



One Thing at a Time

This solid philosophy for life is also an effective way to practice.

Bob Fancher has updated his book on the psychological aspects of playing pool, "Pleasures of Small Motions." He makes many interesting points, but the one I noticed most was that learning pool works best if only one thing is learned at a time. Below is an outline of a procedure that I think puts Fancher's points into practice.

Fancher is a firm believer in separate practice time and play time. During practice time, work on developing specific skills and think about what you are doing. Moreover, notice how all aspects of the shot feel. During play time, thought is mostly a hindrance. You must rely on your feel (this will be scary for the over-thinkers among you), and thought for the most part must be put aside during the execution of the shot.

Well, let's suppose you want to improve and are organized enough to practice, and you have a list of things to work on. What's the best way to wire up the circuits that must be in place in your brain/spine/arm to make one of the shots you're having trouble with? Isolate! Work on just that shot for an extended period of time, perhaps an hour. After your practice on that single subject, don't try to learn anything new. It's okay to play and run practice racks, but don't try to work on any new skills for at least six hours.

For example, your list of problem shots might include break shots, draw at a distance, open table cuts such as the spot shot, and precision stop/stun shots. You might want to fix all of these at once and put in two hours on each. Fancher suggests that this is a bad strategy, and that you should concentrate your time on just one aspect. <

Let's take stop/stun shots as an example

and work through it for a whole week, supposing you can get to a table three times in a week for at least half an hour each time.

Monday is league night, and you can arrive an hour early for practice alone. In Diagram 1 is your job for the night: progressive practice stop shots. The goal is to

During your practice, try to get a feel for the shot. Note your body position, the motion of your arm, the feel and sound of the tip on the ball, and the cue ball sliding down the table straight at the object ball. The goal here is to build up images of the shot to replay when it's time to play it in a

game. One thing that may help on this particular shot is to use a striped ball (or a training ball) as the cue ball, so that when you start the cue ball with draw — as you must — you can see the draw ebb due to friction with the cloth until the instant of contact.

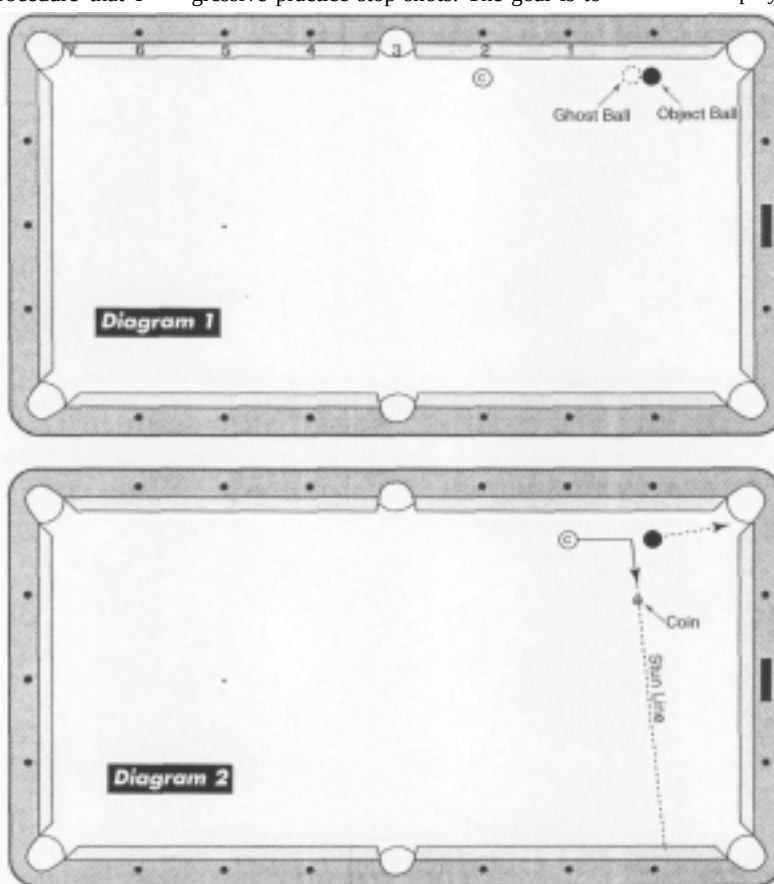
Score the drill by how far back you are starting the cue ball at the end of your practice. Since you have moved the cue ball position each time, this one number gives your score for the night. The cue ball is shown at point-value 2.

If you have gone through a couple of racks of this shot, and there is still some practice time before league, try two other variations. You have probably been playing the shot with a medium amount of draw; instead try the maximum and minimum draw you can use and still get a stop shot. When hitting the cue ball as low as

possible, you will probably also have to reduce the speed for most shots. With the minimum-draw option, you will have to crank up the speed, so the cue ball doesn't have time to acquire follow on the way to the object ball.

Later that night during league, just play your regular game and let the practice sink in. If you happen to come up to a stop shot, remember how it felt in practice and try to duplicate the feeling.

On your second session of the week, practice the stun shot, which is a stop shot



shoot the straight — in shot and have the cue ball move no more than its own diameter after contact. Another way to say this is that the cue ball must come to rest overlapping the ghost ball. (The ghost ball is where the cue ball is at the instant of contact.)

As in all progressive practices, if you make the shot with all of the requirements, set the next shot up a little harder by starting the cue ball farther back. If you miss, make the next shot easier, adjusting the cue ball position in either case by half a diamond.

Bob Jewett

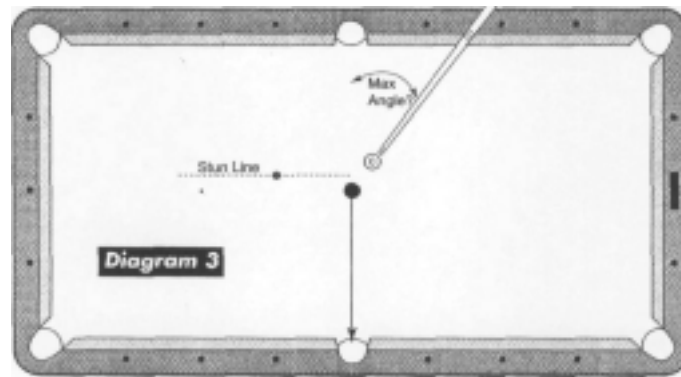
at an angle. Set the balls up as in **Diagram 2**, with each ball exactly a ball off the cushion, and place a coin straight sideways on the stun path. Pocket the object ball and move the cue ball to the coin. The precision required is up to you. Leaving the cue ball on top of the coin is best, but mortals will settle for a palm's width of space (about four inches) between the coin and the ball. Move the coin progressively farther away as your skill improves.

You will probably find that this shot feels a lot like the second part of the first night's practice. You are shooting a "stop" shot at various speeds. To get the distance, you need a certain speed, and to get the stop, you need a certain amount of draw for that speed.

If you have time in your hour of practice, try the shot with the cue ball starting a diamond further back. This is a much harder shot, since there is less angle to the pocket and you have to hit the cue ball harder to get it to move sideways. After the hour, challenge someone to straight pool.

For the final night of practice at stop/stun shots, try the shot in **Diagram 3**. The object

ball goes on the center spot — right between the side pockets — and the goal coin is placed along the kiss line starting one diamond toward the end. For that position goal, try various angles on the cue ball. Of course, nearly straight — in is what you



practiced on night two, but see how much cut you can have and still get the cue ball to the coin. You will probably find that this is easiest when you place the cue ball only a few inches from the object ball. Do you see why?

After you have tried moving the cue ball one diamond from various approach lines, move the coin another diamond down the table and try the various cut angles again.

Continue until the goal is to leave the cue ball on the end cushion. Suppose in a real game you had the shot to the side with ball in hand, and you had to move the cue ball to any position along the long string (the centerline of the table). Do you have a feel for the best starting point for the cue ball?

The third practice hour concludes your work on stop/stun shots for the time being. Play for a few weeks to let things settle in. You will probably have chances to apply what you've learned. Finally, take just a few minutes to give yourself an informal test. Set up five or six shots from all parts of the practice time, and see how well you do on the variety. Play them in shooting

mode — by feel — and not in practice mode with your brain turned on. How's your progress? Try the progressive drill again. Has your score improved?

It may seem like working on only one thing at a time is too slow with all the facets of your game that need polishing, but look at it this way: If you fix just one problem per week, in a year you'll be out of problems.



Physics and Pool?

Is science really helpful in cue sports?

Can your play really benefit from an understanding of the math and science behind the game? That's a question I hear all the time, and the answer is not so clear.

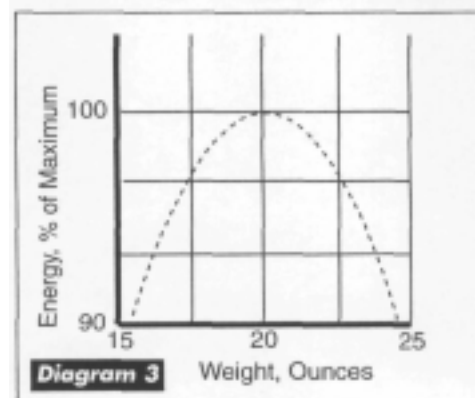
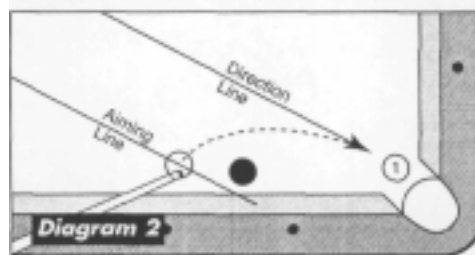
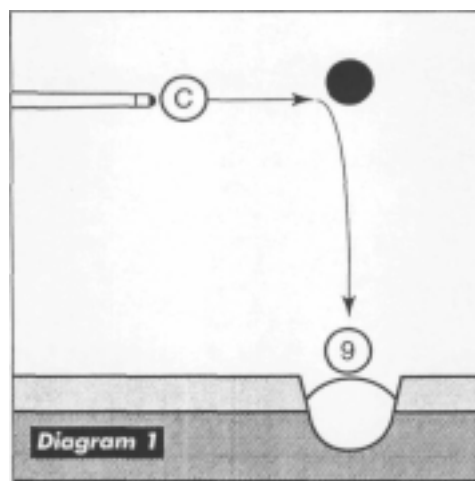
I think that during a match, too much cogitation is a bad thing. If you have a tough 7-ball shot that needs outside draw to spin four cushions to get on the badly-placed 8, it is the wrong time to be calculating deceleration rates based on coefficients of friction and relative surface motions. I'm a firm believer in the simple technique: "See the shot, shoot the shot." That may startle long-time readers of this column, but please note that I'm only referring to a playing situation.

During practice time, you need to be thinking about what you're doing and why the balls behave as they do. Well, it's not required; you can become a champion without ever really understanding what's happening on the table. It just takes a lot of talent and practice time. For most of us, learning how the balls work, and especially how each factor can change the outcome of shots, makes practice time more efficient. If you can put your experience into a coherent framework, and build that base, your game will become solid more quickly.

A second area where science can help is to knock down bogus ideas or give support to valid and useful ideas, and perhaps extend them. An example of the former is the old advice on how to make a ball that is frozen on the cushion: "Hit the ball and cushion at the same time." It is remarkable how many confused, poorly-read players still believe this "obvious" but wrong notion. It is simple enough to disprove, but because a champion or two has passed on this "wisdom," it is still in circulation.

An example of old advice that physics can illuminate is the "perfect draw" shot. Major Broadfoot, in his excellent 1896 book "Billiards," discusses the shot shown in Diagram 1. The problem is controlling the path of the cue ball, and specifically sending it along the line perpendicular to the cue ball's original path.

Broadfoot's solution is to play the shot with a half-ball contact (aim the center of the cue ball at the edge of the object ball) and use "best draw." Broadfoot goes on to say that if you don't get a perpendicular cue ball path, you must have hit the object ball



with more or less than half ball. This basic idea has been covered several times in this magazine, first in Dr. George Onoda's May 1989 column, and more recently in my November 2000 article on half-ball shots.

A closer look at the physics of the shot explains how it works, and what can be modified. The final cue ball angle for any draw shot can be found by complicated equations or a simple graphical method given here in June 2001. It turns out that for a half-ball hit, "ideal" draw — that is, as

much draw as a smoothly rolling ball has follow, so that the surface of the top of the ball is not moving at all — is not quite enough to pull the cue ball back to the perpendicular line. This means that if you do get the right path on the cue ball, either you hit the cue ball slightly fuller than half ball, or you managed to get "retrograde" draw on the cue ball.

