THE ART OF BALLS 3

AN ALTERNATIVE APPROACH TO POOL BILLIARDS

PART 3: PERFECT AIMING

POOL SCALE

In music, to produce different tones, you subsequently cut your string (e.g. on a guitar) or the air vibrating in your instrument in halves, thirds, half of halfes, and so on.

As a result you achive a natural scale of overtones. If you have accumulated enough divisions, you can string them together to a scale.

In music, we usually go with 8 steps to make up one octave.

C D E F G A B C

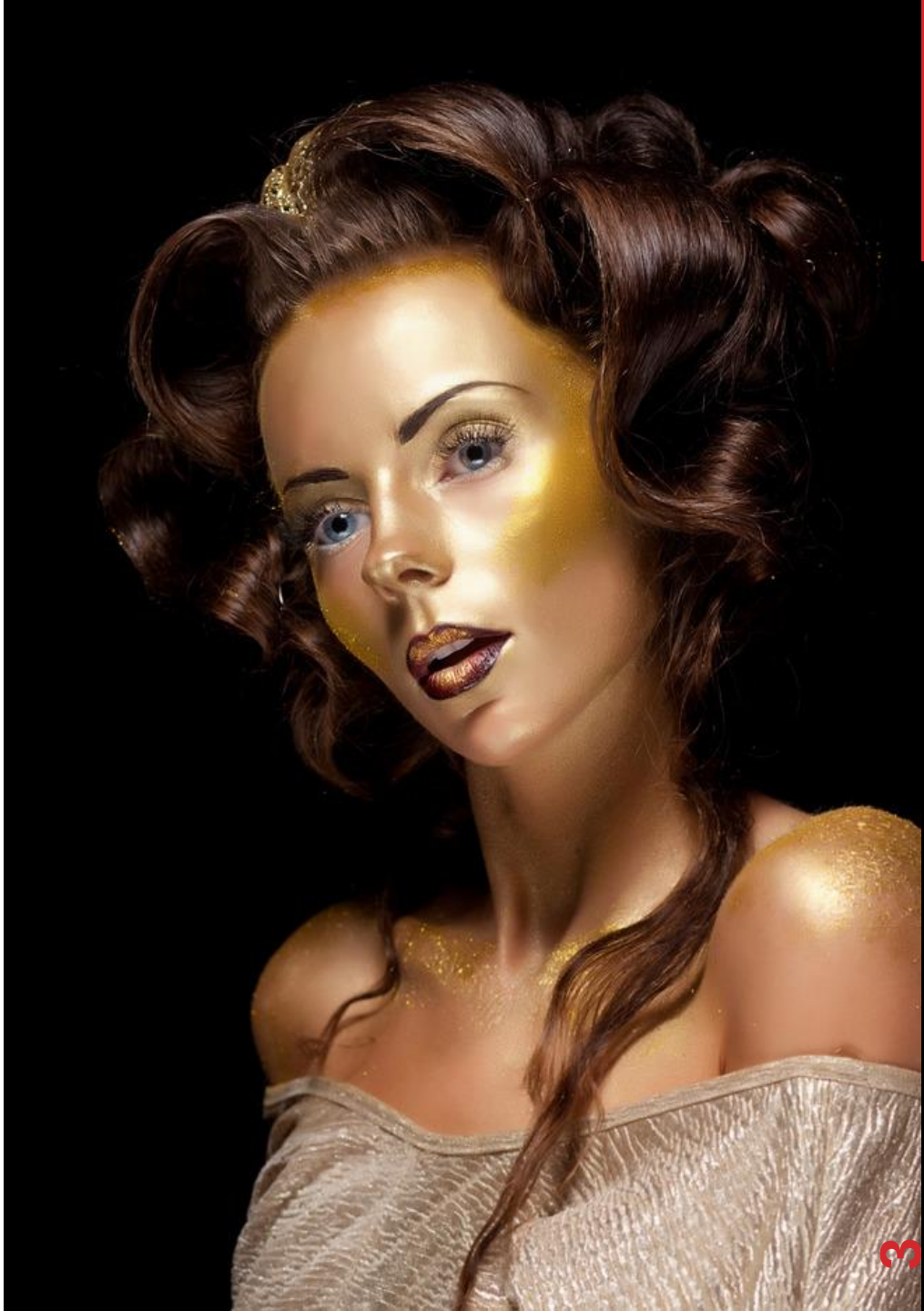
Then we add in-betweens because we like their sound.

Bb, Db, F#, Ab, …

POOL SCALE

At some point we stop the subdivision process because we don‘t really like the sound of the new notes. The don‘t contribute to our song and only add complexity in which we can get lost.

But anchoring on the basic overtones (about 16) we can produce just about any known piece of music, apart from the experimental stuff.



A SCALE FOR POOL

To develop our pool scale, we will also cut things in halves.

First the table.

Then the balls.

And then we‘re going to map both things onto each other.

So you know how to play a whole set of standard shots without ever having to guess the basics.

We will end this process when the precision we achieved is sufficient for our game.

WHY NOT JUST AIM?

Because spot aiming, even with the ghost ball is almost always wrong.

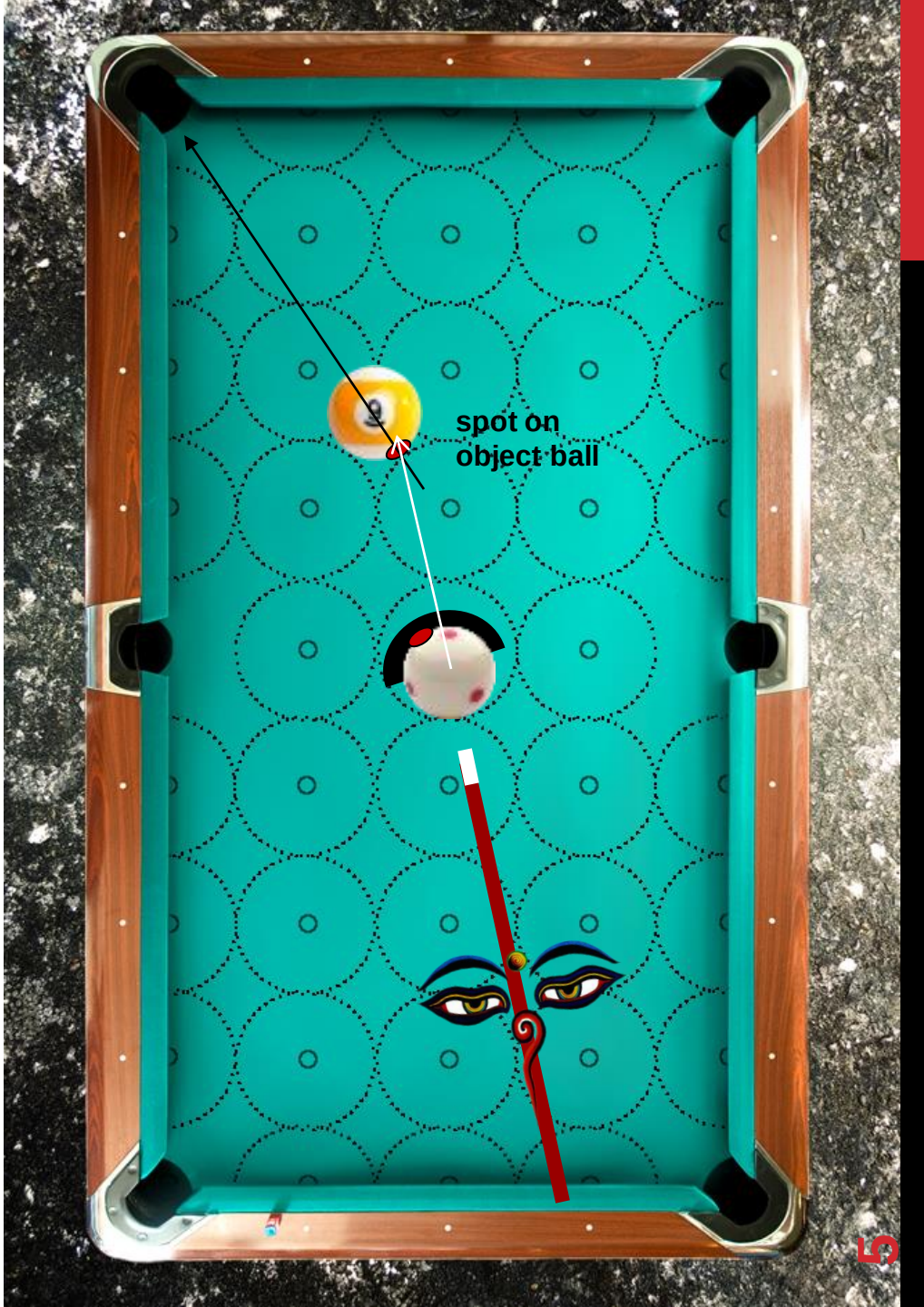
Let‘s assume for a moment you **can really remember** a spot on the object ball that is in line with the pocket while you walk around the table (we know memory is sometimes not that precise and meditation teaches us that is **damn hard even when resting** …).

The same goes for an imaginary ghost ball which is even more difficult to remember in the precise position.

Unfortunately you cannot see the **back of the cue ball** since your eyes are on the opposite side.

However you have to hit the object ball with an **imagined spot on the back** of your cue ball, no matter how precise remember your spot on the object ball.

So ghostball aiming most of the time is **pure guesswork**.



SO WHAT

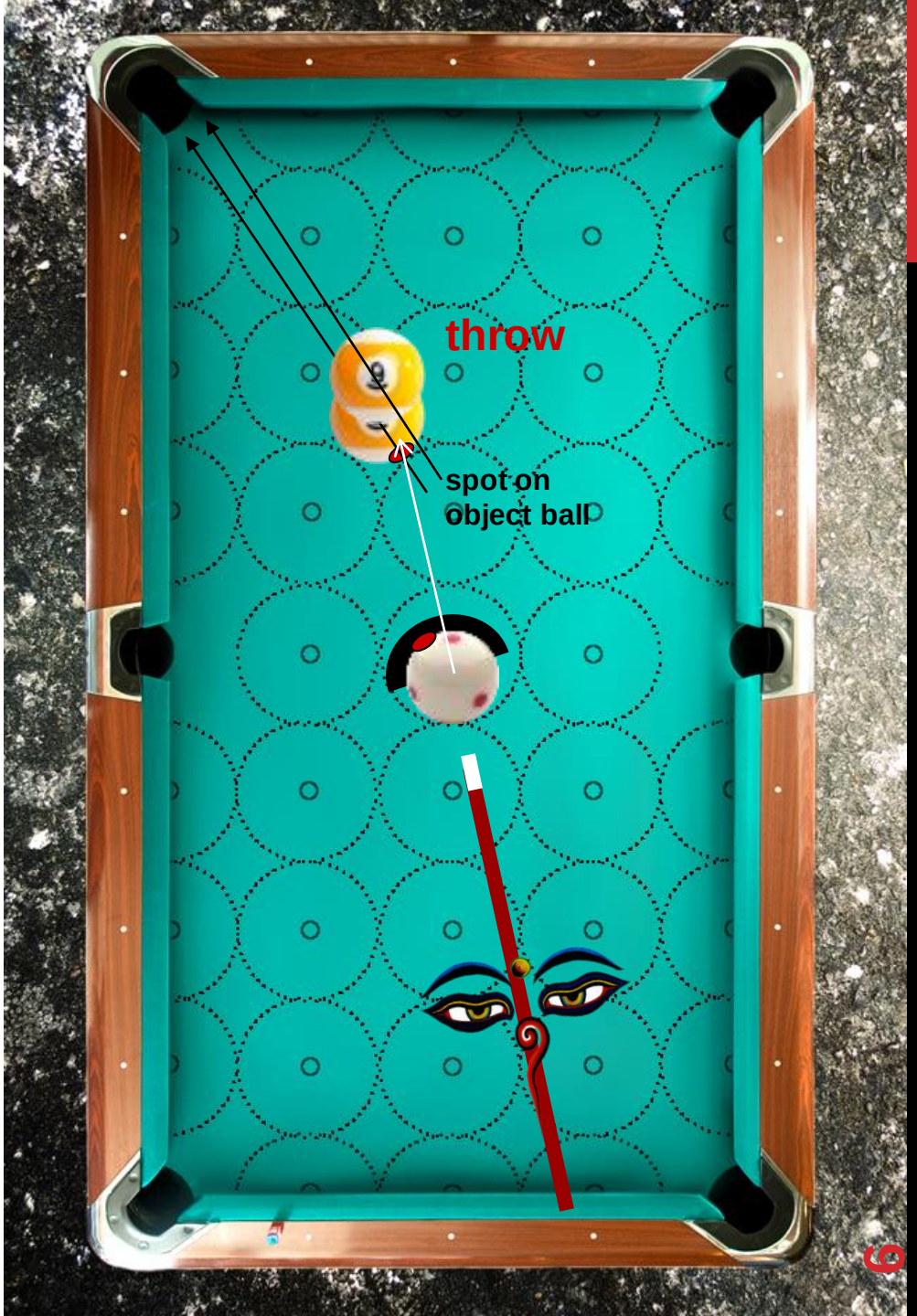
This guesswork comes at an incredible cost.

