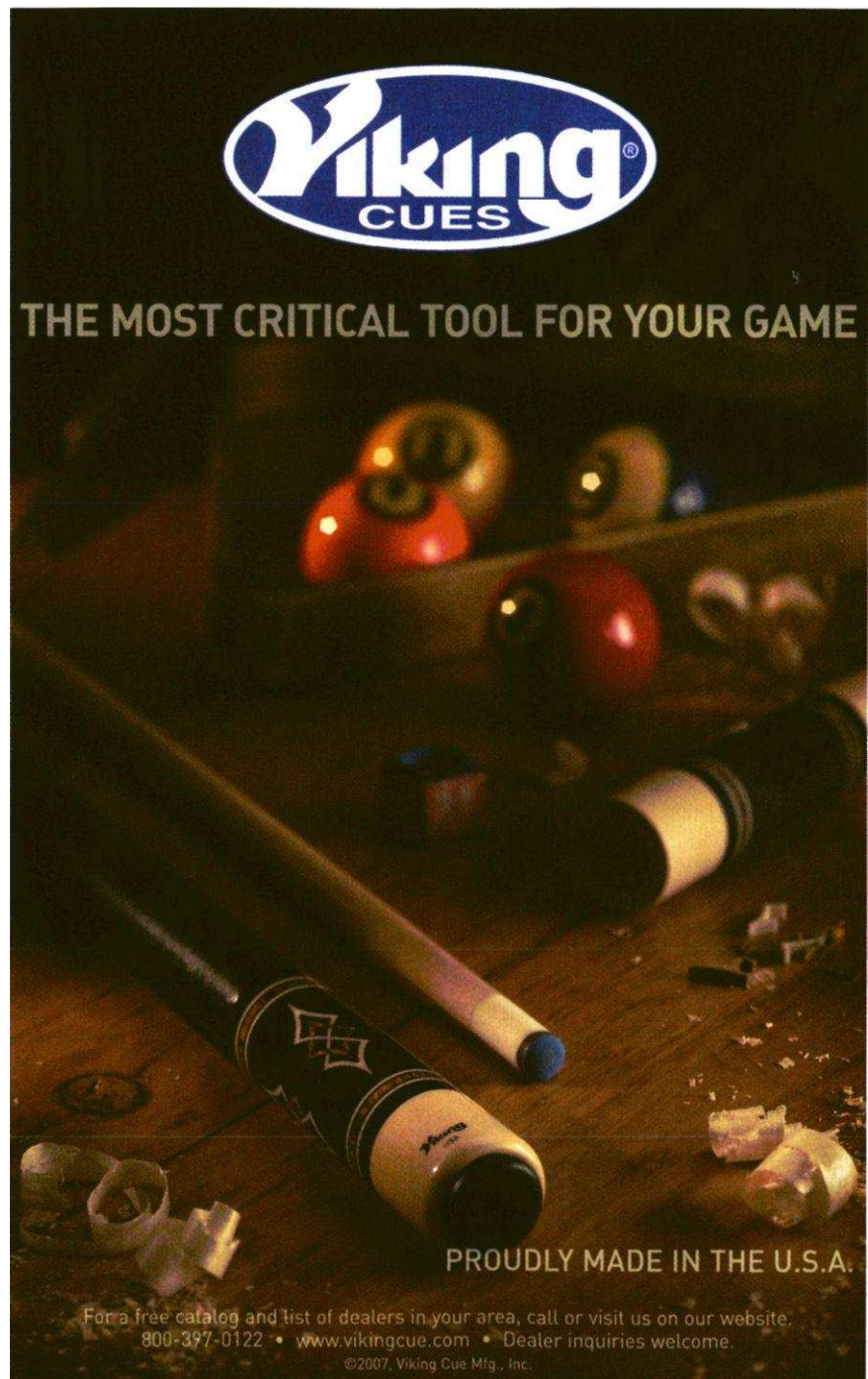
There are some other things to note during play. How often does the player use sidespin? Various authors opine

that it's needed on only a small fraction of shots. Does this theory correspond well with reality?

How much is the stick elevated? It is almost always elevated a little because the rails are in the way of perfection, but some players seem to play with far more elevation than the rails require. Here is a way that you can easily measure the elevation angle: Estimate how many inches higher the butt is compared to the tip. That number of inches gives the elevation angle in degrees within a few

percent. If the butt is six inches (the length of a dollar bill) above the tip, that's six degrees of elevation.

Once you've observed all these characteristics on top players, try looking at your own technique. Either get a video camera yourself or hire an instructor who has a video setup. Record 15 minutes of practice play, and also record shots from specific angles that will allow you to see the above points easily. How do you compare to the players you would like to beat some day?