When seated comfortably in your armchair, physics doesn't tell you the limits to shots. For example, without actually trying the draw shot above, you can't tell whether your tip, chalk, stroke, cloth, object ball, and cue ball can achieve Broadfoot's perfect draw. For that you have to go to the practice table and try a few shots. The practice is also necessary so that the next time the shot comes up, you will recognize it and be able to execute it.

Another shot where science provides at least a partial solution is the masse. Almost 200 years ago, a French scientist named Coriolis worked out the amazing result shown in Diagram 2. If you want the cue ball to curve into the final path shown, your stick needs to be pointing through the cue ball to a spot on the cloth on the "direction line" which is parallel to the final path. Coriolis also showed that the curved part of the path is a shape called a parabola, which is the same sort of path a ball follows in the air if wind resistance is not a factor. Unfortunately, Coriolis failed to provide a useful formula for how hard to hit the ball, just as a baseball coach won't tell you how hard to throw to get the ball to second base — you learn by doing. For more details on this way to aim masse shots, see Robert Byrne's book on "Advanced Technique."

Sometimes physics can provide general guidelines on how an experiment is likely to work out. People often wonder about the best weight for a break cue, where the main concern is how fast the cue ball is going. The actual experiment is very hard to do. If a person is swinging the stick, it is necessary to give him time to get used to the heft and balance of each different weight. Just because you break well with a 21-ounce stick doesn't mean it's best for you, but it could take you a month to get your timing down for a 17-ouncer. Basic physics does say that if you plot your break speed versus stick weight, the resulting curve should be

quite smooth, like the plot in **Diagram 3**. On the vertical axis is the estimated energy in the cue ball compared to 100 percent at 20 ounces — the assumed best weight. The exact width of the curve needs to be determined by a sports kinesiologist (body motion scientist) but I expect no more than a few percent change in cue ball energy for a plus-or-minus two ounce change in stick weight.

This kind of smooth optimum is often seen in physical situations where there are two competing factors. In the case of a break stick, a light stick just can't get any speed into the ball — imagine breaking with just the shaft of your cue. On the other end, a very heavy stick is too hard to accelerate with just your arm — imagine tying a couple of bricks to the butt. Somewhere in the middle is the best weight, and the general nature of the problem says that you won't get 50 percent more power from a one-ounce change in stick weight.

Another area where knowledge of the physics of the game can help is in refereeing. Usually when judging which ball was

hit first, you can detect a bad hit by the directions and speeds of the balls just after the shot. This is good, because it's often impossible to actually see the order of contact. Many players haven't caught on to this, and will call someone over to watch a hit when the legality of the hit will be clear

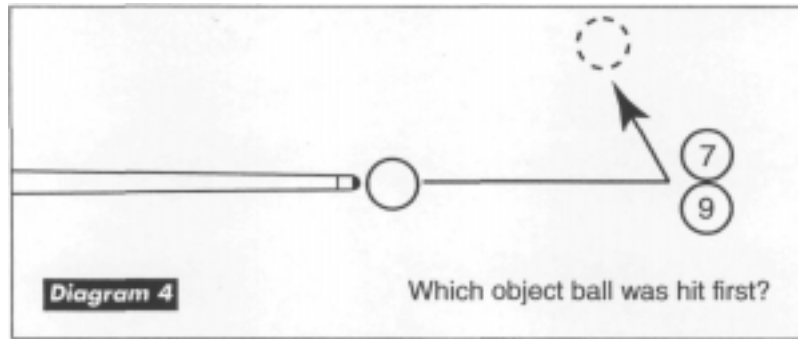
things for good physical reasons, and often players are confused about those reasons. In particular, if the cue ball hits a close object ball full, it will stop dead, just as when it hits a distant object ball full. I've had one player tell me that the subsequent high speed on the cue ball — it caught up

with the object ball — was because he had "special stuff" on the ball, which decays rapidly as the ball moves off the tip, so it is not seen on longer-distance shots. Yeah, right.

A final application of physics in billiards is to the design of the equipment. Most recently, this has been seen in stick design where the underlying

mechanisms of squirt (sometimes incorrectly called deflection) have been first revealed by high-speed camera, and then developed into a theory that can guide useful designs.

Do you need to know pool physics to play well? Goodness, no! Look at all the fine players who don't know tensor from tennis. It can help you learn more quickly, though, and for some people it's fun studying all on its own.



from anywhere in the room. An example of this type of call is in **Diagram 4**, where the cue ball may hit the 7 or 9 first. The diagram shows the path of just the cue ball, something which you could certainly track from across the room. This alone is enough information for a physics-savvy referee to make a call. Can you tell which ball was hit first?

Another refereeing application is in double hits on close object balls. Balls do



Experimental Results

Readers reveal their findings on the question of throw.

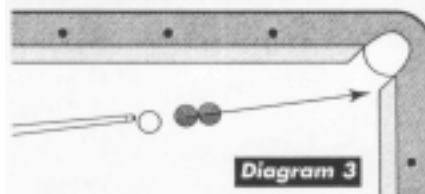
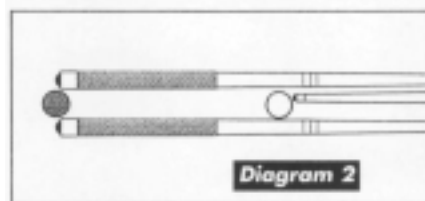
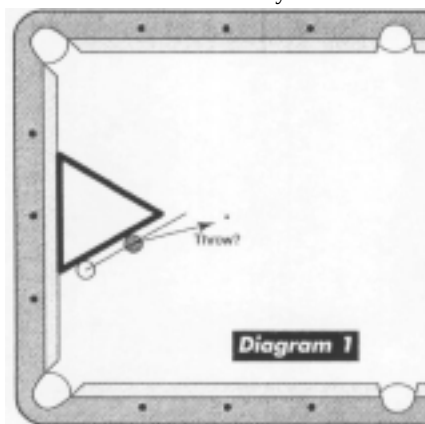
In Mike Sigel's columns last August and October, he presented a remarkable hypothesis: There is no throw between the cue ball and the object ball on normal shots. Since this conflicts with what has been said before by the likes of Willie Mosconi, Robert Byrne and Joe Davis, there was understandably quite a bit of controversy, expressed both in letters to the editor and in lively exchanges on Internet discussion groups.

In my December column, I proposed an experiment (actually, three) for readers to try and to report back on. The response was the largest I've had to such a proposal, with 13 sets of results turned in, including two from group efforts. Several of the amateur scientists had started work before my call for testing went out, and a couple had even finished their studies. One of the responses came from a player who is in prison — did you know that the leather tip was invented by Francois Mingaud while a prisoner in France? — but the analysis had to be done without the aid of a table.

The award for creativity goes to 15-year-old Dave DeSimone, who came up with three different tests. In the early stages of his experiments, to demonstrate the idea to his dad, he used what happened to be available at the time: a cue ball and a baseball. The result was that the baseball was thrown by an easily visible angle, larger than seen with pool balls. He concluded, I think correctly, that there is large friction between the cue ball and the baseball, which makes the angle large. While this doesn't directly address collisions between pool balls, it does establish the occurrence of throw between balls at least under some conditions. This kind of test is often useful in science — do an experiment that is not quite what you want but is easier to do or observe, and try to work the results into a theory that could apply to the test you would really like to do.

Dave realized that the main problem with testing for cue-ball-to-object-ball throw is that you need to know the location of the cue ball when it hits the object ball. He points out that because there is an unconscious tendency to correct for squirt, it's really hard for a shooter to know exactly — within a millimeter or less — where the cue ball is at the instant of contact. His next test

was to set up the cue ball and object ball frozen to the side of the triangle as shown in **Diagram 1**. "Rack side" English and a full hit are used, and the object ball is deemed to have been thrown if it moves away from the straight-ahead line of the shot. This is an effective way to control the



position of the cue ball because, as Dave says, "Even if the object ball is contacted to the right instead of dead on, the rack will absorb the energy and send the object ball at the angle the rack is pointing." In effect, the rack is a very dead rail that makes the ball go nearly parallel to its side.

In Dave's final test, he forced the cue ball to be in a known position by setting up two cue sticks as in **Diagram 2**, with just enough space between them for the cue ball. He reports that the object ball was thrown and that at least on some shots, there was side spin visible on the ball which made it take a noticeably wider angle when

contacting a cushion. He makes the interesting extension that this transfer of side spin is the same thing as the cue ball's transferring follow to an object ball when you play the cue with draw, the usefulness of which any decent player can attest to.

Another reader who started experimenting without being prompted was Ronn Nadeau, who wrote a brief article on the no-throw idea complete with three color pictures. While doing his research, Ronn discovered (or rediscovered) the possibility of "two-ball English-induced throw." His setup is in **Diagram 3**. It is a simple two-ball combination. When testing this shot, make sure you tap the balls into place or use paper reinforcement donuts for repeatability. Normally, you would throw the combination by hitting one side or the other of the first object ball. Suppose that you have to hit that ball full for position or other reasons. Will side spin on the cue ball change the path of the second ball? Ronn thinks so. Check it out.

One semi-anonymous reader named "Pete" from cyberspace tried only the last test I proposed, which was to place several balls as if spotted on the foot spot and see if the back one could be made into a corner pocket. He found that with four balls spotted, and the cue ball starting even with the head spot, about half way to the side cushion, without side spin on the cue ball, it was just barely impossible to cut the fourth ball into the corner pocket as the third was in the way. With side spin (on the side of the third ball) he made the ball ten times in a row. Since the third ball prevents the cue ball from swerving in for a fuller hit, Pete concluded that the only explanation was throw on the object ball: "Although I have not clouded the issue with a lot of spreadsheets, theories of plane geometry or physics, or gobbledygook, I feel that [...] this cuts to the core of the issue and proves that English applied to the cue ball does affect the path taken by the object ball when the two collide."

Of the eight experimenters who tried this last setup, six found that spin helped make a ball that was just barely impossible without it, but two found that side spin didn't seem to help. This is an easy one for you to set up on your own, although it's hard to put an actual number on how spin changes

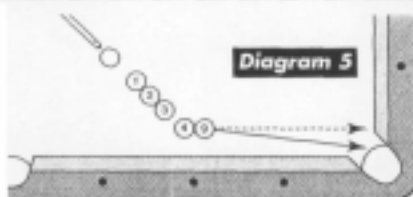
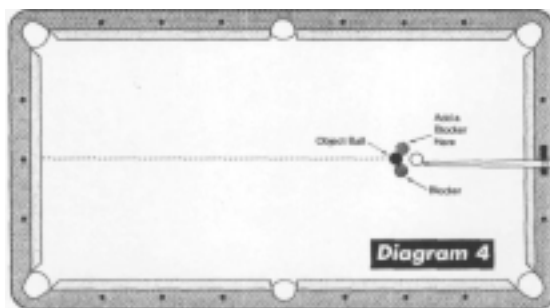
Bob Jewett

the shot.

Nearly all of the experimenters had trouble with my second proposed test, which is shown in **Diagram 4**. The set up is like the "back spotted ball cut" mentioned above, but with more precision in the positioning. The idea was to see if the object ball could be brought across the centerline of the table with spin. The blocker is placed so that the cue ball, when frozen to both balls, is lined up with the object ball straight up the centerline. I have a proposed modification now for this shot, and that's to place a second blocker on the other side so that the cue ball can only be struck at one spot. This is similar to Dave DeSimone's use of two sticks to restrict the position of the cue ball.

Ken Shafer came up with his own test as well, shown in **Diagram 5**. First, set up a frozen ball combination on the 9 — use the 4 ball — that needs to be thrown by hitting the 4 from an angle. Tap the balls or use donuts for repeatability. With the combo set up on the table, line up the 1-2-3 balls in a perfectly straight line pointed to hit the 4 ball absolutely full and at the needed angle for the throw. These balls also need to be repeatably placed. Now remove the 4 ball and shoot the 1-2-3 combo at the 9. The 3

will arrive exactly where the 4 was if you are careful. Ken's result was that the 9 was thrown just as much by the loose 3 ball as by the frozen 4 ball.