There are a ton of effects that you need to be aware of that influence the path of the object ball:

- **How far the cue ball throws the object ball out of line due to friction**
- **How this effect changes for different types of shots**
- **How this effect changes for different speeds**
- **Changes of the object ball path due to spin of the cue ball.**

The problem with guesswork aiming is:

Most of the time you will not even be aware of those effects. All you see is that you missed. You have no clue whether you saw the ball wrong or whether the basic aiming was right and there was some side effect you missed.



IF YOU MISS SIDE EFFECTS

Then you cannot act to counter them.

You cannot decide what the error was. Only after you missed a ton of different shots because of the same effect.

That‘s a masochist approach.

Finding out the truth this way is pure chance.

There must be a better way.

I‘ll give you a system where you know a whole bunch of shots.

If you miss, you will be well aware whether there was a side effect or not.

And I‘ll show you how to correct them.

CUTTING IN HALVES

First, we‘re going to cut the table in two halves and establish our first string.

And for some strange reason we‘re going to call it **half line**.

Now there‘s a most convenient coincidence. For a **mezzo follow shot**.

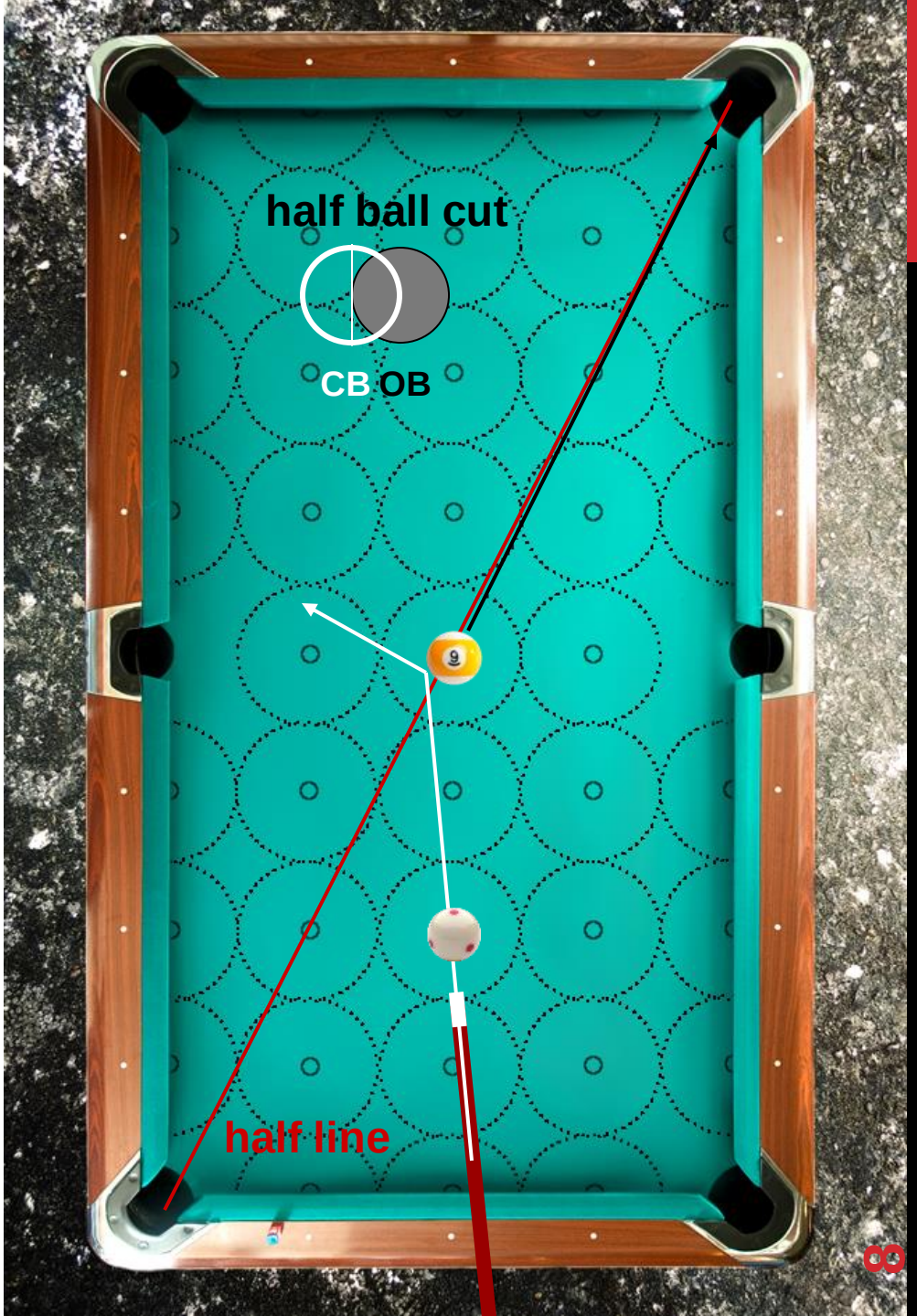
Any object ball that resides on this line, when the cue ball is exactly „above“ it, **is a half ball cut**.

To aim it place your cue stick exactly centered behind the cue ball and **aim its center at the edge of the object ball**.

Aiming the **cue stick** is more accurate than aiming the balls.

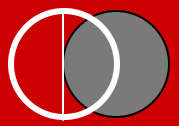
For a mezzo follow shot, the ball will go.

The only constraint is that the cue ball must be **more than one quarter away** from the object ball.

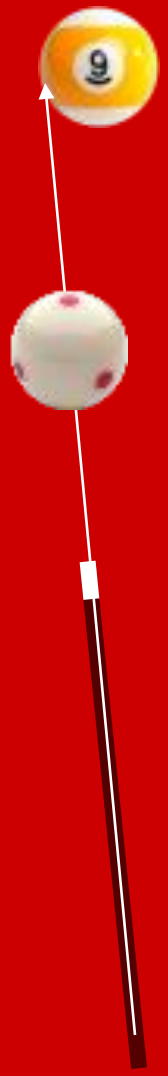


AIMING THE CUE STICK

rifle aiming



CB OB



Aiming the cue stick at a defined point on the object ball (instead of some imagined center of an invisible ball) is a superior strategy.

It includes all components in the line of shot.

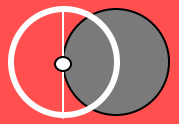
- **the direction of your cue stick**
- **whether you hit the cue ball centered**
- **a defined target on the object ball where you can rifle at.**

Of course, you can only do that if you know the shot.

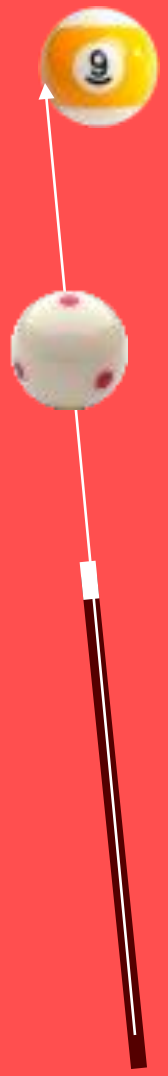
If you don‘t know the shot, you cannot rifle aim, because you have to guess the back of the ball.

ERROR EVALUATION

rifle aiming



CB OB
cue tip



If you made a miss and stay down on the shot, it will now be obvious what caused it:

1. **The cue ball hit where you rifled at**

If so, either your knowledge of the shot was wrong (rare if its one of our references).

Or there was a side effect:

a. It was not a mezzo follow shot, thus there was more or less throw.
b. The balls are sticky so thre is more throw.

2. **The cue ball did not hit where you rifled at**

a. The cue direction was wrong.
b. The cue ball (your setup) was off line.
c. Your shot execution was not clean.

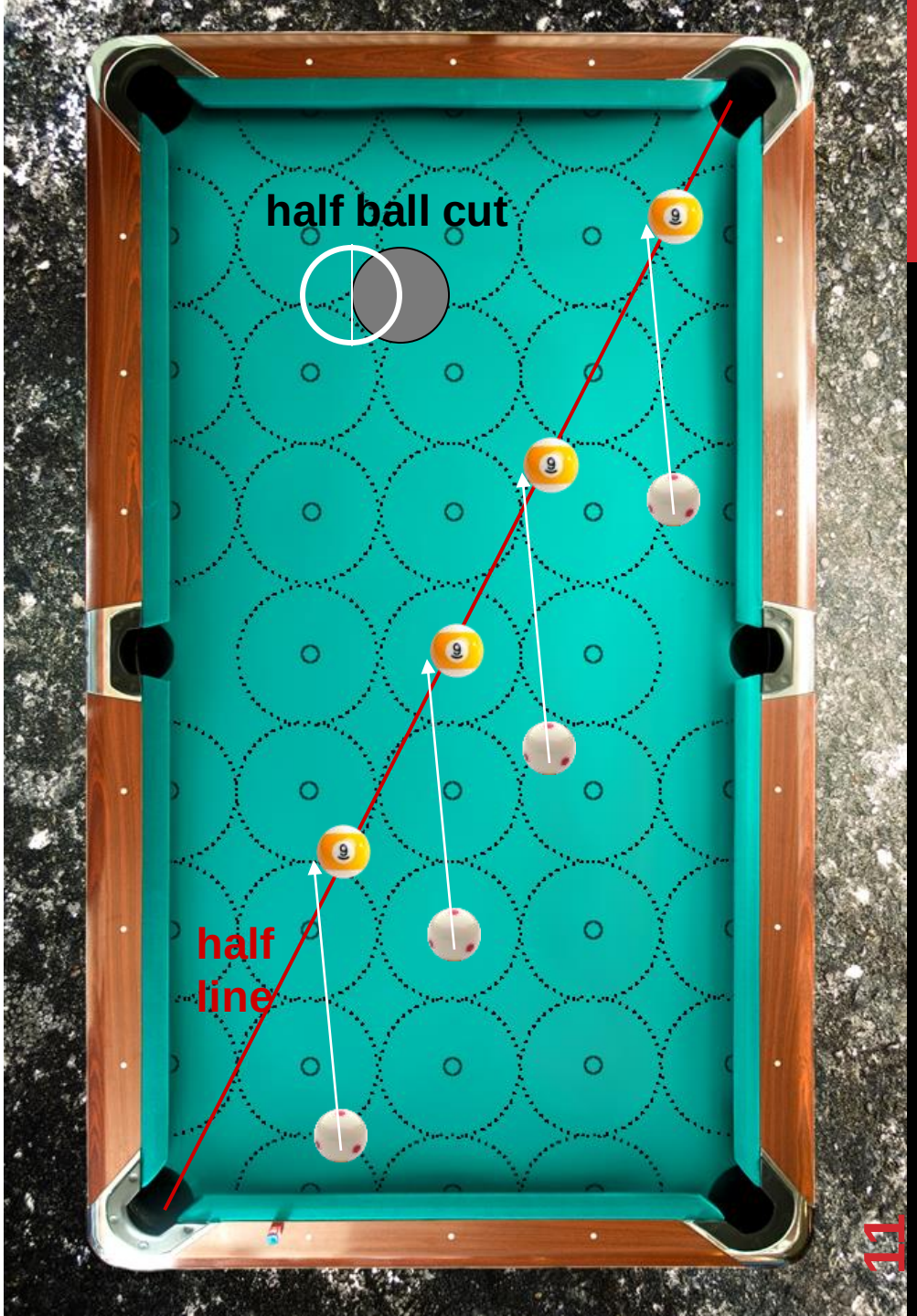
If you know the shot, what went wrong will be obvious.