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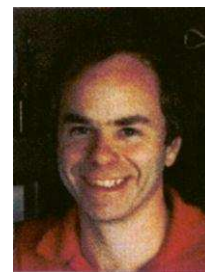
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SCRATCHED TO DEATH

More geometry to keep your cue ball free from a dangerous fall.



IN MY September column, I discussed the fact that certain object-ball positions on the table were very likely to lead to scratches. One example was a semicircle that sits spanning the end rail. If a ball is on that arc (or near it), and you pocket it in one of the foot pockets with no draw or follow, the cue ball is sure to scratch in the other foot pocket.

After submitting that column, I remembered seeing some other diagrams about a similar idea. In the 1925 book "English Billiards Made Easy," James Ogden shows Diagrams 1 and 2. In Diagram 1, he shows various places from which the cue ball can scratch if it starts in the "D" on a snooker table. (In those days, they were called "billiards" tables, because the main game played on them professionally was billiards and not snooker.)

In English Billiards, one of the main ways to score is to scratch off one of the other two balls. You get two or three points for that, and get to take your cue ball to the D and shoot again. Remember that this is on a table that is 6-by-12-feet in size. For a ball sitting in the right place, the scratch is much, much easier than pocketing the ball.

The real trick to that part of English Billiards, called "in-offs" because the cue ball goes into a pocket off a ball, is to recognize those special locations that are nearly certain to scratch. That knowledge is exactly what you need to avoid scratching when playing pool.

In Diagram 1, Ogden shows shots for which a scratch is not only possible, but easy. Just as with September's diagrams, the locations of the object balls form

parts of circles (arcs). Ogden's diagrams have two new features. First, one end of the arc is at the cue balls location. This isn't obvious from the balls shown in the diagram, but you can move the object ball closer and closer to the cue ball and still have a more or less automatic scratch with the right kind of cueing and cut angle. The other difference is the total curve of the arc or the amount of a full circle that it includes,

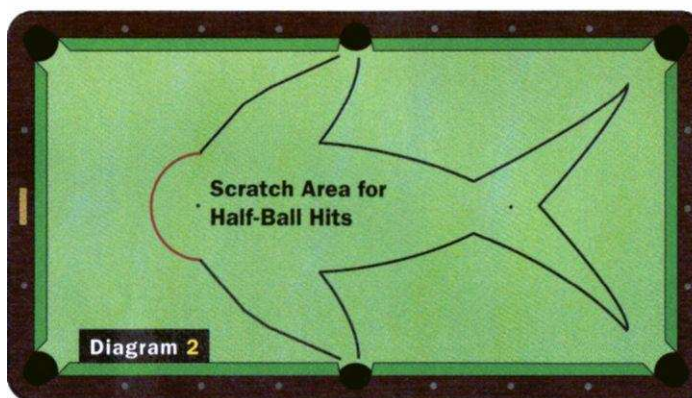
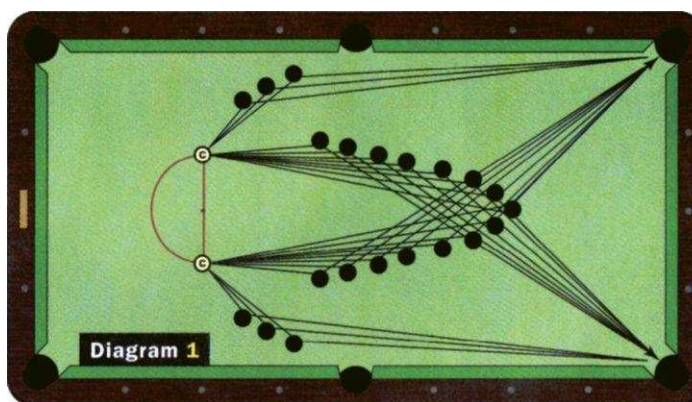
degrees. This angle is very insensitive to how full the object ball is struck, so for a large range of cut angles on the object ball, the cue ball will deflect close to 30 degrees to the other side.

This constant angle of the cue ball coming off the object ball is exactly what is needed at English Billiards. If the cue ball happens to be in the right position, or you can place it in the right position because it is in hand, you can play a half-ball hit and be sure that the cue ball will head for the pocket.

It turns out that the angle the cue ball is deflected for a half-ball hit is not quite 30 degrees but rather 35 degrees (within a fraction of a degree). The exact angle depends on the characteristics of the balls — their weights, how smooth the surfaces are, how elastic the plastic is — and you have to experiment on the table to be precise. You'll need to do that anyway, once you finish this article, to get a feeling for the angle. With the cue ball deflected 35 degrees on a shot, geometry tells us that the resulting arc will be twice that, or 70 degrees out of a circle.