How does this show cue ball/object ball throw? Imagine that the 3 ball is the cue ball. In fact, you could use the cue ball in its place, as the last ball in the three-ball line-up. This shot can test whether the cue ball throws the object ball even without side

spin on the cue ball, just as a frozen ball will throw its neighbor. Many authors think this happens, and this kind of throw is called "collision-induced throw." Believers claim that it occurs on all cut shots without side spin. Try the test for yourself.

The best results in terms of quantifying throw were from tests of the first position I proposed, which is like Diagram 4 but without the blockers. You have to be careful with the setup to make sure that squirt and swerve do not pollute the measurements, but the test is quite easy to do.

Next month, I'll go over the numerical results from the 12 shooters who reported on my first position, and we'll have a for-the-time-being final word on whether throw exists, and how big an effect it has if it does exist.

Deciding on the two sets of results to win the prizes was hard, given the innovative approaches. In the end, I chose the results that were most complete in careful setup, number of measurements, and analysis. The winners are Dan White (who did use a spreadsheet) and the team from the rec center at New Mexico Tech, including Ray Piworunas and his coworkers, August, Lloyd and A.J.



The Results Are In

Readers responding to the Jewett challenge find evidence of throw.

When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science. — Lord Kelvin

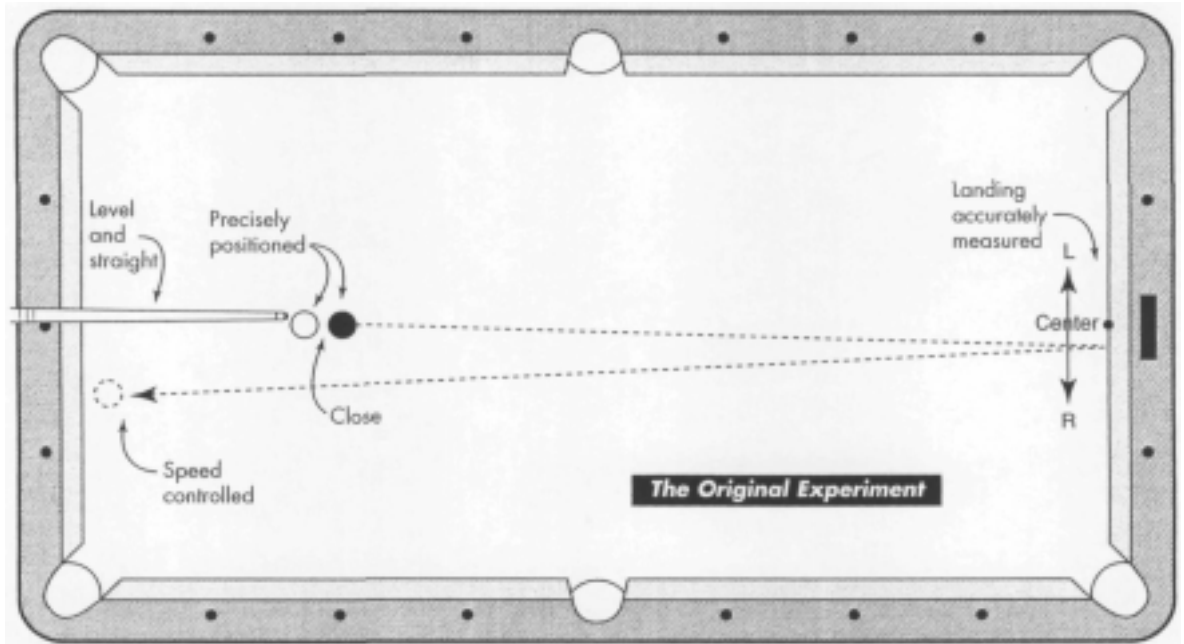
In last month's

column on experiments in throw, I

went over some results from readers that were mostly qualitative in nature — that is, there were usually no numbers involved, just observations. For example, there were no conclusions such as "With old balls and maximum side spin, it is possible to get up to six degrees of throw." Instead, the results were mostly of the nature, "I saw some throw in my setup."

Lord Kelvin, who gave us the Kelvin temperature scale of measurement, would not be satisfied with such results. To start to be real science, the experiment needs not only a number attached to the result, but an estimate of the confidence (or uncertainty) of the number. Even if the measured throw is close to zero, the result should include an "error bar" like: "We consistently measured less than ± 0.5 degrees of throw for all cases."

The setup that I proposed to measure throw is shown in **Diagram 1**. The balls are pointed straight up the table. Trials are made using three different types of English: Center-ball, left and right. The English is applied while shooting straight at the object ball, and the landing location on the far cushion is noted. Care must be used in the setup to avoid known pitfalls. For example, the cue ball must be close to the object ball to avoid the well-known phenomena of



squirt and swerve. The effects of these are in opposite directions, and are known to be plenty large enough to ruin the results if not well-controlled. Also, it is common for players to subconsciously apply a little correction angle on the cue stick when applying side spin, and the close positioning helps to reduce this effect as well.

Results were submitted for eleven different shooters following the above diagram. The most thorough and careful setup was by Dan White, who took the following steps to ensure accuracy. He positioned the balls on paper reinforcement donuts for position repeatability. He set the balls up so that the cue ball travelled only one inch before contacting the object ball. He controlled the speed to two table lengths to avoid any roll-off contamination. He used an object ball as the cue ball so that the amount of English could be easily seen on the ball. (Some experimenters used a training cue ball for this same reason.) He applied the English without any squirt-compensating pivot and with a level-as-possible stick. He cleaned the "cue ball" before each shot and positioned it with the same side "forward." To record where the object ball hit on the cushion, a camcorder with a macro lens was used and a ruler was positioned just above the cushion. The camcorder was repositioned

for each case so that it was looking straight down on the landing location for that case. Ten trials were done for each case to allow a determination of consistency.

The best sets of measurements also included an estimate of the error, as described above. For some of these, all of the measurements were included.

In **Diagram 2**, I have combined the results and represented them graphically. The distance above center on the chart reflects the amount to the left the cue ball landed on the cushion for right English, and the distance below center is the how far to the right the cue ball landed for left English. The initials give the experimenter, and for each experimenter, an average for both left and right results is shown. All but one set of results demonstrated throw; John Cundiff (JC) observed no throw within his estimated margin of error. The entries that begin with "NM" are results for four shooters testing on the same table and with the same balls.

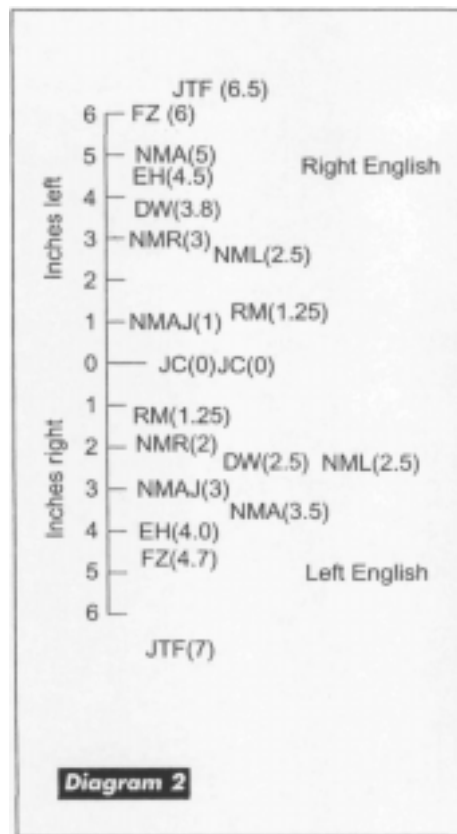
Some experimenters had multiple sets of results. Frank Zrinski tried multiple speeds, strokes, and offsets, and I chose a representative set. He also observed the landing point when the object ball came back to the second end cushion, and managed to pocket the ball under some conditions.

Some experimenters also tried extensions on the original experiment's set-up. For instance, Rick Malm, who recorded low throw under his conditions, also tried the same test after chalking the object ball, and found 9 inches of throw on some shots.

You may want to draw your own conclusions from the results, but here are mine. Cue-ball-to-object-ball throw exists and is significant. It seems to vary with conditions and shooter. It can be as large as six inches for a ball path six diamonds in length, which is clearly enough to affect a significant number of shots. Some players seem to have a bias towards left or right throw. (This could be due to an error in alignment, for example.)

Of course, as a fellow scientist, you may want to take these conclusions on a probationary basis until you can do your own tests.

When I first read the original hypothesis that throw does not exist, I was quite skeptical, but the scientific approach is not to simply ignore or deride ideas that don't seem to lit, but instead to establish tests to see if they have merit. Of course, it doesn't help the original hypothesis that it completely ignored the measurements that had been done in the past to demonstrate throw, such as those by Jack Koehler in his book



"The Science of Pocket Billiards." Yet another set of measurements were made by the several experimenters who participated in a test I proposed in my first column for this magazine, back in April 1992. Scientific methodology demands that you include or at least consider those who have gone before, and those who ignore previous work lose credibility.

Lastly, a hypothesis has to fit into generally accepted theories of physics. In the case of throw, the applicable theories are very basic ones, such as conservation of momentum and energy, and the way friction works. The original hypothesis — that there is no throw — does not fit into this framework at all. As Professor Hilden of the University of Hawaii math department said, "If a cue ball cannot throw an object ball, then much of classical physics can be thrown ... out the window."

Well, whether you're convinced or not of the existence of throw, I hope that you will check for yourself the next time you're playing how large it is on your equipment and for your stroke. Check also to see if you have a left/right bias, as some of the experimenters seem to. If so, you may want to recalibrate the way you look at the table, or at least realize that this bias can affect your play.



Progressive Masse

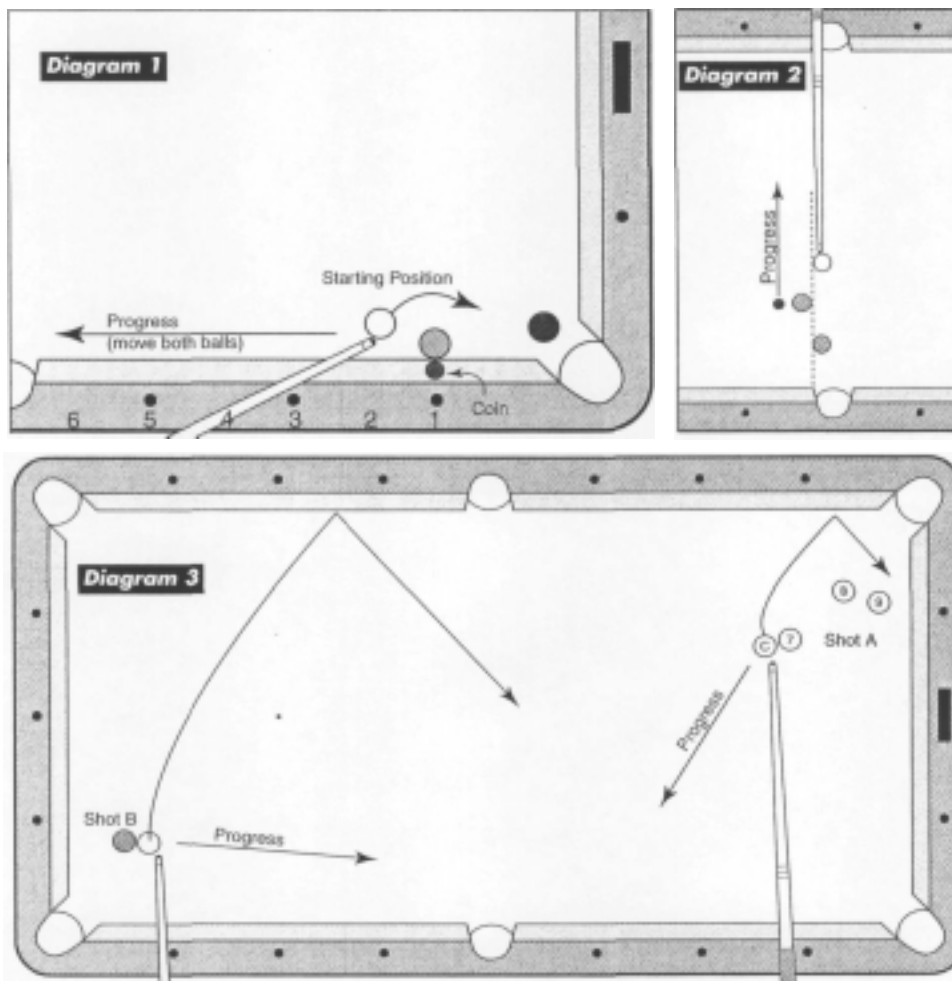
Learn to swerve.