KNOW MORE HALF BALLS

Conveniently, every time an object ball is on the half line, when the cue ball is exactly behind it, a mezzo follow half ball cut will pocket it.

No matter where on that line the object ball lies.

So now you now a whole string of reference shots.



THREE QUARTS

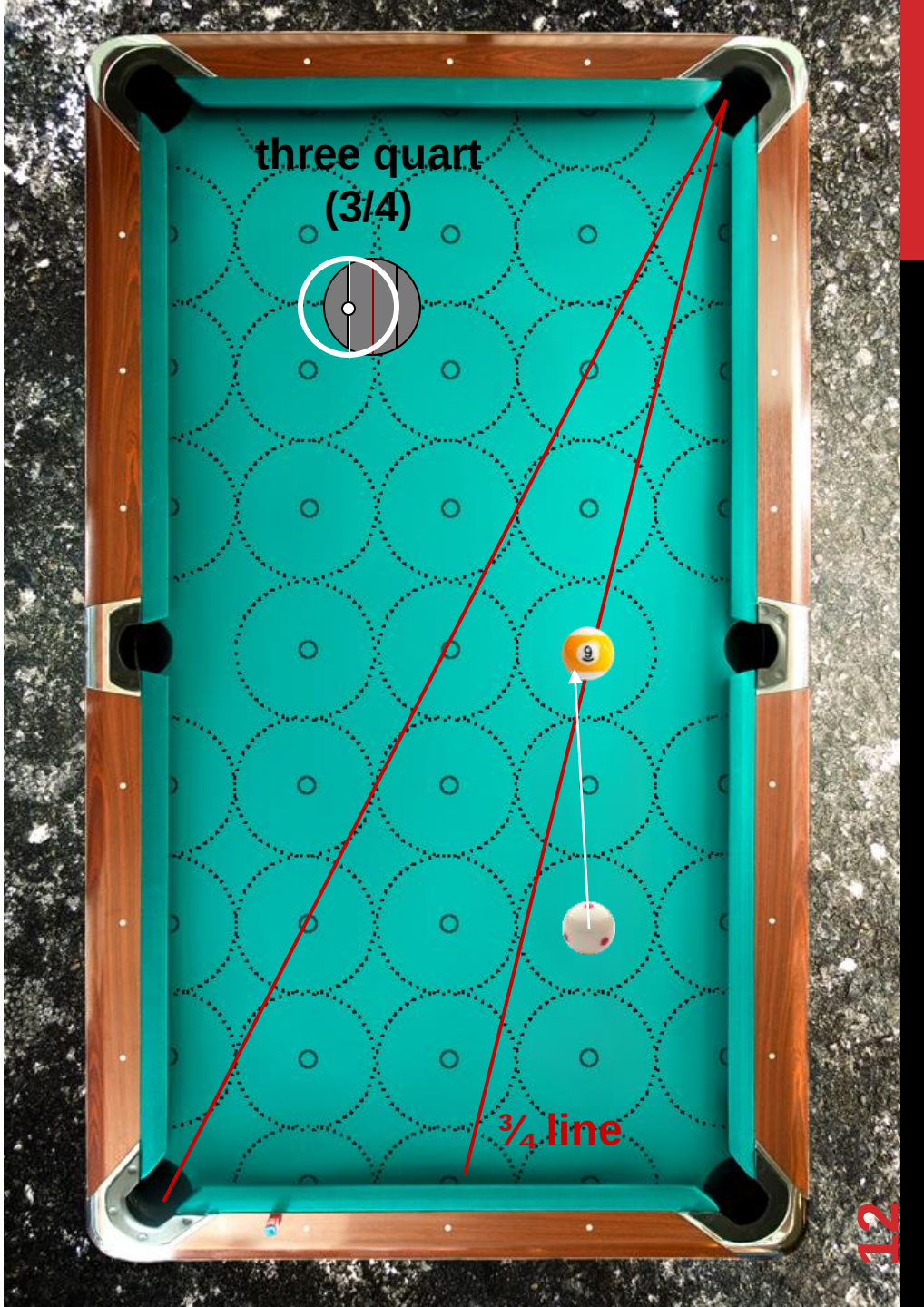
The next ball we‘re going to look at is called a **Three Quart**. The corresponding line is called **three quarter line**.

The point you need to aim the cue stick at is exactly **in the middle between the center and the outer edge**.

If you place a striped ball uprigth on the table you can use the line of the stripe.

Some people say it‘s the place where the core shadow under the ball touches the balls edge.

And again, no matter where on the line the object ball rests, a **mezzo follow three quart cut** will pocket it.



QUARTERS

Of course we can also cut the other half of the table in halves. Please note that we are always going **through the diamonds**, not the edge of the rail.

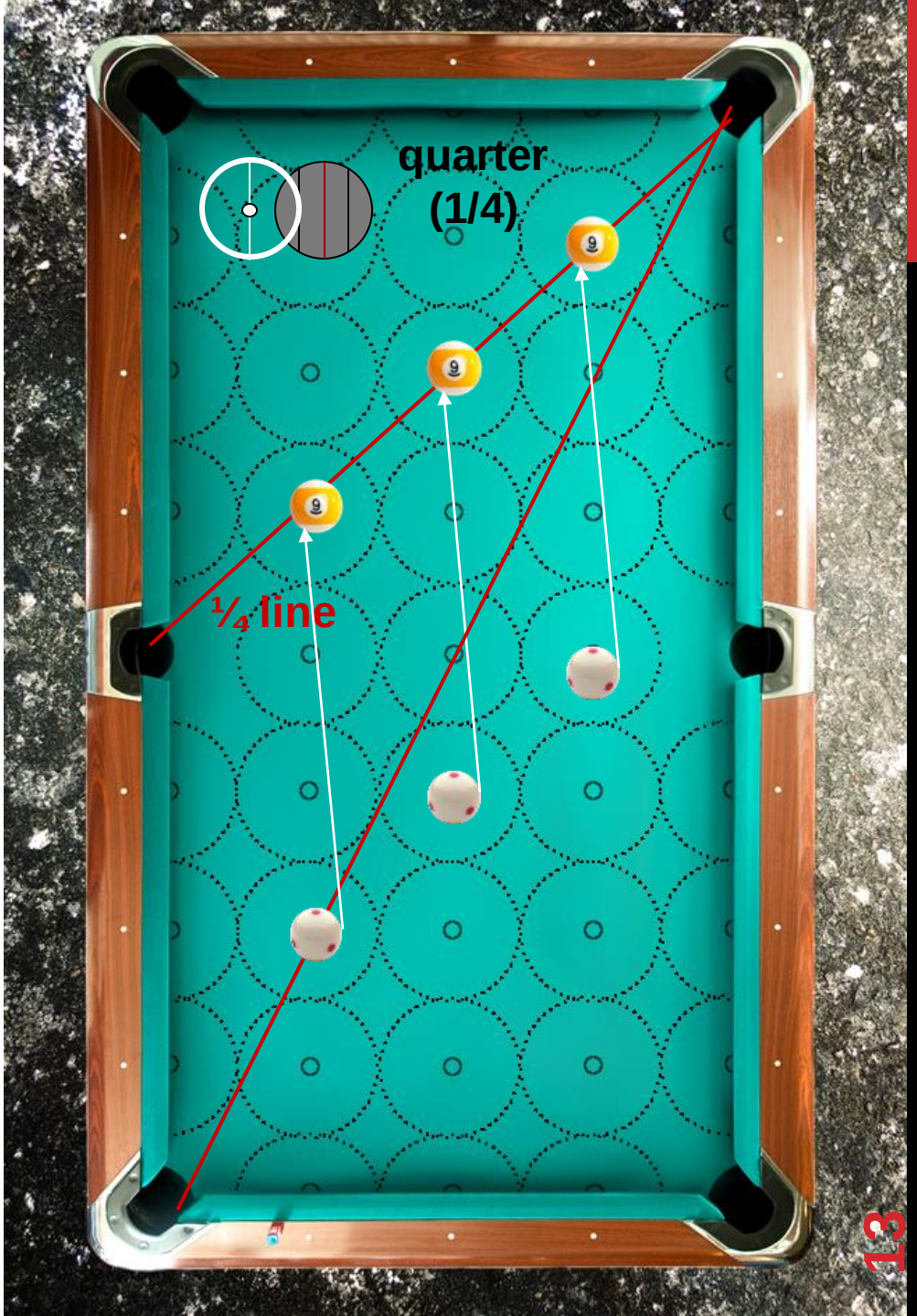
We'll call this line **quarter line**.

The corresponding **quarter ball cut** takes a little bit more time to get used to. That's because the point you could rifle at lies **outside the cue ball**.

But you can double check using the edge of the cue ball. The edge has to go exactly to the point you rifle at for a three quart. Of course, you have to take the difference of the balls due to the size into account.

But the combination of the two will **make your aiming quite precise** for this shot.

This shot is **one of the very basics** and comes up often.



THE MAJOR SCALE

Now we already know all shots of the major scale and on which line and in which standard situation they are applicable:

- **Straight In (we left that one out …)**
- **Three Quart**
- **Half Ball**
- **Quarter**

See the rifle diagrams on the right.

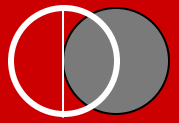
You may notice that the naming system always consists of two syllables, even though some names are shortened. That‘s an intentional pick, so when calling them up in your mind the always produce the same rhythm. That will be important for later.

Which means memorize them ☺

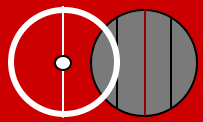
straight in
(1/1)

three quart
(3/4)

half ball
(1/2)



quarter
(1/4)



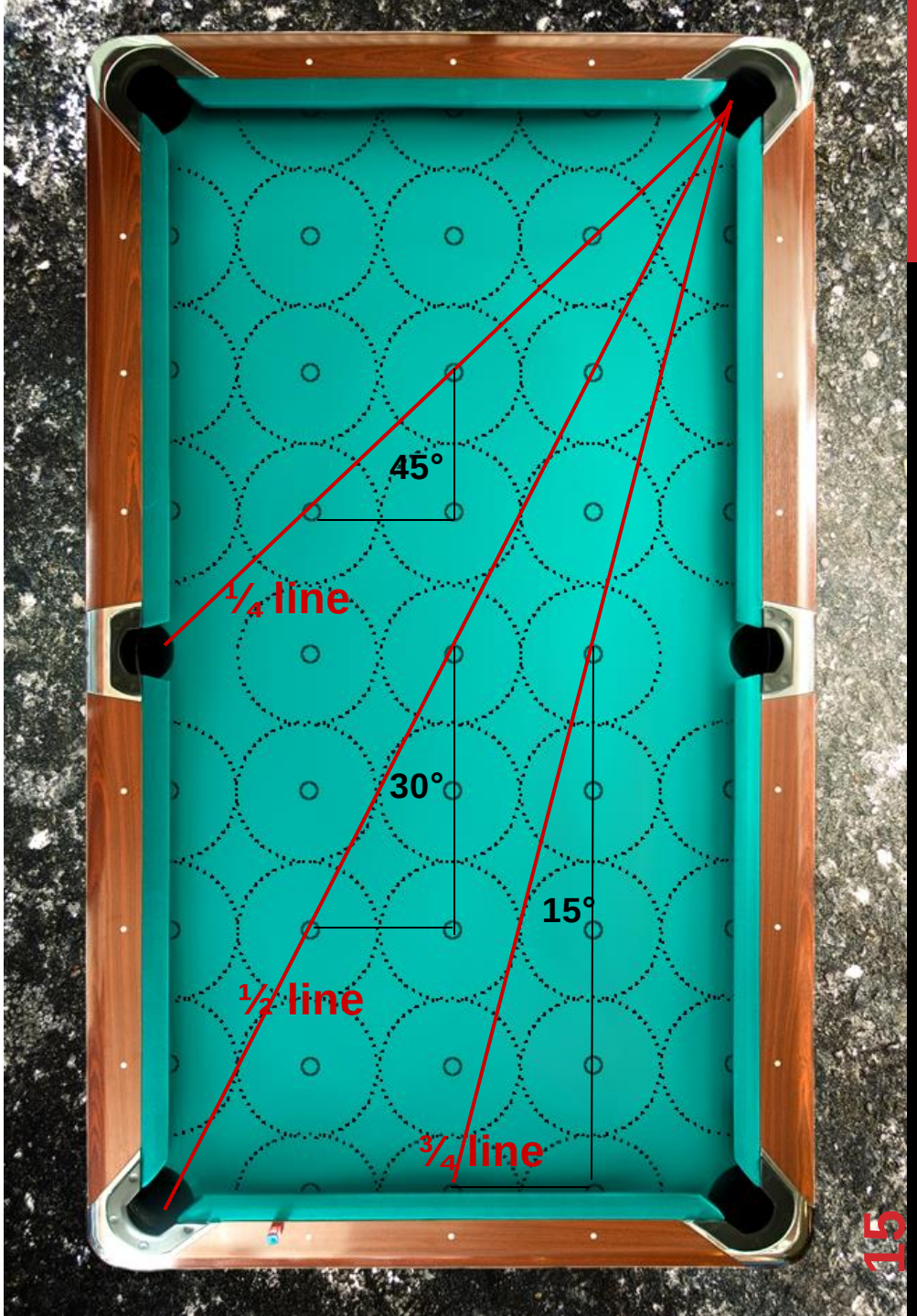
ANGLES

For further reference and to spot shots on the table using the diamons it‘s also interesting to note the cut angles for these lines.