From this idea, Ogden produced the figure in Diagram 2. This looks like the chalk outline of a large, winged, aquatic space alien who was murdered on a snooker table,

but it's actually much more useful than that. It is the region of all possible locations of an object ball where you can set up an easy half-ball scratch from the D. The alien's feet are made up from two 70-degree arcs that have their other ends at the corners of the D. As an example, note that the foot spot, what the British call the pyramid spot or the pink spot, is within the body. This means



which turns out to be 70 degrees. Why is that?

Those of you who have been reading Dave Alciatore's recent columns (and my columns and Bob Byrne's columns before that) should know about the 30-degree rule. If the cue ball strikes the object ball about half full and is rolling smoothly at contact, it will be deflected from its original path by roughly 30 de-

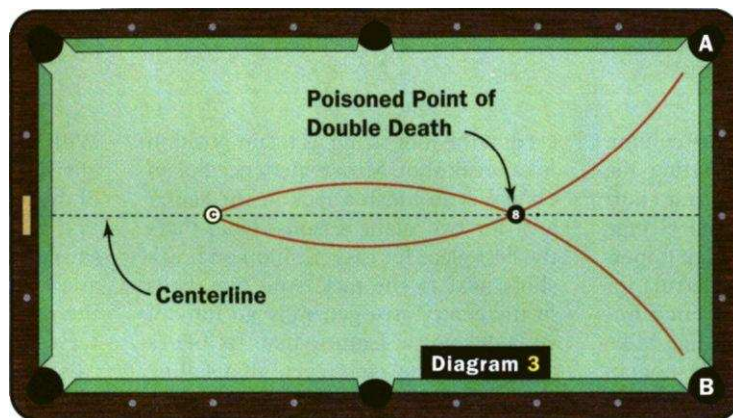
that to scratch off a ball at that location, the cue ball is placed somewhere within the D and played with smooth, rolling follow with a half-ball hit off one side or the other of the object ball.

Go to a table now and find where you have to place the cue ball on the head string to easily scratch off a ball on the foot spot. If Ogden's diagram is right enough for a pool table, that spot should be within a few inches of the head spot.

At English Billiards, one way to run up a lot of points was to scratch off a ball in the scratch area and drive the ball off some cushions back into that area. Top players got very good at doing that repeatedly, always bringing the object ball back to the same spot, so the rules were changed to require some other shot from time to time.

In Diagram 3 is a similar situation for a pool table. The cue ball is on the head spot. The "arcs of disaster" for scratching in pockets A and B are marked and

they meet at a point about 6 inches above the foot spot. For the purposes of play, this means three things. If the object ball is on the other side of the arcs (on the foot spot, for example), it is hard to scratch as long as you shoot



slowly and the cue ball is rolling when it gets to the object ball. The cue ball will go to the foot rail. The second is that if the object ball is at the intersection, marked as the "poisoned point of double death," there is no way to make the object ball in either corner pocket with

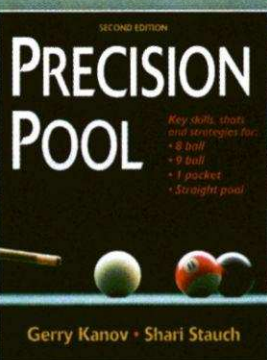
a slowly rolling cue ball and not scratch. The exact point might be a little forward or back from the illustrated spot, but there is such a point. The last thing to note is that if the object ball is on the centerline of the table but on your side of the poisoned point, it is again hard to scratch while making the object ball, as the cue ball will always land on the side cushion.

Try constructing your own scratching arc, say, for the cue ball near a head pocket and scratching into a foot pocket. Remember to always try to hit the object ball half full and let the cue ball roll on the cloth with just a little

more speed than required to get to the pocket. That will ensure a true half-ball carom angle.

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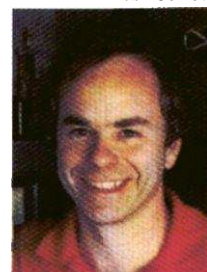
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TRICKY TICKY TACTICS

See new safes using a shot borrowed from carom billiards.

PART OF learning how to play well is developing a repertoire of shots and shot concepts. This month's subject is the "ticky," which is a shot largely borrowed from carom billiards. In a ticky, the cue ball strikes a cushion just before it hits an object ball and then wonderful things happen.