Masse shots are a delight to play and see, provided that you're not the owner of the table. Here are some useful and fairly gentle masse shots to practice and have ready for play. A good way to avoid irritating the owner is to find out when a table is going to be recovered, and arrange time on the table the week before.

Diagram 1 shows one of my favorite drills. It is set up as a progressive practice, which means that the difficulty is automatically adjusted depending on your progress. The object ball is in the jaws of the pocket, the blocker ball is on the cushion at a location marked by a coin, and the cue ball is half a ball off the cushion and about a ball from the blocker. The goal of the shot is to make the object ball with a masse, but you should also be working on two other aspects of the shot. Try to use as little speed as possible; making the ball just roll over the brink without the cue ball touching any cushion is ideal. At the same time, try to use as little elevation as possible — I think you'll be surprised at how shallow an angle will work for this relatively moderate curve, if you combine a little draw with the side spin. Do not attack this shot like some yahoo killing snakes; easy does it.

The progressive part comes after each attempt. If you make the shot, move the coin a little farther from the pocket, perhaps half a diamond, and move the blocker ball to match. If you miss, move the marker closer. You could just use the blocker ball to keep track of your progress if you don't hit it very often. This method will automatically adjust the shot to the distance where you can make it about half the time, which is not too hard or too easy. At the end of each set of 15 shots or so, you can record the location of the coin as your score and measure your progress.

If you find that you can make the shot most of the time from eight diamonds away, it's time to move the cue ball farther behind the blocker ball, so that it is fully eclipsed. If you can do *that* shot from eight diamonds away half the time, let's go on



the road. Practice curving in both directions so your game doesn't get lopsided.

If you find you do occasionally hit the table with your tip, get additional protection for the table by placing a piece of leather or thick cloth on the table under the "corner" of the cue ball where the tip hits. On this shot, the tip's landing spot should be out the path of the cue ball.

Another very common situation in play is when you are only slightly blocked by a ball, and a combination of a little bit of swerve and throw will move the ball over enough. In **Diagram 2** is such a shot. There is a straight line between the edges of the cue-ball, blocker ball, object ball and corner of the side pocket. It might help to stretch a

thread on the cloth for quick alignment.

The shot is shown in the easiest position. It is made progressively harder by moving the cue ball and blocker farther from the pocket. In this drill, you can again hold your place with a coin. A slightly harder version is to move the object ball with the others. For still more challenge, move the cue ball so that its edge is slightly over the thread, so that you need more curve.

Because the object ball is farther away from the pocket, this shot requires quite a bit more precision than the first one. You will find that if you use minimum speed, spin and elevation, your job will be easier.

A use for masse that many players overlook is to move the cue ball after contact

Expo

Bob Jewett

with a close-by object ball. Often some kind of safety is involved. In **Diagram 3**, Shot A shows a situation from 9-ball that needs a safety, but how? The angle doesn't quite allow hiding the cue ball behind the 8-9 with just side spin. Elevate a little and use right draw to get the cue ball to curve just after leaving the 7. The shot progresses by moving the pair of balls back along the arrow shown.

Shot B shows a similar safety situation without any hiders handy. On this shot, the goal is to leave the cue ball at the other end of the table, and the object ball close to the end rail — let's say less than a hand-span. In this case, "outside" English is needed along with draw. Progress is made by moving the pair of balls farther up the table. This shot is not dangerous to the table if hit properly, but at first you might want a landing pad. One thing to note while playing this shot is how little the object ball moves for the strength of the hit. As you elevate the stick, more of

the shot's energy goes into the slate and less into moving the cue ball.

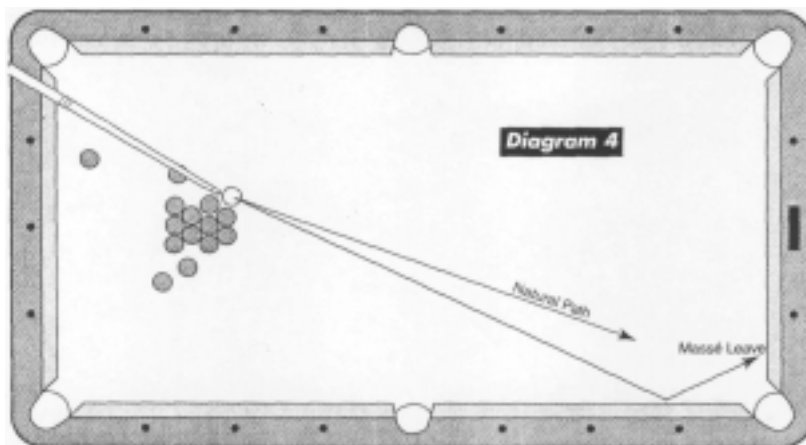
Shots like A and B come up frequently in one-pocket and straight pool. In either, you

pocket) and requires excellent speed control if the cue ball is to touch the rail but still be left close.

The masse solution is to elevate just a little to curve the cue ball after contact, so that it first hits the side cushion. Now if the cue ball stops a millimeter short of the end rail, you haven't fouled, and the safety is very tough to escape from.

If the cloth is sticky and the cue ball is old and worn, good masse action is much harder to obtain. A silicone lubricant like ArmorAll on the cue ball will help make the cloth play like new, and is much less expensive. Unfortunately, it is only a temporary solution, as it wears off.

For further study, check out Robert Byrne's "Advanced Technique in Pool and Billiards," which covers the standard way to aim masse shots. If you have back issues of this magazine, check in February of 1998 for some other suggestions.



will find yourself stuck to a ball or most of the rack, and any normal angle to a cushion for a safe is not safe. Often, a little curve on the cue ball solves the problem. A particularly useful example is when the cue ball is on the side of the rack, as in **Diagram 4**. You want to freeze the cue ball on the far end cushion. The normal kiss angle off the rack goes to the end cushion (or maybe the



Handicapping 14.1

Start up an even-handed straight pool league.

It seems that the demise of **14.1**, AKA straight pool, may not happen for a while.

While there has been no major 14.1 tournament that I'm aware of since the 2000 edition of the U.S. Open in New York City, I've heard of several active leagues from NYC to Fargo, Minn., to Mountain View, Calif., where I play in one. More players show up each season, perhaps attracted by the lower luck factor — compared to those smash-and-pray games that are more common — or the fact that you can more easily keep track of your progress in learning the game as your run lengths increase.

The local league runs with "seasons" and a round-robin format, so every player gets to play every other player, just as the teams in most 8-ball leagues do. Since each "team" is just a single player, it's easy to schedule makeup matches. The turnout this season is so large that we've had to split into A and B divisions. At the end of regular play, we'll have a two-week playoff of the four players with the most wins in each division.

Handicapping is done by setting the number of points each player needs for a win, with the best players going to 140 and the novice players going to 50. This length was chosen to give roughly a two-hour match.

In the past, adjustment was done only at the end of the season. The handicaps of the top third of the field were raised and the bottom third lowered, typically by 10 points. This system is pretty simple and gives everyone a chance to win at least some games.

In the next season, we are going to adopt an automatic rating adjustment system to be applied after each week's play. This is based on the player rating ideas discussed by Mike Page in his analysis of the results of the 9-ball World Championships in *BD's* October 2002 issue, "Sizing Up with the Pros." The adjustments are also similar to a 9-ball system I discussed here in December 1996.

Each player is assigned a rating — the higher the better. Someone who sometimes runs 50 in the league might have

120-Point Chart	
Rating Diff.	Match
0-3	120-120
4-9	120-115
10-15	120-110
16-22	120-105
23-29	120-100
30-37	120-95
38-45	120-90
46-54	120-85
55-63	120-80
64-72	120-75
73-83	120-70
84-94	120-65
95-106	120-60
107-119	120-55
120-133	120-50
134-149	120-45
150-167	120-40
168-188	120-35
189-212	120-30
213-241	120-25
242-277	120-20
278-326	120-15
327-400	120-10

a rating of 700, while someone who has a season-best of 20 balls might be a 600. The actual number is unimportant, since the handicap is determined just by the difference between the ratings. The handicap tables are set up so that a difference of 100 rating points leads to a 50 percent handicap of the length of the game.

The first table, printed in the middle of this page, shows straight pool matches in which the better player goes to 120 points. For our two hypothetical players who are 100 rating points apart, the match would be 120-60. If the players are 300 points apart, they would play at 120-15, which is probably not such an interesting match, and means that the league needs to be split into divisions.

Other charts can be calculated for other game lengths so that the games come out about the right length of time. For example, if two weaker players are matched up, the 60-point table on page 26 might be used.

Other lengths of matches from 50 to 150 points are available online at the San Francisco Billiard Academy Web site, at www.sfbilliards.com, to allow tailoring to your time constraints. If one player is particularly slow, you could take his matches from a shorter chart.

Ratings are adjusted after each match. The winner goes up by three rating points, while the loser goes down by three points. This is easy to put into a spread sheet, but is also easy enough to do by hand. The next week, everyone finds the difference between their rating and their opponents', looks on the posted charts, and begins the matches. It's best to have a score sheet at each table with the handicap written down, since the matches will be changing every week.

In a player's second season, adjust his rating by only two points per match, since he has some track record. In the third and following seasons, adjust by just a single point for each match.

In some handicapping systems — 14.1, 9-ball and carom — it is necessary to keep track of per-inning averages. Often this leads to sandbagging, where a player will intentionally drag the

game out to appear to be much weaker than he is so he will get an unfair start from the other players. This is not a pleasant situation. In the above system, there is no requirement to keep inning averages and much less chance to sand-bag.

One of the hardest parts of running a handicapped league is figuring out where to start new players. One good way is to have them play an established player to see how they match up. You could even look at one of the charts to figure out the rating. Suppose the new player won the test match, 60-45. Looking in the 60-point chart, on this page, that puts him roughly 40 rating points better than his opponent. Of course, either player could have been having an exceptional day, and a longer match would give a more accurate idea of their relative strengths, but it's a start.

Sometimes new players need to be adjusted significantly after the first few weeks of play. One way to handle this would be to look at the scores of each match as above, and figure out the inferred rating difference from the

60-Point Chart	
Rating Diff.	Match
0-6	60-60
7-19	60-55
20-33	60-50
34-49	60-45
50-67	60-40
68-88	60-35
89-112	60-30
113-141	60-25
142-177	60-20
178-226	60-15
227-300	60-10

scores, and then the inferred rating for each match from the ratings of the opponents. In the example above, if the opponent is a 630-rating, the new player is estimated — for that single game — to be a 670. The average of the estimates from several matches, or perhaps the middle one of an odd number, should be a good estimate of the new player's performance.

A good league operator is essential to the success of any league. Our league is a low-budget effort, with our volunteer league operator, Alex Balogi, doing all the work for zero pay. His frequent e-mails and posted schedules keep everyone up to date. The \$8 per week charge goes mostly for table time plus an occasional pizza night. This season the winners of the two division playoffs will each get a set of billiard balls in a hand-made presentation box.

If you do try a straight-pool league, don't be discouraged by a low turnout the first few sessions. As word gets around, and people see the game, the league will grow, and players will have fun and build skill at a game that deserves to be played more.



Odds and Ends

Take the \$200 challenge.

This month, I'll wrap up a few loose ends from previous columns, and repeat some things which seem not to have been understood by all.

Last month, I covered a handicapping method for a straight pool (14.1) league. Recently, that scheme has been put into operation at a local pool hall in Dublin, Calif., with a twist that you might find useful. Instead of the usual round-robin format for teams, it is what you might call a "drop-in" format. Whoever shows up each week gets to play, with a random draw. Since the matches are handicapped, it doesn't make much difference who you draw each week, but the draw could be adjusted to match up more pairs who haven't played before in the season. If an odd number of people show up, the League Operator sits out that time.

At the end of the season, the top finishers are decided by most games won, with losses used only for tie breaks. Half of the weekly \$10 entry fee goes towards cash prizes at the end of the season, with the other half to the house. This format could be used for 9-ball as well, and gives players a reason to return to the pool room at least once each week.