If you‘re familiar to pool, those angles probably sound famliar, because they come up often:

- On quarter line there‘s about a 45° cut.
- On half ball line there‘s about a 30° cut.
- On three quart line there‘s about a 15° cut.

(Since we‘re going through the diamonds they are really 14, 28 and 48, but that doesn‘t matter too much.)

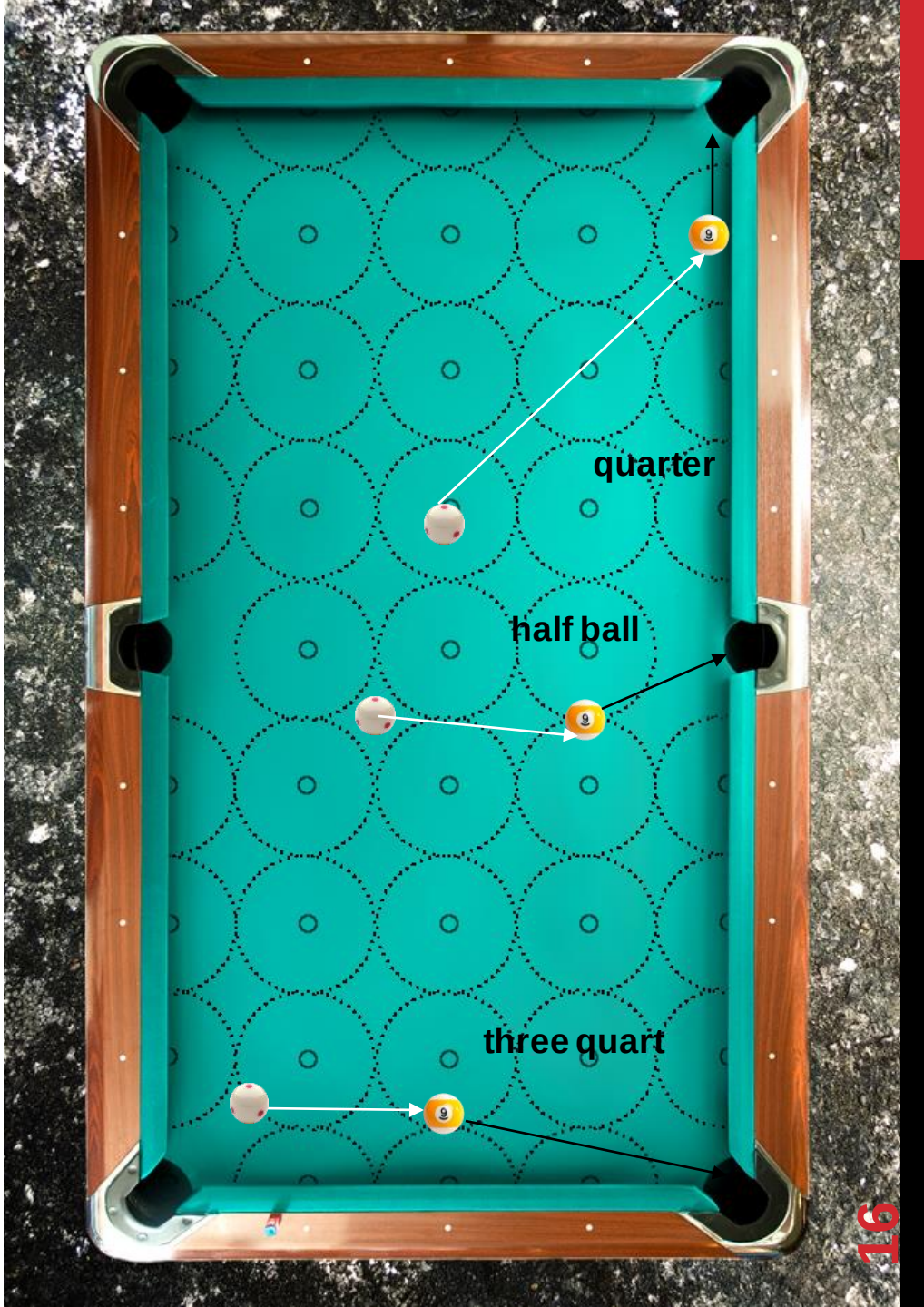


IDENTIFYING ANGLES

You can identify those angles by looking at the diamonds:

- A three quart comes in 1 on 4 diamonds.
- A half ball comes in 2 on 4 (or 1 on 2 …) diamonds.
- A quarter comes in 4 on 4 (or 1 on 1, …) diamonds.

So you can find those angles in many different situations.



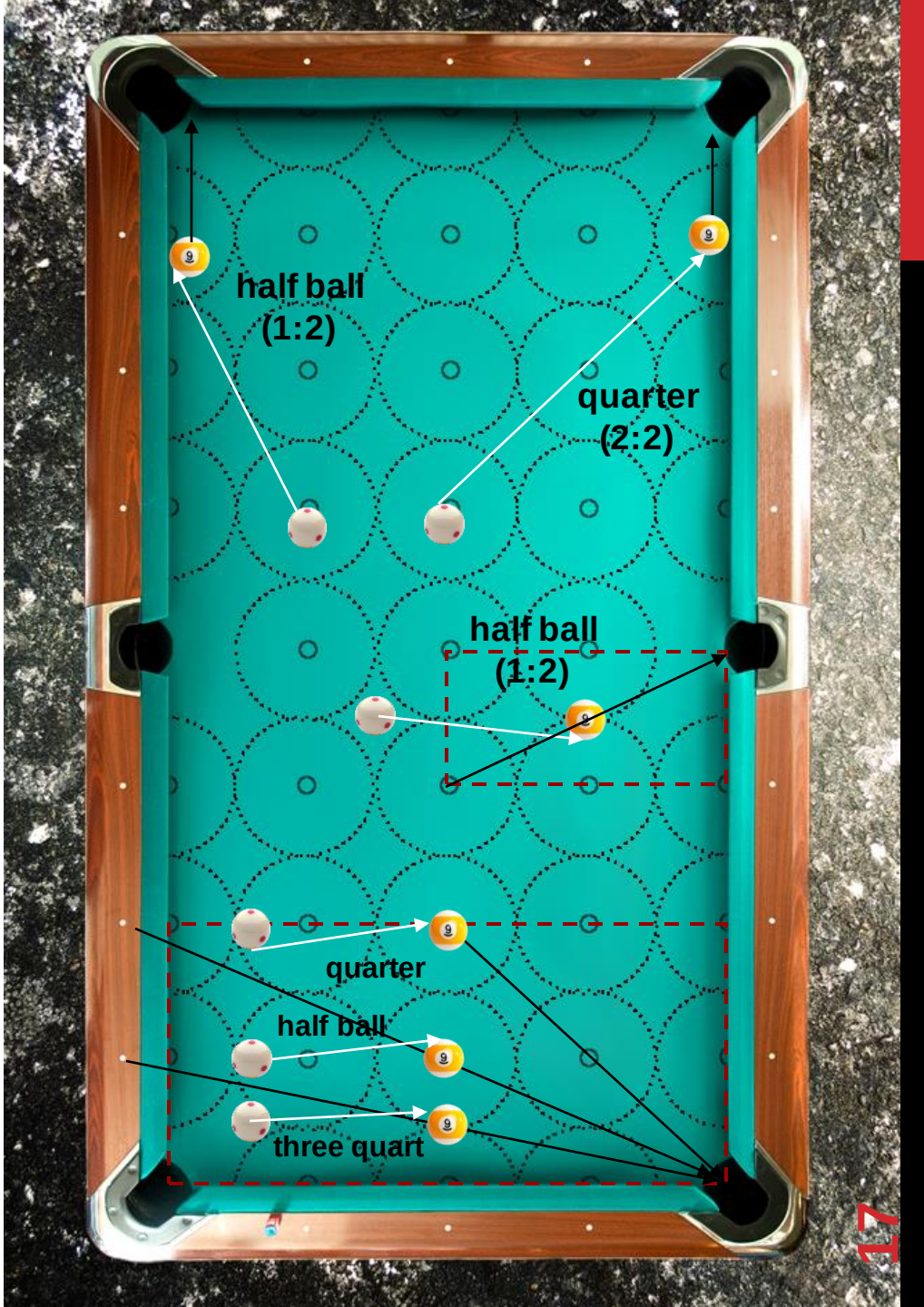
SCALING

It can help a lot if you start to visualize miniature versions of the table where possible.

So you can see the corresponding lines on that miniature table. Your aiming will then become much more confident, since all of a sudden you know a ton more shots.

All shots along the cushion can be known according to the diamond ratio of cue ball and object ball.

This eliminates doubt in many unfamiliar situations.



YOU CAN PROBABLY GUESS WHAT HAPPENS

NOW ...

THE MINOR SCALE

Four angles are unfortunately not enough to play everything.

But you probably would be surprised how high a percentage of balls can be pocketed using only those shots, if you're playing on loose pockets within one half of the table.