Shot A in Diagram 1 is a sell-out at 9-ball. Your opponent left you no direct shot at the 1 ball, but it is easy to hit using one or two cushions. The path shown has the big advantage of pocketing the 9 ball. This shot looks hard to beginners; but with the balls in the position shown, the 9 becomes nearly automatic, with the cue ball hugging the cushion on the way to the score. The important parts of the shot are that the 1 ball must be a little more than a ball from the cushion, and the cue ball should come into the rail at an angle of 30 to 45 degrees.

To get consistent action on the cue ball, play it fairly softly with follow and running (right) sidespin. A hard shot will tend to make the cue ball ricochet off the cushion and away from the 9. Follow keeps the cue ball on the cushion and the running English helps the cue ball continue toward the target if it returns to the long rail.

Practice Shot A until you are confident with getting the right action. Try varying the angle of the cue ball and the distance of the 1 ball from the cushion. There are systems for aiming the hit on the 1, but try to develop some feel first. Most systems will be rendered inaccurate by the follow, the running English and the fairly soft speed of the shot.

Shot B shows an example from a game

of 8-ball. This time it's the object ball that's destined for the pocket, going in off the back of one of the blockers. Here you cannot use running English on the object ball, but you can use follow on it to help it hug the cushion. To get follow, just shoot fairly softly. As the object ball slides across the cloth on the way to the cushion, it will naturally pick up some forward roll. This works better from farther back so the object ball has more time to get rolling, but even a

your conditions. I've shown the blocker three-fourths of a diamond from the pocket. Is that too far for consistency?

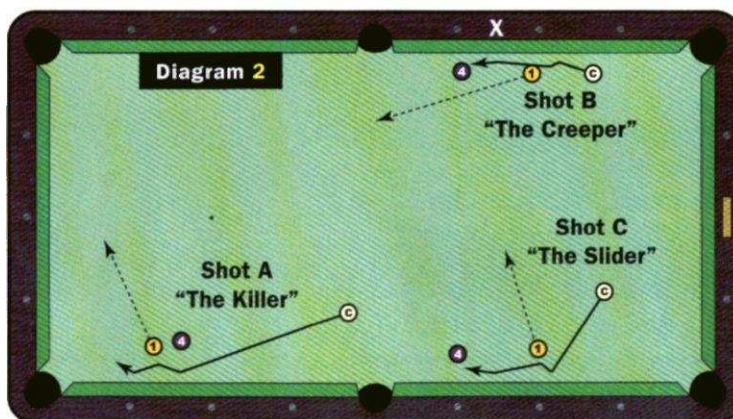
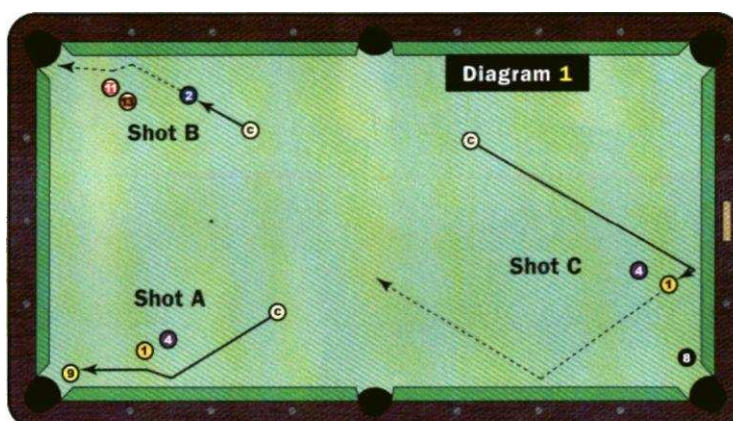
Shot C is a slightly different 9-ball situation. You could try to ticky under the 1 ball to pocket the 8; and having practiced Shot A, you would be ready and able. The problem is predicting where the 1 will end up. It does you no good to use your new toy (the ticky) if it just gets you into trouble.

Instead, aim to hit the 1 ball full when the cue ball comes off the cushion. The cue ball should stop dead, or if it has some follow, it will stick to the rail as if it were glued. For this shot, the 4 ball becomes an asset since it will likely block your opponent's shot if you kill the cue ball as planned.

I find that on old, sticky cloth, Shot C is quite a bit harder, because the cue ball loses all its follow when it hits the cushion. This means that you will need to try the shot under different table conditions as well, or at least be prepared for a slight surprise if you try the shot on a table strange to you.

Shot A in Diagram 2 is a similar safety shot, but the problem is to keep the cue ball from following its natural angle. With the blocker as shown, there's a good

chance of hitting the 1 ball thin and sliding into the corner pocket with the typical ticky action. To avoid that possibility, play the cue ball with full draw and a somewhat firmer stroke. You can get the cue ball to pull to a stop from surprisingly steep angles. As you practice this shot, note the paths you can get



diamond or so gets useful follow on the object ball.