In my June 1992 column, I proposed the experiment in curve shown in **Diagram 1**. Some people claim to be able to make an object ball curve. I don't believe them. Unlike some non-believers, I'm willing to put my money where my mouth is and pay \$200 to anyone who can teach me how to make the ball curve. So far, I've had no takers. The balls are as shown, with the object ball in question exactly a ball off the cushion. Can it be made to curve into the far pocket? The shot must be legal to collect on my offer. Since it is impossible to prove an impossibility, I can't say that the shot absolutely can't be done, but until I see it, I'm a skeptic, and will put the "object ball curvers" in the same camp as the Chalk Borers.

In my first column for this magazine, I proposed an experiment to determine the best way to cut a ball that was frozen to the

Here is a quick test you can do to convince yourself of the error in that idea. Suppose you are cutting a frozen ball down the rail at 45 degrees as shown in **Diagram 2**. The problem in doing the test is to be sure that the cue ball touches the object ball and cushion simultaneously. The trick is to use the cue ball as a combo ball so that we can set precisely where it hits the object ball and cushion. Place the cue ball frozen to the object ball where some say it must land to make the shot. Now very carefully move the cue ball one millimeter away from the object ball and one millimeter away from the cushion. You could use a coin as a gauge. Note that you have moved the cue ball at 45 degrees away from the object ball. If you now send the cue ball back along that 45-degree line, the cue ball will hit the cushion and ball simultaneously.

Now, using an object ball as the cue ball, set the shot up at 45 degrees so that a full hit on the object ball will drive the cue ball back to its starting position.

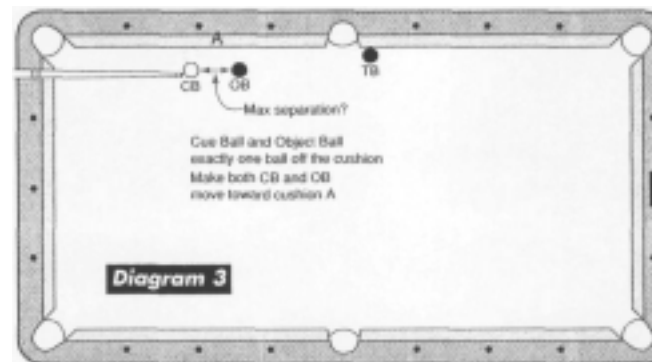
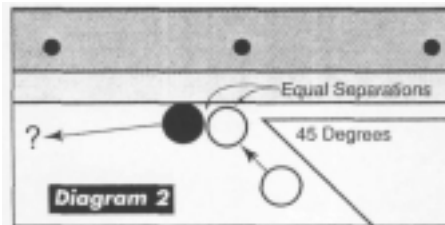
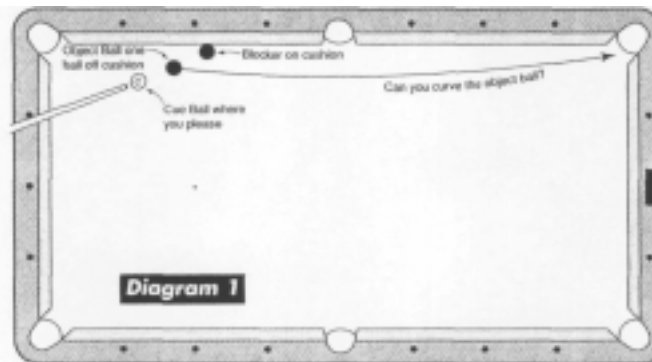
The reason for the 1mm separation is so that the cue ball will have left its contact with the "object cue ball" before contact on the frozen ball is made, and avoids any complication of all three balls touching at the same instant.

If you want to repeat the original experiment, set up the shot as above, but then move the frozen ball down the rail a little

until it starts going into the pocket. It is possible to move it nearly the width of a chalk down the rail and still make it if you shoot hard.

Perhaps the best advice for shooting this shot is from Steve Mizerak, who advises ignoring the cushion, and just shooting the ball into the pocket with the same aiming method you use for all other shots.

In several recent issues, there was a lively discussion of the existence of throw. *BD's* readers conclusively showed — if anyone really needed proof — that throw does



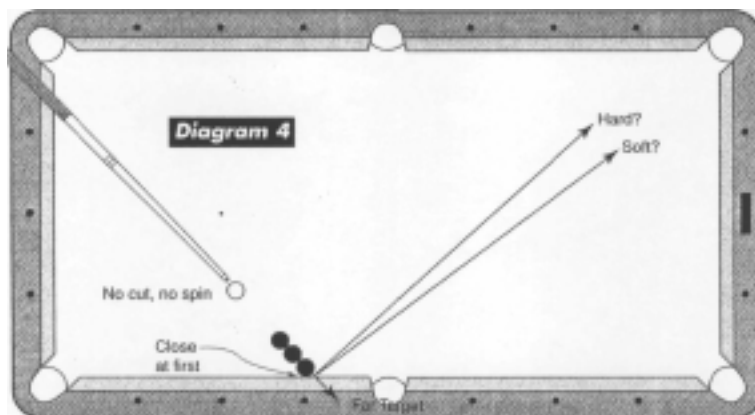
cushion straight down the rail. Some books, like Mosconi's "Winning Pocket Billiards," get it horribly wrong when they say to hit the ball and the cushion at the same time. In response to my column, *BD's* readers (and, separately, Jack Koehler, in his detailed study of the problem) showed that you almost always need to hit the cushion first, typically a quarter-inch from the object ball.

Sadly, some authors continue to push the myth of "ball and cushion at the same time."

exist: sidespin on the cue ball can alter the path of the object ball from the line of centers at the instant of contact. One author who has shown the utility of throwing rather than cutting an object ball into the pocket is Ray Martin in "The 99 Critical Shots in Pool." He shows a typical situation in 14.1 (though it also shows up in 9-ball) in which the shot is almost but not quite straight in (shot 16, page 50). The goal is to minimize the sideways movement of the cue ball but still get the cut angle.

A recent discussion on the Internet put this shot into question. **Diagram 3** shows another quick test you can do to see how well the shot works with your equipment. The goal on this shot is to get both the cue ball and the object ball to move toward cushion A. For the object ball, try to hit the target ball (TB) on the cushion. For the cue ball, you measure success by seeing whether the cue ball ends closer to the cushion than it started. The measurement — I hope you remember Lord Kelvin's admonition about numbers — is to see how

far apart the balls can be started before the two goals cannot be met. I hope you quickly see that if the balls are an inch apart, both can be moved easily towards the cushion. This alone proves the existence of throw.



Now, what is the distance at which you can no longer meet the goals?

A final item is a major misconception about how cushions work. Some instructors say that when you bank the ball hard there is some kind of cushion compression and the ball is returned on a more perpendicular path to the cushion than it is for softer shots. There seems to be no truth to this

idea (and I have to plead guilty to teaching this bogosity before I did learn the truth).

The test shown in **Diagram 4** has been previously covered a couple of times in this magazine, and in Bob Byrne's "Advanced Technique" book, as well as countless times in Internet discussions, but there are still many players who remain uninformed, but perhaps not uninformable. Set up a three-ball combo on the cushion and close to the cushion — as close as you can put them without the last ball being interfered with as it exits the rubber. For repeatability, aim them at a far target — a spot on the wall — or tap them into place. Try hard

and soft shots. Move them back from the cushion a diamond, and try again. Move them back two diamonds and try again. It is follow on the banking ball and not cushion compression that explains the results that I think you'll observe.

Have you encountered a loose end or an idiocy that you would like illuminated? Send it in as grist for a future column.



Bumping Balls

If Efren does it, shouldn't you?

Perhaps the best advice on how to plan your way through each rack is to keep it simple. In an ideal world, the cue ball never bumps into extra balls, cushion use is minimized, and stop shots dominate. The real world is different, and usually some complication creeps in, often as a need to bump into balls — either to break clusters or just because the carom can't be avoided.

A couple of years ago at the L.A. Billiard Expo, there was a concurrent invitational 8-ball tournament. I got up early one morning and found Efren Reyes at the tournament table about to practice. There were two noteworthy facts. First, I was the only spectator, in a building full of pool players, who seemed to want to watch one of the greatest position players in the world practice tough position play. For free.

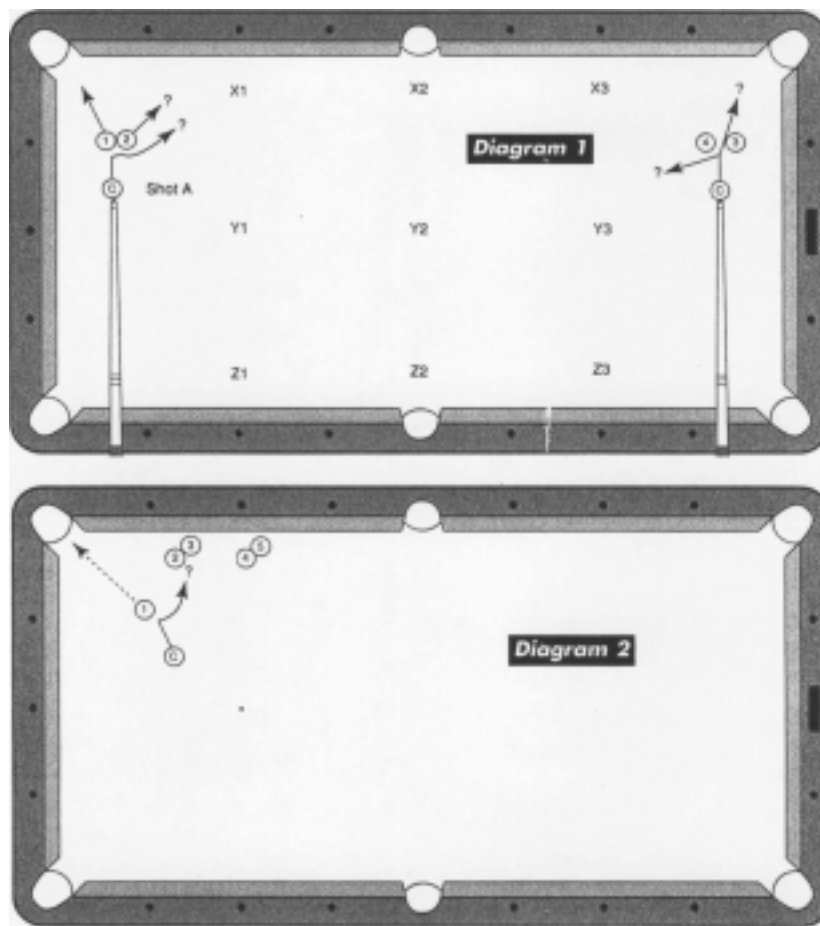
Second was the way Efren practiced 8-ball. He would carefully set up two or three clusters of balls near cushions, and then try to get through this tough lay-out. When he took the cue ball into clusters, it was with only enough speed to move the balls a little apart. How often do you drive half a broken cluster to the other end of the table for fear of getting stuck against one of the balls?

If Efren needs practice at bumping balls, maybe you do too.

In Diagram 1 are several good drills for learning how the cue ball reacts when it hits a second object ball just after the target ball. In Shot A, the object balls are frozen and aligned straight up the table. Place the cue ball as shown, more or less parallel with the short rail, so that you are forced to

touch the 2 ball a little. The first drill is to pocket the 1 ball and get position on the 2 for the same pocket. Try follow, draw and stop on the cue ball as well as different speeds. Once you are comfortable with a

second shot of Diagram 1, in which the 4 ball is about a ball from the 3. To make both balls, you may find it easier to use soft follow, and play the 4 up the table, depending on the line the cue ball takes off the 3.



In Diagram 2, the drill is to practice landing on clusters to get a second shot. Set yourself up with a pretty good angle to get to the pair of balls on the cushion, and then try to call your next shot. Does breaking hard or soft work better for you? It's not so easy to name which ball in a cluster is next, but it's even harder if you never try for anything specific. Of course, you would prefer to have a "safety ball" positioned in the jaws of a pocket for a sure next shot, but let's suppose the ducks are all gone.

Start with the balls all fairly close to the pocket, and as you get a feel for the break-outs, move the balls for a harder shot, or so the cue ball has more travel to get to the cluster, such as the 4-5. You will want to review the half-ball follow angle to find the best place for the cue ball. (That's when you hit the first

little bump, move all the balls farther from the pocket so that you will bump the 2 harder. Finally for this drill, move the cue ball for a thicker or thinner shot on the 1 ball, for several positions of the object balls.