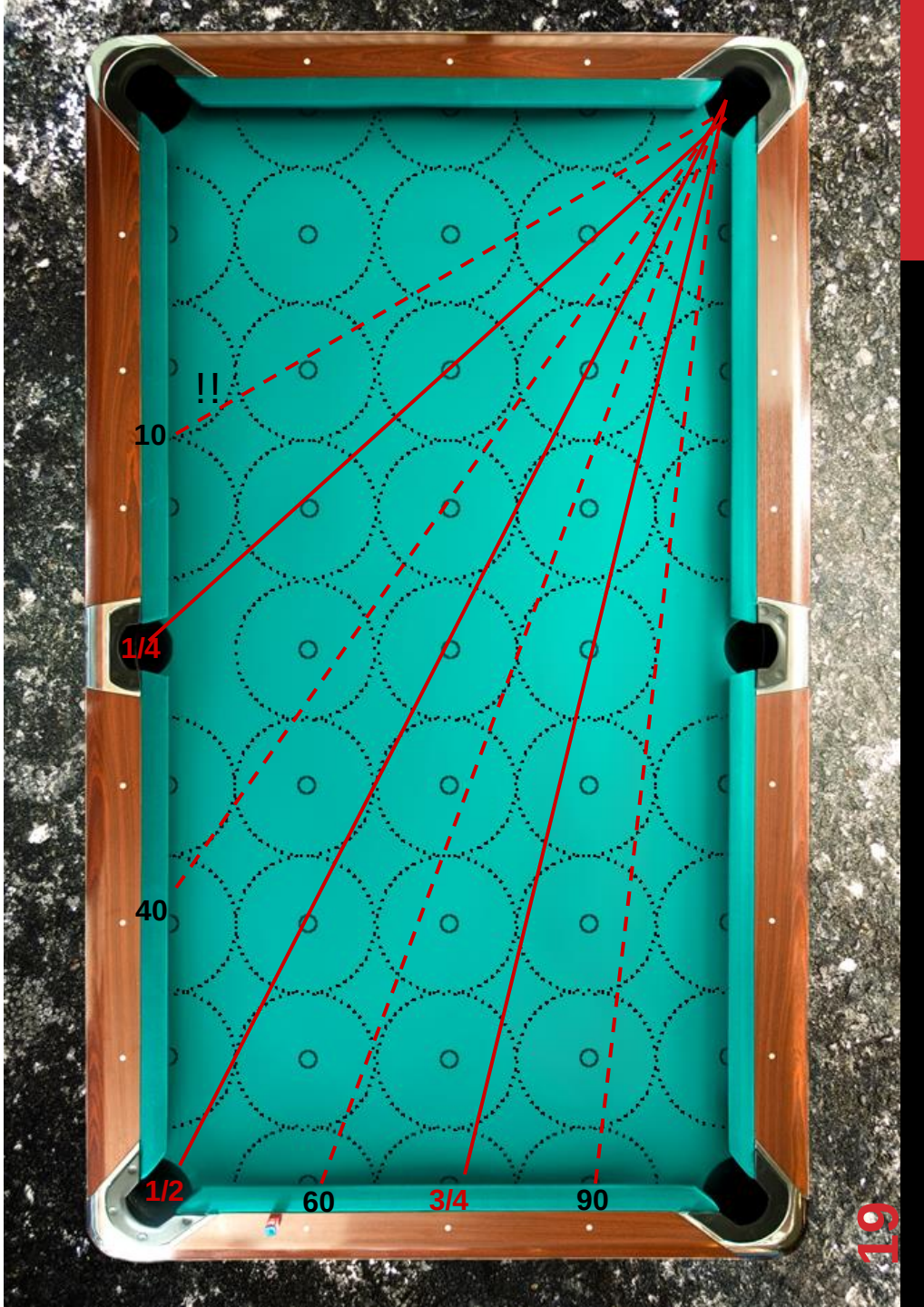
So to add precision, we again cut down in halves. For the minor scale our base are eighths.

So we'll identify four more lines and shots:

- Ninety (7/8 is really 88% …)
- Sixty (5/8 is really 62% …)
- Forty (3/8 is really 38% …)
- Ten Thin (1/8 is really 12% …)

Since we're only using them as labels those 2 percent won't really matter.

Note that breaking down in halves is off on the top left corner of the table as we're passing the quarter line. The 1/8 is about 1.5 diamonds down the middle pocket.



THE MINOR SCALE (II)

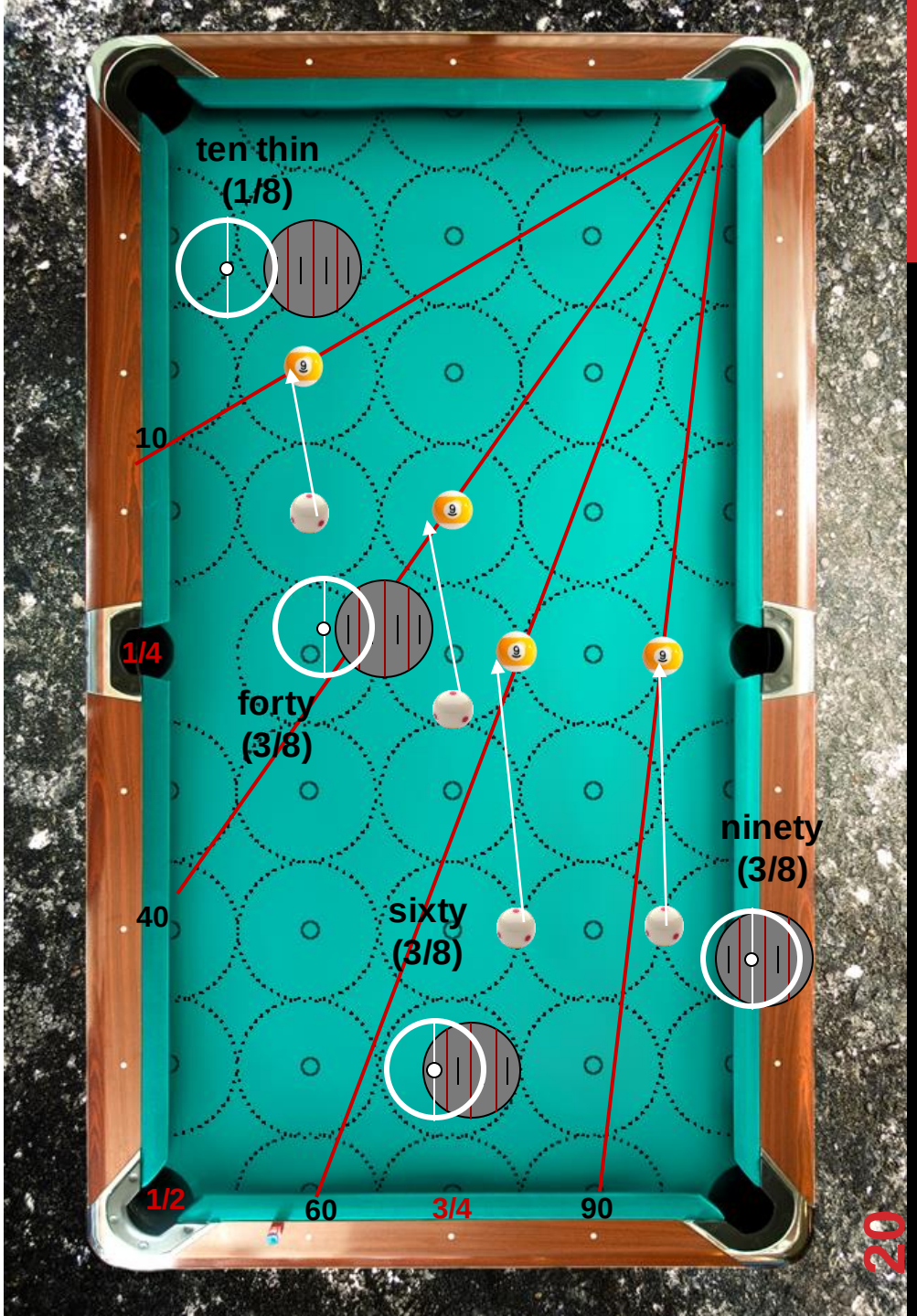
And again, balls played from exactly above can be rifled at.

You'll nail the ninety pretty quick, as you can rifle from center cue ball at the line between center line and what you practiced as three quart target.

The sixty is reasonably easy when you rifle from center cue ball to between the edge of the object ball and the three quart target.

The forty becomes easier when you think of it as the sixty target mirrored at the edge of the ball to the outside.

The ten thin is reasonable when you try to hit the sixty target with the edge of the cue ball.



THE SPOTS

So you can define typical spots even out in the field, where playing from exactly above will yield one of our standard shots.

The major notes indicated in red.

MINOR-MAJOR SCALE

So let‘s string the pieces together. Our minor-major scale goes like this:

- **Straight in (1/1)**
- **Ninety (7/8)**
- **Three quart (3/4)**
- **Sixty (5/8)**
- **Half ball (1/2)**
- **Forty (3/8)**
- **Quarter (3/4)**
- **Ten thin (1/8)**

Each with a corresponding line on the table where from exactly above you can rifle the shot according to the rifle diagrams..

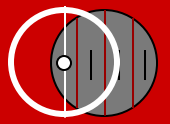
Now if you‘re playing on a pool table with 4,5 inch and above pockets you will hardly ever need more than these shots.

straight in
(1/1)

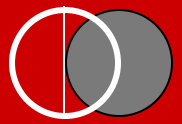
ninety
(7/8)

three quart
(3/4)

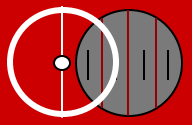
sixty
(5/8)



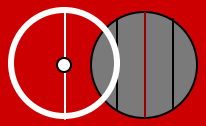
half ball
(1/2)



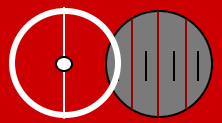
forty
(3/8)



quarter
(1/4)



ten thin
(1/8)

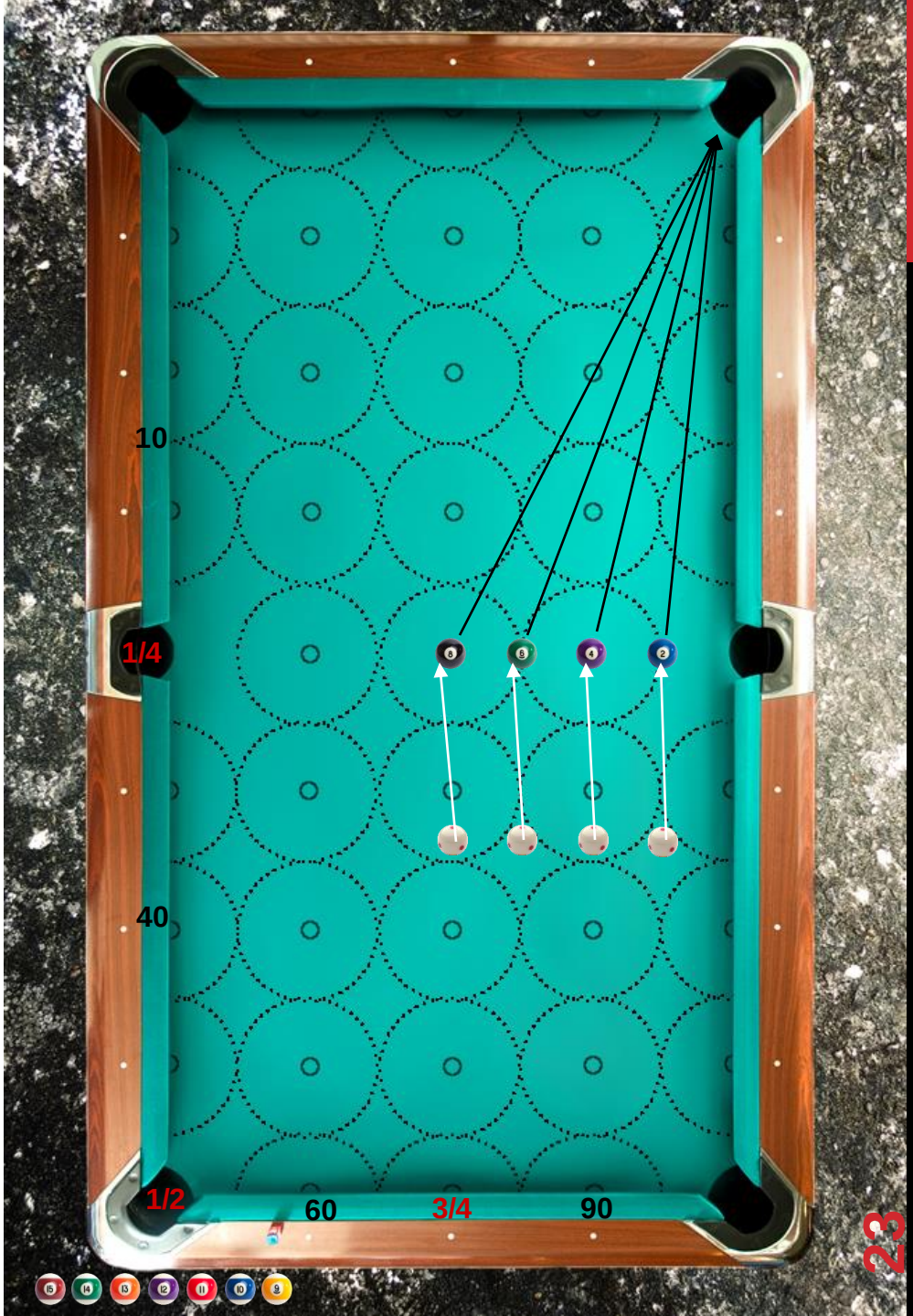


ENOUGH PRECISION?

Well, let‘s check it.