Again, you need to practice Shot B so you have some idea of the percentages involved. Change the angle and the distance of the blocker off the cushion, but also vary the speed. The goal is to find what makes the shot the easiest under

on the cue ball. Reverse (left) English will help to kill the cue ball, especially if it gets back to the cushion after hitting the 1 ball. If necessary with a fairly thin hit, this shot can be used to play the 1 into pocket P without the risk of a scratch or obvious sell-out. Your best bet would be sending the 1 off the short rail, long rail and then up-table, but this is dependent on the layout of the rest of the table.

Shot B, or the Creeper, is a 9-ball safety that not too many pool players would think of, but it's a standard kind of ticky in carom billiards. If you try to cut the 1 ball slightly to the left to miss the 4 ball, the cue ball won't be well hidden. The ticky trick is to hit the cushion very softly with running English and follow. The 1 is driven near the side pocket, while the cue ball returns to the cushion, the right spin making it creep up to nestle against the 4. Remember that you must get the cue ball back to the cushion (shown at X), or the shot is a foul for lack of hitting a rail. If your opponent is the sort of person who is unlikely to recognize genius, you should alert him to watch for the rail contact at X after the hit.

There are two things you have to practice for on this shot. The first is the full hit on the 1 ball. If the 1 is being cut away from the side cushion much more than shown and the cue ball is running through the 4 ball with more speed than the 1, you are hitting the cushion too close to the 1. Aim at a steeper angle. The second is the speed on the cue ball. Since you want the cue ball to move only a diamond or so after the hit on the 1 ball, the speed is less than you would need to shoot the 1 ball to the far end of the table. Softly does it: It almost seems like cheating to play safe like this.

Finally, Shot C in Diagram 2 is a slight modification of B with a much steeper angle into the cushion. For me, it is much harder to judge the cue-ball hit to move it along the rail and put it very close to the 4 ball. Note that for the angle shown, the 1 is not naturally hidden after contact as in Shot B, so the cue-ball speed must be perfect. (The exception would be if you used the right speed on the 1 to send it back across the table to end on the on the other side of the 4 ball. Then all you would have to do — besides judge the speed accurately — is kill the cue ball.)

The general concept of the ticky has a long history, but few authors explain it

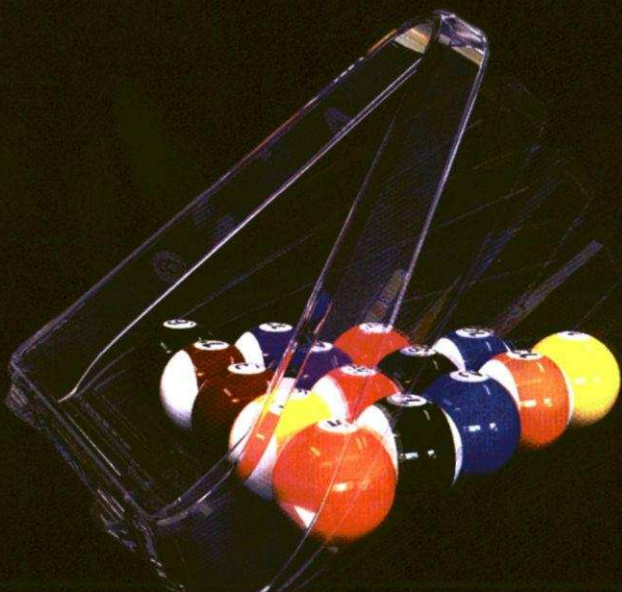
clearly. Ray Martin, in his "99 Critical Shots in Pool," more or less shows the action in shots 50 and 75 but doesn't name it as a special shot. Mike Shamos, in the "ticky" entry in his "New Illustrated Encyclopedia of Billiards," alludes to Bob Byrne's "Standard Book of Pool and Billiards," where it is illustrated both in the pool and carom sections. Byrne also covers various ticky variations in his "Advanced Technique" book. Shamos points out that 200 years ago, the shot was shown in E. White's

"A Practical Treatise on the Game of Billiards." White seems to have lifted the shot from an earlier French book which is quoted, but White does not explain the details in English. (For those of you who would like to have a copy of White's book, there is good news: It has been reprinted and will be available shortly for far less than the \$600 to \$1,200 that it usually sells for. Keep an eye on these pages for the ads.) OK, you have a new toy. Have fun playing with it and use it when appropriate.

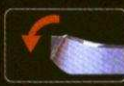
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