As a second drill, start from this same set of positions but try to move the cue ball to various spots on the table after bumping into the 2, such as XI, X2, Y1, Y2 and so on. Perfection is hard on this drill, but if you end up on the wrong side of the table, rethink your method.

Next, try the very similar situation in the

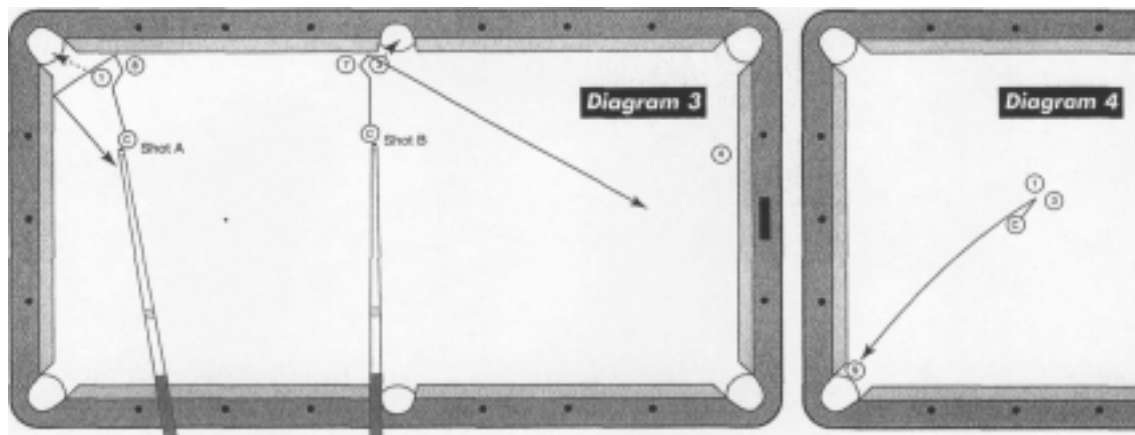
ball about half-full, the cue ball has follow at the time, and the resulting angle the cue ball takes is the most predictable and repeatable in pool.)

These kinds of close bumps and break-outs are more common in full-rack games than in 9-ball. In the early stages of a rack of one-pocket, position from a second contact is often vital.

You may run into situations like those shown in Diagram 3. You have a shot, but you're guaranteed to hit a ball near the cushion, and you have to move the cue ball

a fair distance. In Shot A, the goal is to get to the other end of the table using left English. In Shot B, you have an easy shot in the side, but the 7 ball complicates position on the 4. Use right English and make sure you hit the 7 on the right side. Several plays like this are shown on Robert Byrne's latest tape, "Game Breakers."

When controlling the path of the cue ball off a second ball, it's critical to know where the cue ball will land on that ball. Usually you can judge close shots by the simple kiss-line (or tangent line, or perpendicular) principle: The cue ball comes off the object ball at a right angle to the path of that object ball. If you can visualize the cue ball at the instant of contact (the ghost ball), you should be able to estimate fairly accurately how it will land on a nearby ball. If you can figure that out, just apply the principle to



the second collision as well to find the initial path off that second ball.

This "path planning" is easier when the balls are close together as in Diagram 1, Shot A. Since the cue ball travels only a few millimeters from the first to the second ball, you know exactly how the second ball will be struck. For Shot B in that diagram, things are not so clear because of the larger distance between the balls. If you play the shot with soft follow, the cue ball has time and space to bend forward some before it hits the second ball. With soft draw, you might be able to avoid the second ball

entirely, depending on the cut angle.

While it's much better not to bump balls, if you practice the above shots for a few minutes each, you'll be better prepared for the next time you can't avoid it.

For a little fun, in **Diagram 4** is an interesting proposition based on hitting two balls. With the balls as shown, can you shoot between the pair and draw the cue ball straight back to make the hanger? The shot is duck soup if the pair is just the right distance apart, and near-impossible if they are much closer or farther apart. Can you find that distance?



Jumping As It Should Be

Take the leap to a higher level.

In the October 2000 issue of *BD*, I pointed out some uses of jump shots in play. Pool books, such as "Byrne's Advanced Technique," also show examples, and recommend techniques for getting more height. Below are several practice drills that will let you prepare for your next journey into the third dimension.

I hope all readers know by now that it is illegal, immoral, and unpatriotic to jump by scooping under the cue ball to get a miscue to get over the obstacle. Jumping is only legal if done by driving the cue ball into the cloth with an elevated stick, and the obstacle is cleared on the rebound.

First, a word about the cloth. A small scrap of pool cloth can be placed under the cue ball to reduce the chance of tears and those ugly white spots that a jumping cue ball leaves, but you can't fully learn the reaction of the cue ball off the cloth with that protection. And if you're going to shoot more than a couple of shots, you better have the approval of the person who owns the cloth. A good strategy is to find out when the cloth is about to be changed, and practice just before. Another aspect of cloth is that some styles are really hard to jump on — maybe the table bed contributes to this.

In **Diagram 1** you'll see a standard trick shot with the two object balls exactly a ball apart. Two other balls (those on the outside) have been placed on paper reinforcing donuts to allow quick repositioning of the object balls if you hit them. The goal of the shot is to pocket the ball by the side pocket without touching the two interferers. Let's

set the additional goal that the cue ball must not hit the side cushion. This shot is about as easy as jump shots get. If you make it, move the obstacle balls slightly closer together. The two outside balls — the ones on the paper reinforcers — allow you to see easily how much you have moved the inner balls together. Try a quarter inch (6 mil-

you can draw the cue ball back to the rail you are bridging from. Then, move the cue ball and blockers out onto the table some more, so you have to bridge on the table rather than on the cushion. Then, try different separations between the cue ball and the blockers.

After a little practice, you will come to the conclusion that with a normal cue stick, you (and your particular technique) can clear x% of a ball that is y inches away for a given speed of stroke. After that limit you have two choices: get one of these new-fangled jump sticks, or shoot something else like a kick or masse. If you do get a jump stick, remember that you will retain more aiming accuracy with your normal stick, but you can get more height with the short, light, hard-tipped jumper. In either case, you need to find your limits and the drills above will help.

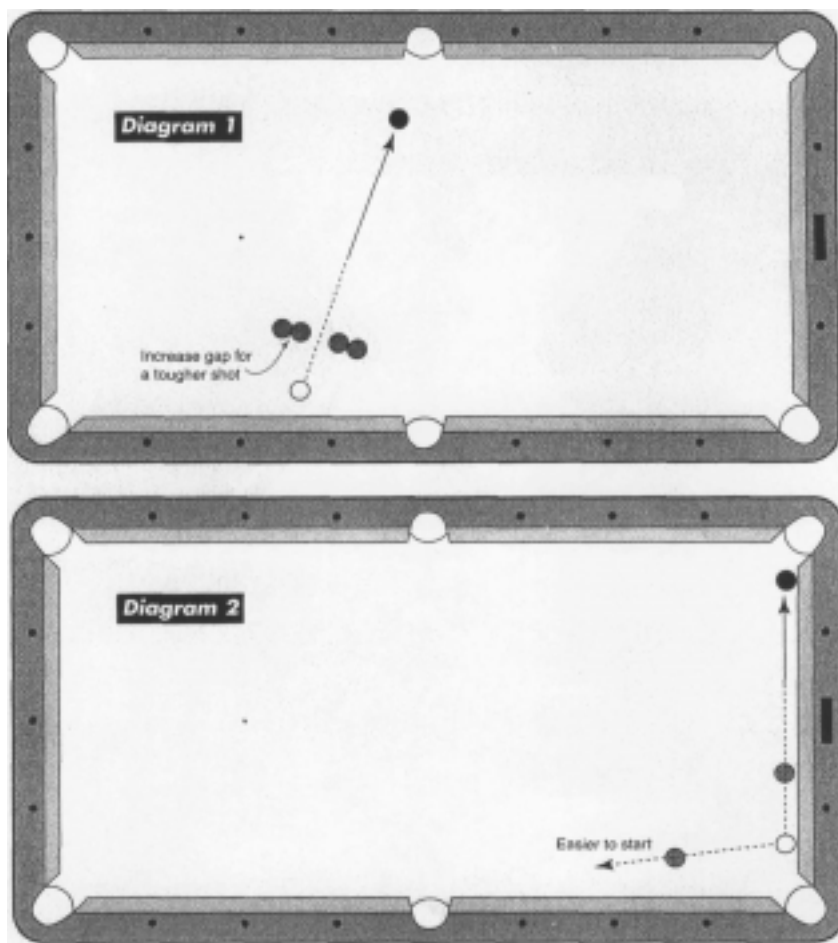
In **Diagram 2** is a drill that probably requires a jump stick. The idea is to get over a whole ball. Begin with the blocker at your best distance from the cue ball. For me, that's about one diamond. To find our own best distance, enlist a

limeters) or so closer. Each time you make the shot, narrow the gap, but if you miss, make the next shot easier. After a dozen shots or so, you should reach the limit of your current ability. Did you remember to make the shot easier or harder after each attempt?

For variations, see how softly you can shoot and still get the jump. Then, see if

friend to watch on a few shots without a blocker — just try to get good height on the cue ball. Your friend needs to note where the cue ball came back to the cloth. You may be able to see the landing spot yourself, as the cue ball's return will leave white marks on some cloth.

After you have some success at your best distance, try moving the object ball closer



Bob Jewett

gradually. Some suggestions: dart grip; release the stick on contact; throw the stick at the ball; play lower on the cue ball, but not so low that you miscue; get a harder tip. Work that blocker towards you until you find your absolute closeness limit.

Next, try the same shot, but move the blocker farther away. I think you'll find that this direction is much tougher to deal with. The cue ball needs to be in the air for a longer distance, and on the second bounce (the bounce after the landing bounce) it is likely to hit the object ball high and proceed off the table.

You may want to try this shot in the long direction of the table to allow the cue ball to settle down before it gets to the object ball.

This drill suggests something about how to play safe. If you leave the cue ball within an inch of the blocker, a good hit is unlikely. On the other hand, if the blocker is a couple of diamonds away from the cue ball, the speed required for a good hit is

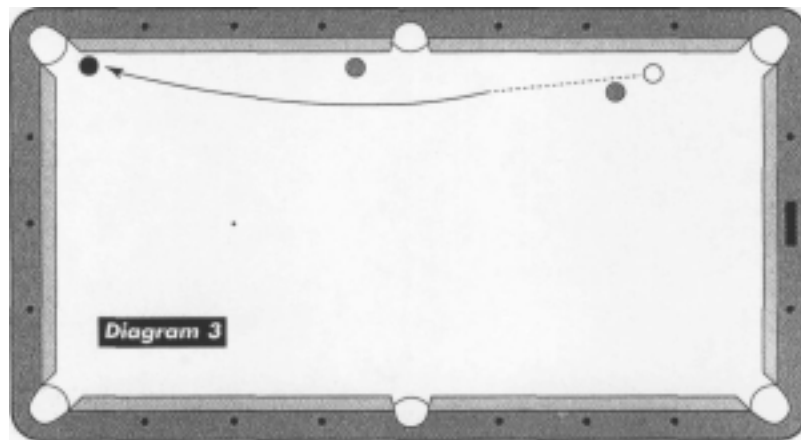
likely to cause a trip to the carpet. There is one way to keep the cue ball from jumping on such a shot, and that's to hit the object ball just as the cue ball is landing. As long

limit. Begin with the easiest shot possible, as in Diagram 1. Can you follow forward and back across the table? What if the blockers are tighter and you have to elevate more — is follow still possible?

While we're spinning the cue ball, let's try yet another dimension — jump masse. **Diagram 3** shows a good place to leave your opponent. Clearing the first ball is not hard, but going straight over that second one is a real challenge. The recommended option is to jump the first ball and curve around the second. In this case, right English is needed, and draw may help as well.

Start with the second blocker barely in the way, and move it farther from the cushion as you get the knack.

Jumping is fun, and nothing electrifies a crowd more than when a champion executes a full jump to make the object ball from a stone-cold safe, but always remember that other ways may be better, and you need to have them ready as well.



as the cue ball contacts the object ball near the equator, any forward jump is much reduced. However you're going to play safe, try to avoid the middle distance — about a diamond — that is most comfortable for jumping.

Can you play jump shots with follow? The high cue tip will tend to trap the cue ball on the cloth, but try it to find your own



Sharks and Scams

To untangle some of these tricks, you have to do the numbers.