Let‘s have a look at this line first. You probably recognize these shots by now: ninety, three quart, sixty and half ball.

Now let me draw that picture differently …



REALLY ENOUGH PRECISION?

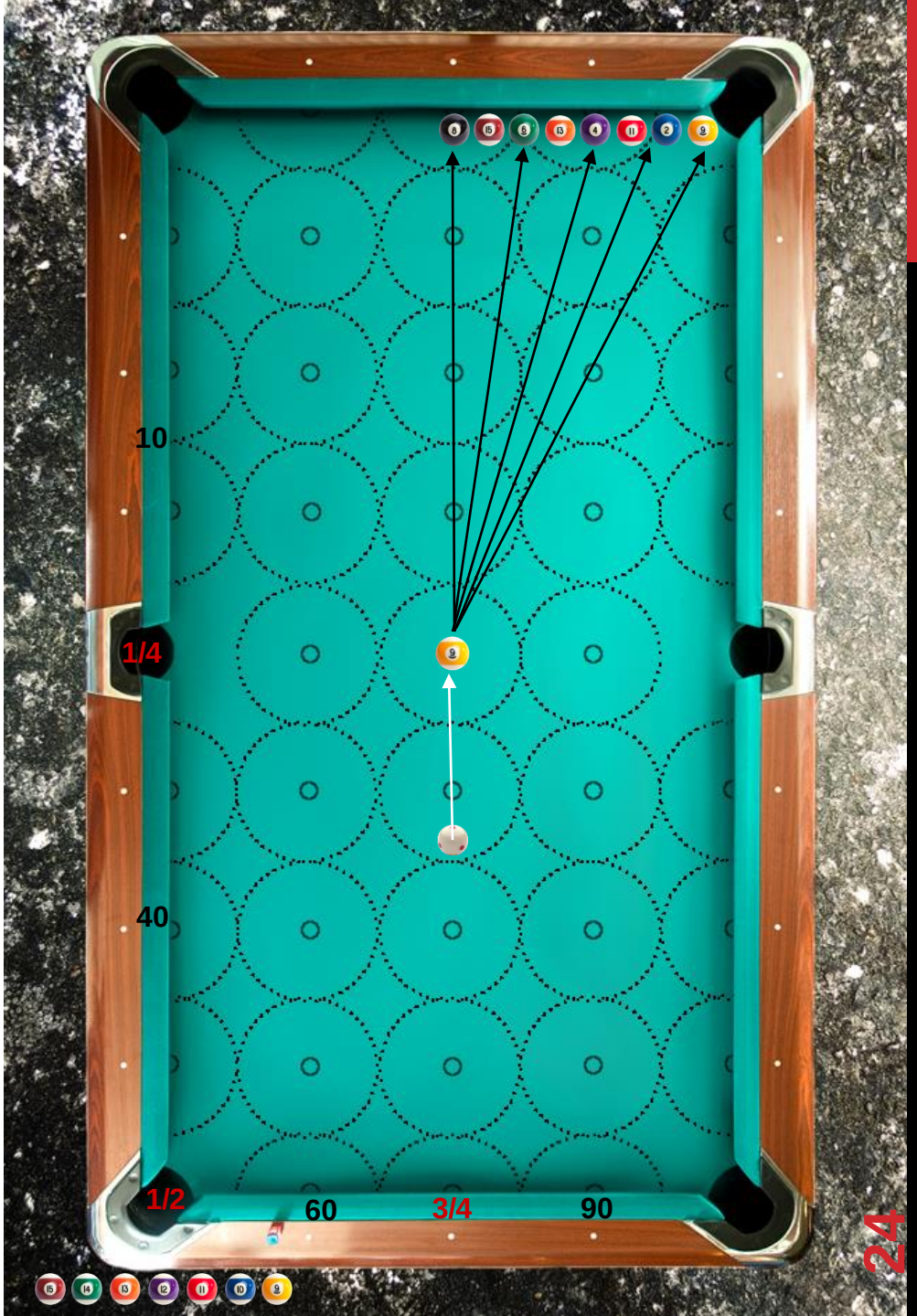
If I want to send the nine down to the rail caroming into those balls or into the pocket the necessary shots are: straight in, ninety, three quart, sixty and half ball.

Now if I'm placing the stripes in between you will see that there are still gaps between the balls.

Now if your pocket was exactly two balls wide, the minor-major scale wouldn't allow for any ball to be pocketed on half a table, since hitting those gaps means hitting the edge of the cushion.

You can easily see that on a table as tight as the one to the right, the cut shots we have until now are not sufficient.

But if you have a standard Gold Crown V with 5" pockets, you're set. That's why it's not a good idea for tournament players to practice on such a table. It costs you precision in your aiming.



WE‘RE VERY CLOSE.

DON‘T WORRY

FLATS & SHARPS

To throw the 16ths in would probably blast our heads, not be fun and not be suitable for use in reality.

So we‘re doing what the musicians do. We‘re throwing in a couple of flat and sharp notes. So we‘re anchoring the 16ths at something well known.

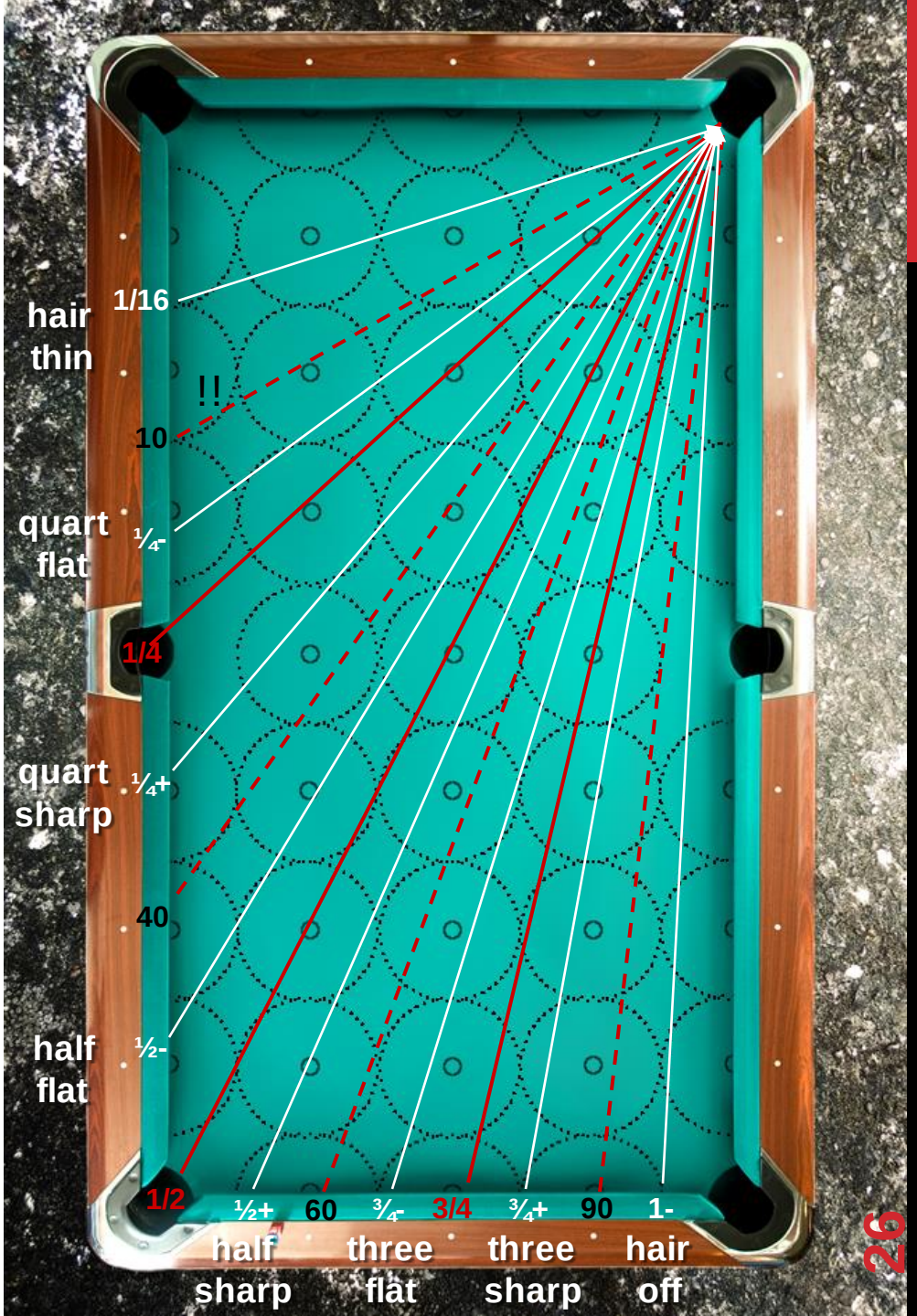
Around a half ball we put half sharp and half flat (or half plus and half but, or half more and half less). You can name it like you want to. I‘ll stick with sharp and flat.

Around a quarter we place quart sharp and quart flat.

Around a three quart we place three sharp and three flat.

At the top we add a hair off (a straight in).

At the bottom we add a hair thin. The hair thin is the thinnest cut you would ever reasonably attempt, at 1,5:4 diamonds.

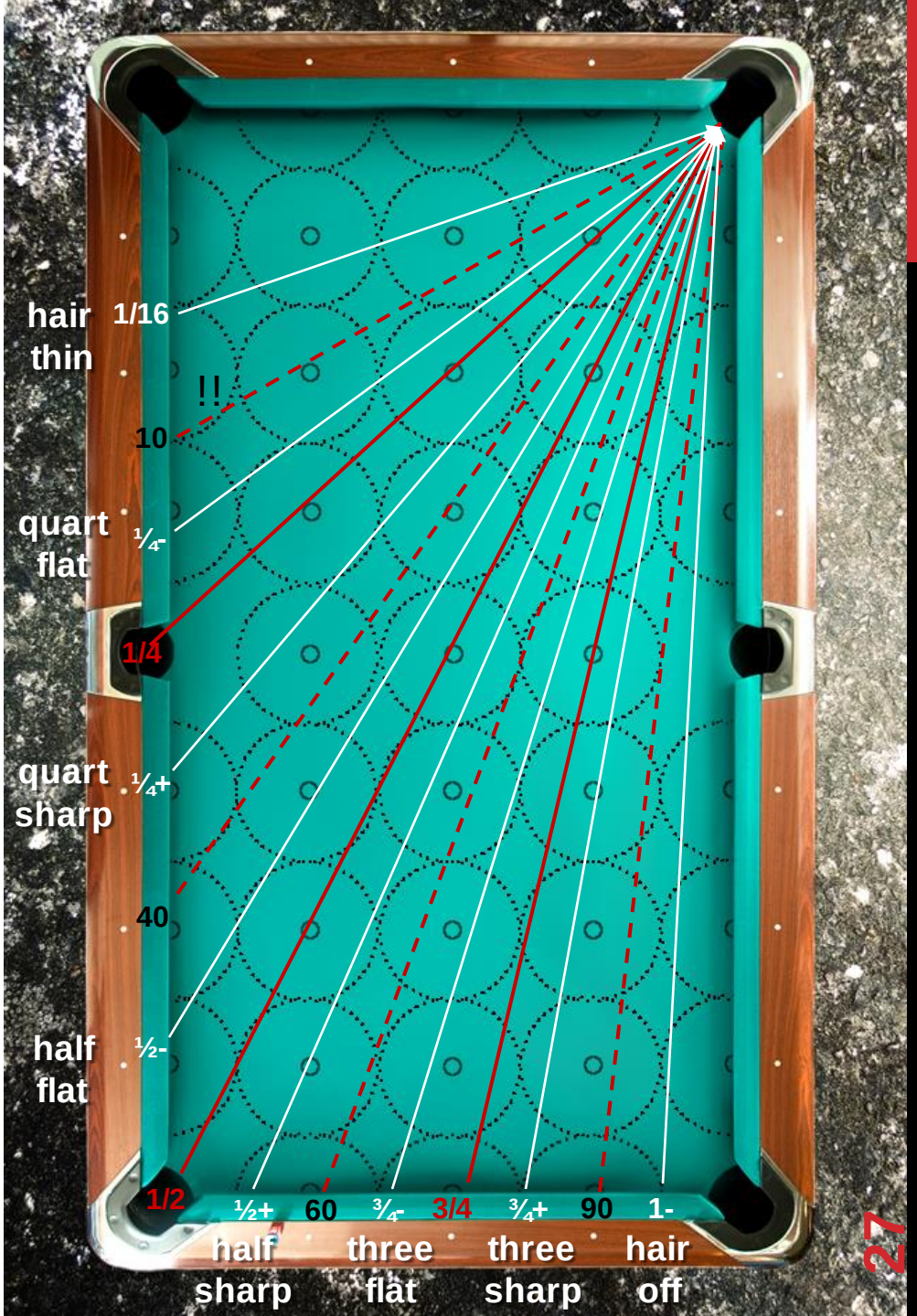


FLATS & SHARPS

With those lines we have enough precision for just about any ball on any tournament table that is reasonably pocketable.