Recently in the on-line discussion group rec.sport.billiard (www.groups.google.com/groups?group=rec.sport.billiard), I asked the participants to describe notable sharks, moves, and scams. The response was very enthusiastic. If you prefer to think of the game as a pure, intellectual pursuit of geometry and physics, you may want to skip this month's installment, which deals with the sordid and unseemly.

One recurring theme was methods of distraction. Mentioned several times was the strategic positioning of attractive women near the table. I've seen this in person when a local big-money player showed up for a match accompanied by a mini-skirted helper who perched on a bar stool by the table. Effectiveness is reported to be inversely proportional to clothing.

Talking during your opponent's turn is too obvious. A twist is to launch into lengthy stories on your own turn and then clam up when you're seated. While you're at it, don't watch while your opponent is shooting — look away as if you have no interest in the game. Of course, some players are painful to watch, and your apparent disinterest can be excused. Luther Lassiter was said to sleep during some of his matches.

Does your opponent like to listen to heavy metal rock? Get to the juke box first and punch up five bucks' worth of Frank Sinatra and Britney Spears.

One of the most common lesser sharks is visiting the rest room. When you finish a nice run, and suddenly your opponent bolts for the John, it's easy to suspect your five-minute wait is more due to his desire to cool your streak than any gastrointestinal urgency. Would it be impolite to offer such a person a bottle of Kaopectate? Most larger tournaments have rules about breaks — number and duration — and some players always seem to press the limit. I'm generally against shot clocks, but I recently heard of a system used in Europe that might be worth a try. Chess clocks are used, and each player starts with so much time. Need a bathroom break? Fine, you're on the clock.

Among mildly irritating activities to employ are putting the chalk on the cushion face down, getting talc all over everything, moving all the chalk to your chair, racking for a few minutes or nit-picking your opponent's rack to death, saying "nice try" for a

lousy miss, saying nothing for a world-class shot, and lots more. Timing of the change of players at the table gives lots of off-putting possibilities. Linger at the table after each miss until your opponent is ready to shoot; jump up from your chair as soon as you're sure your opponent has missed (an antidote to the preceding method), or take an extra five seconds to get to the table, which will seem like an eternity after many repetitions.

Another fertile situation is the concession of the final balls at games like 9-ball. The most blatant form of this is to get up as if

course, if your opponent isn't Bustamante, the break probably is a disadvantage on most tables with most racks. A study by Accu-Stats Video Productions of pro results showed that the breaker lost more than half the time at 9-ball. So, maybe I was trying to pull something.

Some players smash things when they're mad, and again it's not clear whether it's spontaneous release or with some purpose. Ranting at your own bad play is a mild form of this. Others get mad at everyone around them — sometimes in World Championships — perhaps because they have a need to feel like a lone underdog, or perhaps to rattle all concerned.

When gambling is involved, the better player may need moves to get or keep the "client" interested. One report was of a player who saw his fish about to swim away, so he conceded a tough 9 ball. The generosity got him a few more barrels.

Often the inducement to play comes as a spot that's not a spot. (The break at 9-ball may well be one of these.) I'm guilty of spotting my opponent — who was my roommate at the time — the removal of five of his balls at 8-ball, so he only had to make two before the 8. If I remove them, there's no way Efren can beat me. Please note: I found out it's not a good idea to use such tricks on your roommate.

"I'll shoot left-handed," may be a sinister invitation, and "You played so bad against me, I'll bet that girl can beat you," may be followed by an introduction to a pleasant young woman named Karen with a funny accent and an open bridge.

One report on the Internet was from a one-pocket player who was spotting his opponent 8-6. (Shark needs 8 balls before the fish gets 6.) After a threat to quit, the fish agreed to continue at 9-7, since it would be harder for the better player to get to nine balls. Well, you can calculate the change in advantage here, and the shark's chances improved by about 6 percent. That is, if the first spot were even, the second would give the better player a 6 percent advantage, in the long run. It helps if the donor suffers from innumeracy.

Ron Shepard reported a move from a tournament. The better player was on the hill (needing one more game), and the opponent needed a bunch. The offer was a

Would it be impolite to offer such a person a bottle of Kaopectate?

you're going to concede a shot that's a little harder than average, and then sit back down. A variation of this technique is used if you have been on a good run, and then miss on a late ball, leaving a very easy run-out. Concede all the balls so your opponent, who has been seated for a rack or two, has no hangers to warm up with. Around here, some tournaments have the rule that if you concede a 9, you lose the next game, too.

There are lots of less-direct distraction methods. A good source is Steven Potter's "Gamesmanship," which has been discussed in this magazine by Robert Byrne. Potter tends toward the "mind worm" ploy, such as the suggestion from the group to ask, "Do you usually exhale before the stroke?"

You may encounter more aggressive sharks as well. One player told me he would make my life a living hell if I left the game for a brief dinner break, and at the time he seemed to mean it. Another player in this area would pick a fight over any slight thing. When I offered him the first break in a 9-ball match, he accused me of trying to pull something and demanded to flip. Of

side bet of \$20 on each rack played for the rest of the match. The player who was on the hill could only win \$20, while the other might win \$100, so it seemed like 5:1 on the money. Of course, if someone is better than you are, it's a losing proposition to bet at all, but this situation may cloud your mind.

One correspondent mentions giving up the "8 and the last four" at 9-ball. This means that the client wins if he pockets the 8 ball at any time or any of the last four balls on the table. When that didn't go well, it was adjusted to the "6 and the last four," which seems like more, but is it?

There are lots of word dodges that might be used. Be prepared for one in "Poolhall Junkies," if you haven't seen it yet. Examples are: "I bet you can't make that ball." (Brunswick made it.) "I bet I can roll the ball under this bridge on the table." (Roll it under the table.) "I know where you got those shoes." (On your feet.) "I bet I can roll over 250 at bowling." (Write "250" on a piece of paper and then roll a ball over it.) My own feeling is that such tricks should be rewarded with broken thumbs or worse. If the parties to a wager do not agree on what the conditions were, there was no wager. You can quote me.

Sometimes the scams are more complex. I know one player who was about to leave

the area, so he arranged a match at his home room with a visitor. All the locals backed their guy, of course. The result was a "dump." The lesson: If you need to wager, bet only on yourself.

An extension of the dump was related to me by a player who toured the South with a couple of old-time hustlers. The usual arrangement was for A to go into a town, and gradually work his way up the local pecking order until he was beating everybody by playing better pool than the townsfolk had ever seen. A few days after the action had subsided, B would get to town, and a match with A would be arranged. Player A would play great pool, better than he had showed before, but B would play even better than that. I suppose this sort of plan was safer before the days of Internet chat rooms and the instantaneous worldwide broadcast of descriptions of remarkable touring players.

Sometimes unusual games can be confusing. Eddie Robin describes lots of strange spots at one-pocket in his two excellent books on the game. How about a game where nothing I do counts — is there any way for me to win? Assume that scratches don't count against me, if I make a ball for you, it doesn't count, but if I make my own, they don't count either. I'll describe the way out of that fix next month.

In a strange match several years ago at the location of a major tournament, two players had a strange one-pocket game: 2 to 1. Yes, the weaker player needed only one ball to win. Now, it's possible to try to compare this very short game to a longer game, say 10-5. It turns out that simple theory says the shorter match favors the weaker player by about 10 percent compared to a long game. This may confuse on-lookers as to the proper odds. I didn't hear how the two players came out, but the on-lookers were reported to have lost \$30,000.

As far as proposition bets go, be sure to keep an eye on Willie Jopling's column for ideas. Amazing things can happen on a pool table without any kind of flim-flam. Keep your wallet in your pocket and remember the advice of Sky Masterson's father (according to Damon Runyon):

"Son, someday a man is going to walk up to you with a sealed deck of cards fresh from the factory, and say, 'I bet I can make the jack of spades jump out of this deck and squirt cider in your ear.' Son, when you meet this man, do not take his bet. For as sure as the sun rises every morning, if you do take the bet, the jack of spades will jump out of the deck and squirt cider in your ear."

Oh, and if you play me, don't try any of the above, or I'll call you for unsportsmanlike conduct.



Practicing Inside Spin

Progressive drills will drive home the lesson.

When an object ball is close to the cushion, there are two standard ways to use spin on that cushion to move the cue ball around the table for the next shot: inside spin with follow and outside spin with draw. This month, we'll talk about inside spin.

First, we'd better make clear what is meant by "inside" and "outside" spin. In the shot shown in Diagram 1, where the object ball is being cut to the right, English on the right side is "inside" English, while left English would be "outside." You could think of inside English as being more on the inside of the shot, that is, near the middle of the cue ball and object ball as seen along the line of the stick, while outside English is more on the outside of the shot, being away from the object ball.

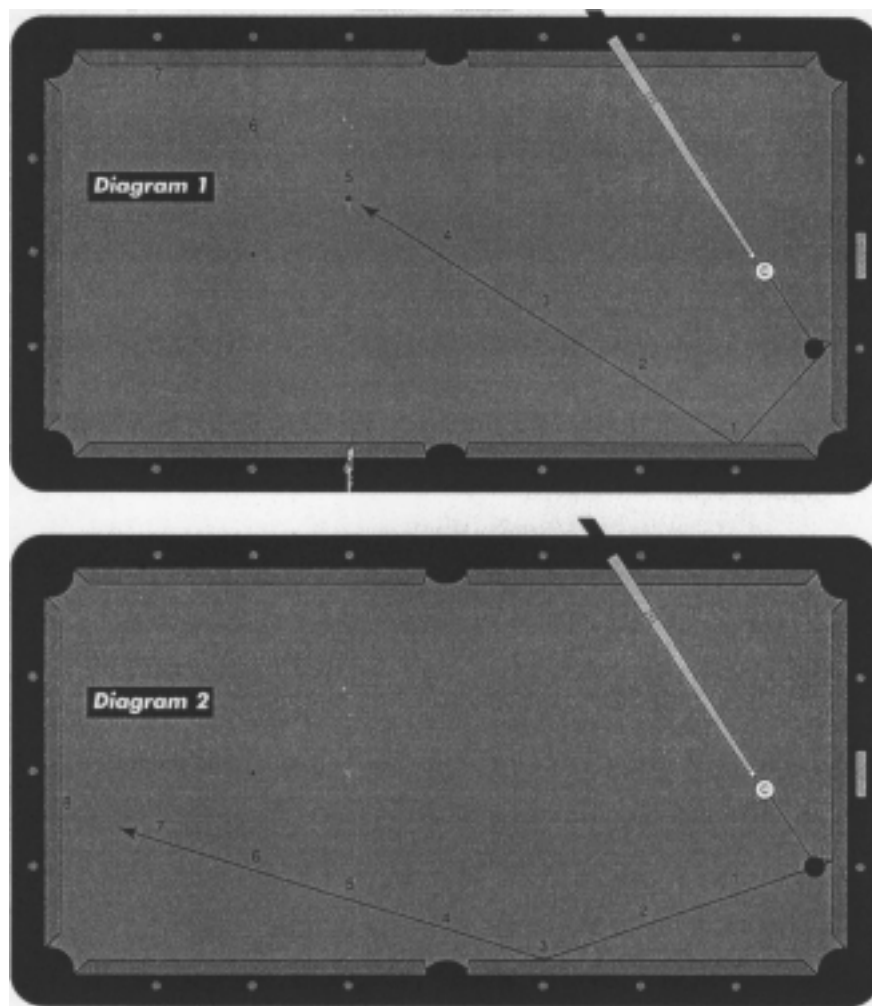
So, we're going to play the shot with right-side spin. As with all spin shots, the first thing to do is check your tip for proper chalking. Does it have a thin, smooth covering of chalk? Far too many beginners cripple their learning of English by not having such a friction-aiding layer.

The first drill is shown in Diagram 1. The object ball is placed just off the cushion and a diamond from the pocket, and the cue ball is placed for about a half-ball cut shot with the stick passing over the second diamond on the side rail, as shown. To begin with, put the cue ball fairly close to the object ball to minimize the difficulty in aiming.

Use mostly right spin with some follow. Both of these act to carry the cue ball forward and give it more speed. Combining them on a shot like this allows you to move the cue ball a long distance with minimum effort.

The goal is to move the cue ball to a particular point along the path shown. Mark that spot with a coin, and begin with location 1. You have to leave the cue ball within a small distance of the coin — say, the width of your hand — to call the shot a success.