So our chromatic scale sums up to:

- Straight In (1)
- Hair Off (1-)
- Ninety (90)
- Three Sharp (3/4+)
- Three Quart (3/4)
- Three Flat (3/4-)
- Sixty (60)
- Half Sharp (1/2+)
- Half Ball (1/2)
- Half Flat (1/2-)
- Forty (40)
- Quart Sharp (1/4+)
- Quarter (1/4)
- Quart Flat (1/4-)
- Ten Thin (10)
- Hair Thin (1/16)
- (Miss ...) (0)



CHROMATIC SCALE

When you're rifling this scale, I recommend you follow the strategy of the naming scheme.

A hair off is a bit off the center, but not as much as a ninety.

A three sharp is a tad fuller than a three quart, but not as much as a ninety.

A half sharp is a tad fuller than a three quart, but not as much as a sixty.

A half flat is a tad outside the edge, but not as much as a forty.

A hair thin is a tad thinner than a ten thin, but not missing the ball completely.

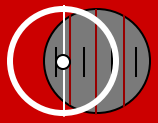
You really need to aim the edge of the cue ball for quarts and hair thin.

This tiny bit more or less gives you all the precision that is needed in pool. And the good thing is: If you know the shot, you can now rifle at it.

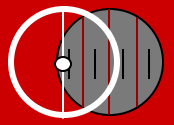
hair off (1/1)

three sharp

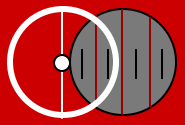
three flat



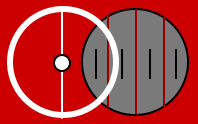
half sharp



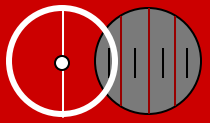
half flat



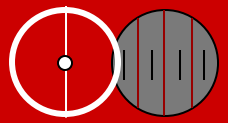
quart sharp



quart flat



hair thin



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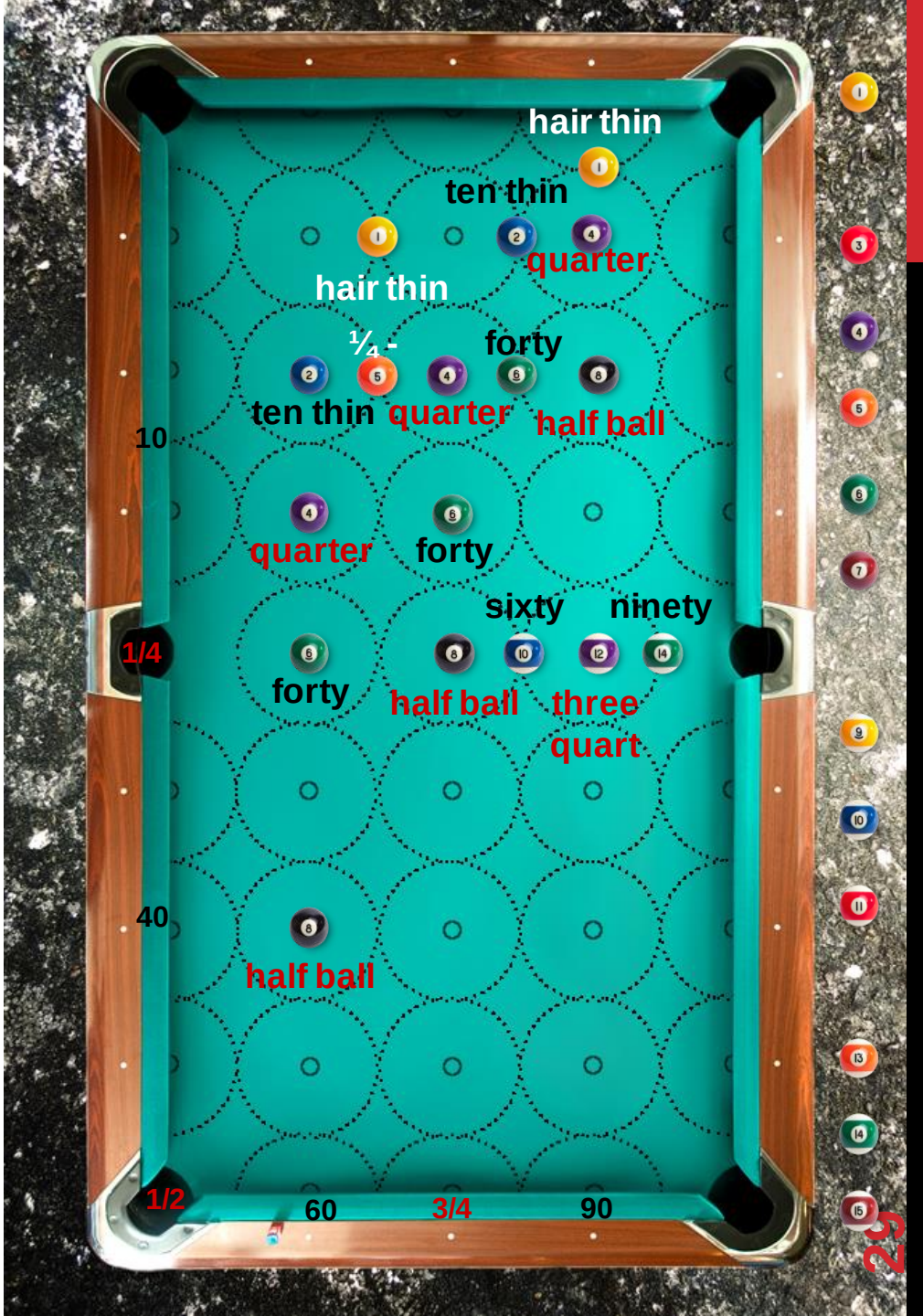
So you can define typical spots even out in the field, where playing from exactly above will yield one of our standard shots.

The major notes indicated in red.



LET YOUR CUE TIP HELP YOU

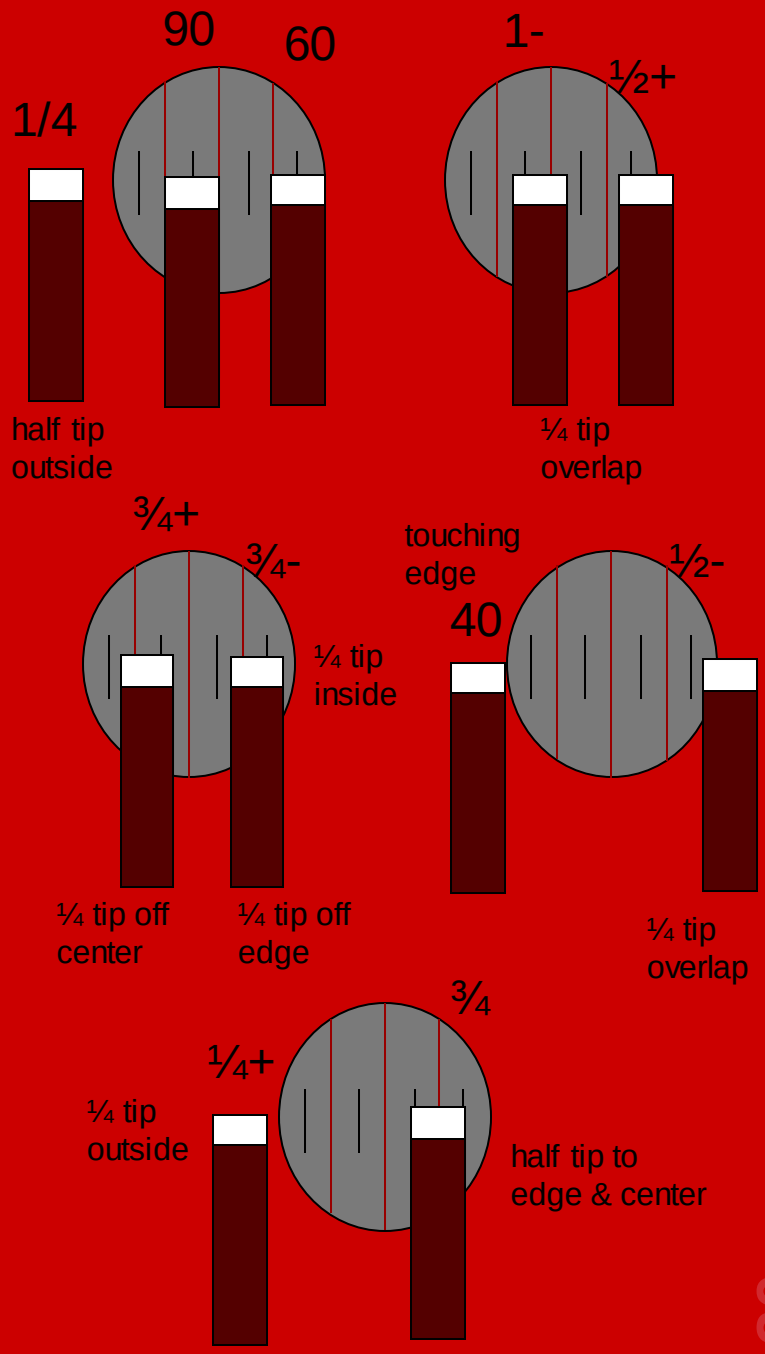
You may find playing for those sharps and flats not too easy. Only incorporate them when you nailed the minor-major scale. What you cannot play for, you cannot use in a game. Period.

Your cue stick can help you aim. It really depends on your tip size and distance, so I cannot give you a system here. But I can hint you at finding one with your own cue.

At a certain distance, your tip covers a fix amount of the object ball. Let‘s take 2D distance, because it‘s very common.

If you know how much it is, you can also aim the edge of your cue tip at those points. If for example you see it covers a quarter of the cue ball, you can easily find the 60 and 90 positions with it.

But it depends on your tip size and the distance of the object ball. Maybe you will have to work with 1/3 overlaps instead of 1/4. Some prefer smaller tips so they can better aim. But it might give you an edge when you‘re unsure or want to double check.