Try the shot several times, and when you're confident you have spot 1 mastered, begin a "progressive practice" drill. Each time you put the cue ball near the coin, move the coin to a harder position (2, 3, 4, ...). When you fail to position whitey properly, move the coin to the next easier posi-



tion and try again. After your first failure, it's better to move the coin only half a number at a time for each subsequent shot — harder after each success and easier after each failure. Shoot the shot 10 or 15 times, and the location of the coin at the end will tell you your score for the drill.

This kind of practice — with self-adjusting difficulty — is called "progressive practice" and is explained in more detail in the free Basics Clinic handout on the San Francisco Billiard Academy web site at www.sfbilliards.com.

You will probably find that there is a "natural angle" that the cue ball seems to want to take off the second cushion. In a

way, the shot is self-correcting, in that if you have an excess of right English on the first cushion, the cue ball will go straighter into the second cushion, and then the extra spin will grab and bring the path back to what it would have been with less spin.

Try various amounts of side and follow. Move the tip all the way out to miscue territory on the equator of the cue ball. Try equal amounts of the two spins (called 1:30 with reference to a clock face), and various tip offsets. Look for the easiest, most consistent way to move the cue ball to the desired spot.

If you feel you are doing pretty well on this drill, tighten up the requirement and

place the cue ball so that it partly overlaps the coin. If you find it impossible to make much progress with this much more stringent goal, give yourself two or three chances for each distance.

A second way to make this drill tougher is to move the cue ball back toward the side cushion so the shot is longer. As you do this, you may notice that the aim for the shot changes significantly. This is because, with a longer run to the object ball, the cue ball has time to swerve to the right and will hit the object ball fuller than expected, driving it into the end cushion. There is no fix to this problem except to practice.

Another way to make this drill tougher is to change the angle of the cut shot by moving the cue ball to one side or the other. If you make the shot fuller, you will probably find that the "natural" angle off the second cushion is more toward the side pocket, while if the cut is made thinner, the cue ball will need a lot more side to get it into the desired path. For this last case, the cloth on the cushion may have a large influence. If it is slippery, the English can't grab enough, and the cue ball will tend to go parallel to the long rail, and cannot be coaxed into the desired path.

It should be pointed out that there may be

other ways to play the required position. For example, to get to 5 in Diagram 1, you could play the shot with no spin except for a little draw. (In a game situation, there may be obstacles in the way which block this path.) Try to get to 5 with just draw, and see if you can do it as consistently as with inside English. Try moving the cue ball back near the side cushion and compare the two methods again.

A second drill is shown in **Diagram 2**. Here the angle off the first cushion is not so acute, because you are using less side spin. This is also a progressive practice, so you again are taking the cue ball to the spot marked by a coin. In the first drill you probably needed at least as much side spin

TRY THIS SPOT

Last month I mentioned a strange one-pocket handicap: "Nothing I do counts." The way to win this game is to get my opponent to make balls for me, while making sure he never has a shot toward his pocket. If he has a ball in the jaws of his pocket, I'll shoot it in for him. It spots back up, since nothing I do counts. If no better shot is available, I'll just roll the cue ball to the jaws of his pocket — it's a foul, but nothing I do counts. When possible, I'll herd balls toward my pocket, but I have to be careful not to make any, since they wouldn't count. I've played this game, and it seems to be about the same as giving up a 10-4 spot. Try it and see how it goes. If you discover clever plays, let me know and I'll pass them on here.

as follow on the cue ball (1:30 or later on the clock-face cue ball), **but** with this drill more follow than side is probably needed. Again, try to find the combination that gets the cue ball to the desired resting spot with the least effort.

For this second drill, with only a little bit of English, there is little of the self-correcting effect noted above, and you will have to be much more precise in the amount of

side you apply.

If you are not already proficient at these kinds of shots — see if you can get the coin out to 5 consistently — it is worth spending a few hours on the above drills. Space them out in half-hour segments over a week, to give the feel of the shot a chance to soak in.



Practicing Outside Spin

Try this progressive practice to improve your game.

Last issue, the subject was using inside spin off the cushion to position the cue ball. This month I'll discuss its complement, outside spin. Remember that "outside" English is spin applied to the "outside" of the shot, as shown in both diagrams. For cuts to the right, as shown, it is left English, and would be right English for cuts to the left.

As with the drills last month, because you will be spinning the cue ball, you need to chalk well. This is even more important this month, as you will be using both draw and English. Most players chalk poorly, and I hope that after my nearly incessant harangues, you are not in that group.

Diagram 1 shows almost the same position of the balls as last month, but this time the requirement is to pull the cue ball back along the indicated shape line. Last month, it was possible to shoot with just side and let the follow develop on its own. For this shot, you will need to have draw on the ball and this will be a harder (faster) stroke. The draw will slow the cue ball down on its way to the object ball, and extra energy is required both to overcome this slowing and to make sure there is still some draw on the cue ball to pull it back to the rail.

The goal of the shot is to make progress along the indicated line. The cue ball and object ball are always placed as shown, and what changes is the position to which you try to take the cue ball. Place a coin to mark your progress, and start with spot 1.

Even if you have good familiarity with this sort of shot, experiment a little with the best way to get to "1." Try just draw, mostly draw with a little left English, equal parts of draw and side spin, and even just side spin. In this case, by "best" I mean the shot that requires the least effort. How softly can you hit the cue ball and still get it to spot 1?

Once you feel you have mastered the first position, proceed with the normal progressive practice. If you get the cue ball to within a short distance of the coin — you could use your index and little fingers as a gauge, or your thumb and ring finger as a bigger gauge — move the coin, perhaps half a dia-

have to use a rail bridge.

If you do set up the longer shot from the cushion, it's important to remember the effects of using English. There will be some squirt, which takes the cue ball somewhat to the right of the line of the stick. Especially if you have elevated the stick to

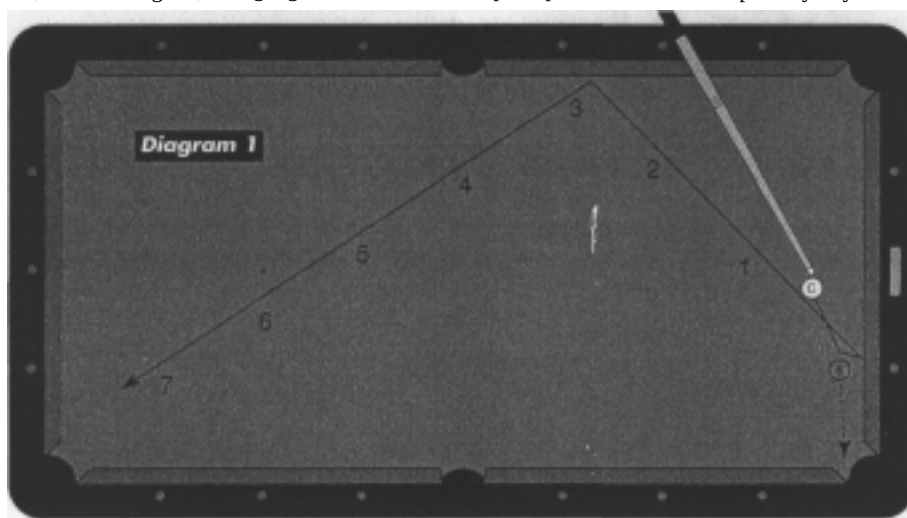
shoot with draw from the cushion, there will be considerable swerve to the left as the cue ball travels to the object ball. During the collision, the side spin on the cue ball will tend to throw the object ball to the right. I say "tend to" because if the cue ball has only a little left English, it might just roll across the surface of the object ball without any throw at all.

I point out these effects not to give you more equations to solve during actual play, but rather to give you some clues as to why you might miss a shot during practice.

Another way to alter the shot in order to get more out of it is to make the shot nearly straight-in. This is a fairly common problem that comes up in play. (To move the cue ball off the cushion, it is nearly always best to keep a "nice" or "working" angle into the rail, as shown in Diagram 1. About a half-ball cut (30 degrees) or a little less usually works well. To leave yourself straight — in is often a disaster.) On this shot, you will need to find a cue ball line that allows you to draw the cue ball nearly straight back; the ball will then spin off the cushion up the table.

On all these shots, it's important to note the exact cut angle to include in your calculations of position play. With less angle, it is easier — more natural — to bring the cue ball back straighter, while with more cut angle you may find it impossible to reach the side cushion on the correct side of the side pocket.

Another detail that is important is how far



mond at a time. If you mess up on the shot by either missing the ball or the required position, move the coin back for your next shot.

Give yourself a fixed number of balls to shoot, and see how far you can progress along the line in that number of shots. The position of the coin at the end of the rack is your score for the drill. If you are serious about measuring your progress as a player, enter your score into a log, and do the drill at least once per week. A log sheet and other progressive practice drills are available in the Basics Clinic handout on the San Francisco Billiard Academy Web site at www.sfbilliards.com.

If you get to the point where this drill seems too easy — if you can put the cue ball within a hand-span of spot 5 most of the time — there are a couple of ways to increase the difficulty of the drill. The first is to make the shot longer by moving the object ball farther from the pocket, or the cue ball farther from the object ball. For example, put the object ball at the middle diamond of the end cushion and the cue ball close enough to the cushion that you

Bob Jewett

the object ball is off the cushion. If it is frozen, you will probably find the shot quite a bit different. As the object ball gets farther from the cushion, you can get the draw to curve the cue ball more before it gets to the rail, and you can get a straighter-back path. I've seen many beginners trying practice shots who are totally careless with such details. It's important to learn the variations of the shot, but work with one position at a time.

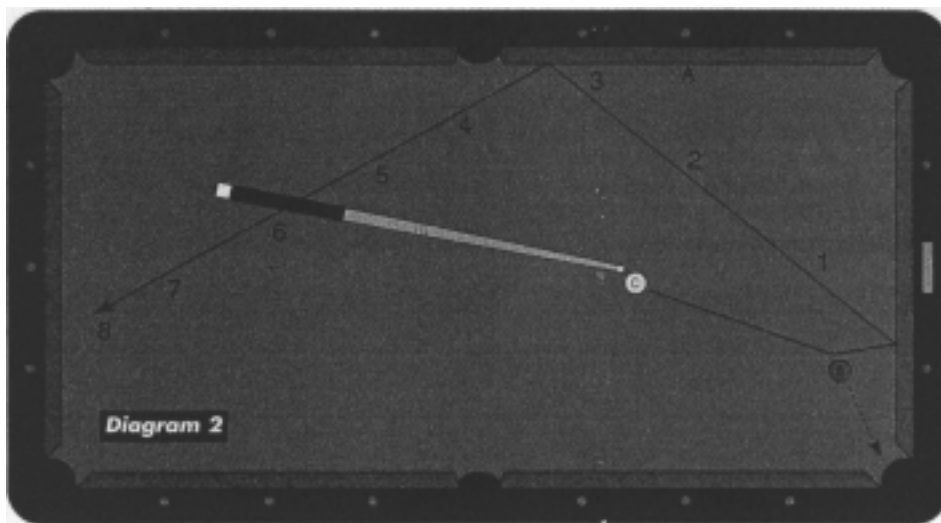
A second outside English progressive practice drill is shown in Diagram 2. This time, you should not need draw to achieve the indicated line for the cue ball, since the object ball and cue ball are both farther out from the end cushion. Try the drill first with just left-side spin, but as before, experiment with the mix of side and top/bottom spin.

Again, find the most efficient — least effortful — way to get the cue ball to position 1. Also try to find the way that allows you to have the cue tip strike as close as possible to the middle of the cue ball — the way with minimum spin. Are these two

Moving the object ball closer to the cushion is a not-so-obvious variation. I think you'll find that the shot gets much harder as the object ball starts nearer the rail. Finally, alter the position line to the extreme you can achieve on your table with your stroke.

Can you move the line to go to the cushion at A? Tougher than A? Hint: Start with equal amounts of draw and side.

In this pair of columns, I discussed shots with the object ball near the cushion and using inside follow or outside draw to carry the cue ball for position. I hope you have learned by now why outside follow and inside



ways the same? Were they the same for Diagram 1?

You should already be thinking about how to make this drill harder after you master it. Moving the cue ball back is obvious.

draw are generally not useful in such situations. Instead, you want the draw/follow working with the side spin to take the cue ball effortlessly to the needed spot.

Enough theory! Get to the practice table.