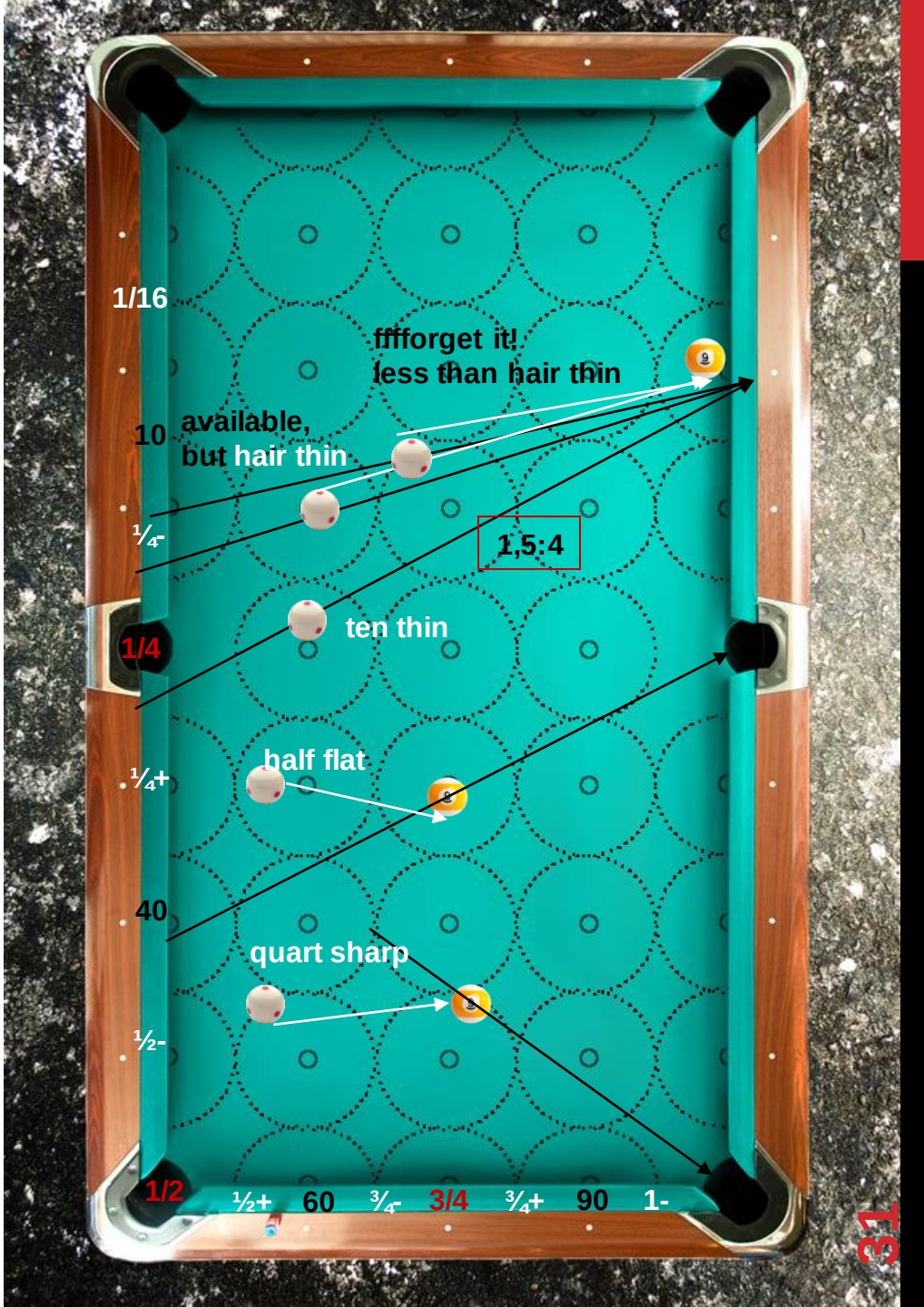
SOME MORE SHOTS

You probably noticed. The diamonds have now names.

Now if I'm walking around the table and looking over the object ball into the pocket, I don't remember a spot on the cue ball. Instead I remember the name of the diamond behind it. That gives me more information about the position of the ball.

Because the cue ball is not always straight behind the object ball ☺

And look at the nice ratio of 1,5:4 diamonds for the ten thin. That's a 60 degree cut shot.



YOU CAN CALCULATE WITH THAT!

MORE EVIL

THE TABLE AS RULER

You can measure angles on the table.

One diamond across the length of a table is an angle of 7 degrees. Two are 14 degrees, and so on. But **degrees won't help you**.

But you already know: **One diamond** across the length of a table is **1/8**. **Two diamonds** across the length of the table is **1/4**.

In our scale:

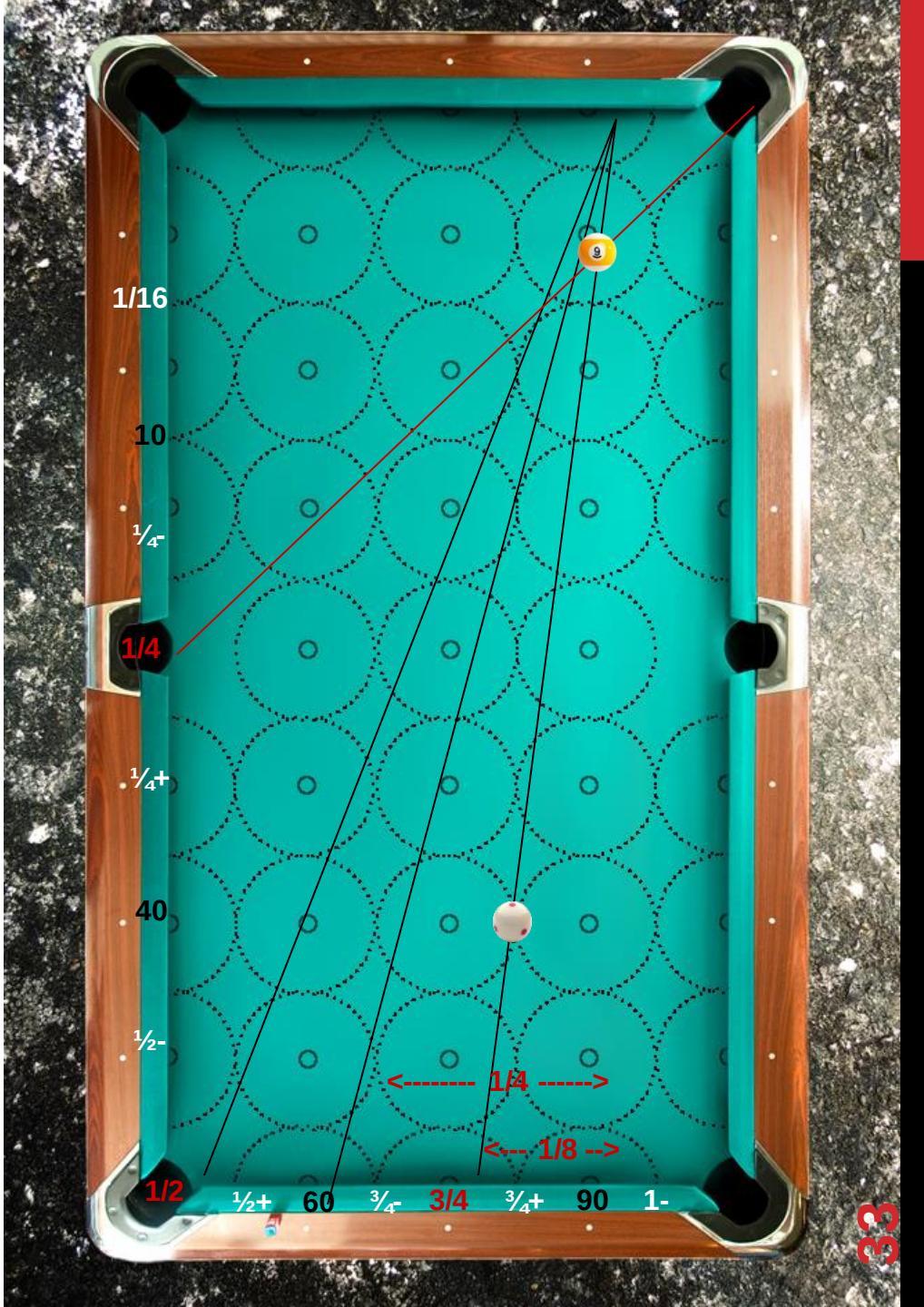
- **1/8** means **one minor step up or down**.
- **1/4** means **one major step up or down**.

So if your ball is on the quarter line, and your cue ball is 1D (=1/8) off, you need to select the next minor setp, which would be a **forty**.

A **mezzo follow forty** will pocket that ball.

Now call this insane or genius, but it does work for all shots you shoot more or less down the table.

And no excuse for missing. You don't need to guess. **You know this shot.**



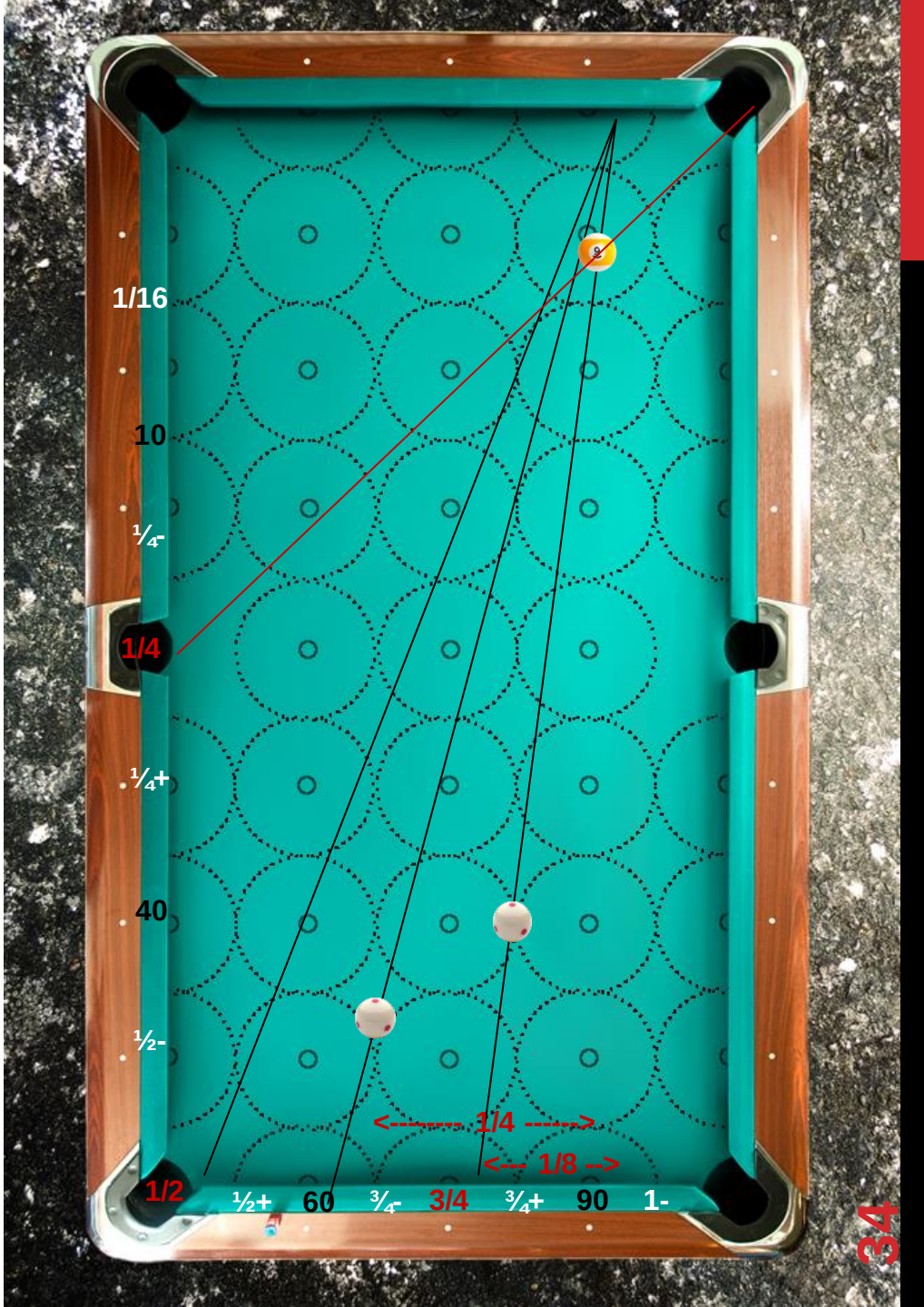
THE TABLE AS RULER

To repeat the procedure:

1. **When looking at the object ball you notice that it is in straight line with the pocket and the quarter diamond. You say „quarter“ in your mind.**
2. **You walk behind the cue ball and see that its path through the object ball is a diamond off across the table. In this case you make a mental note „plus an eighth“.**
3. **Now you know a quarter plus an eighth makes a forty.**

You don‘t need to do any ghost ball aiming now anymore or other pinpoint feng shui. You can go down on the shot, and rifle a forty at it. Since you know what a forty looks like.

If the cue ball lies „plus a quarter“ (2D across the length of the table) you rifle quarter plus a quarter = a half ball at it.



UP THE SIDE CUSHION

Now out from the corner you'd be playing a 60, which is three minor steps up, or even a three flat, because by the rotation about the object ball we really have 3,5 diamonds across the table.

Up the side cushion is not that easy. But still you can take very useful guesses.

If out of the corner is a 60, then:

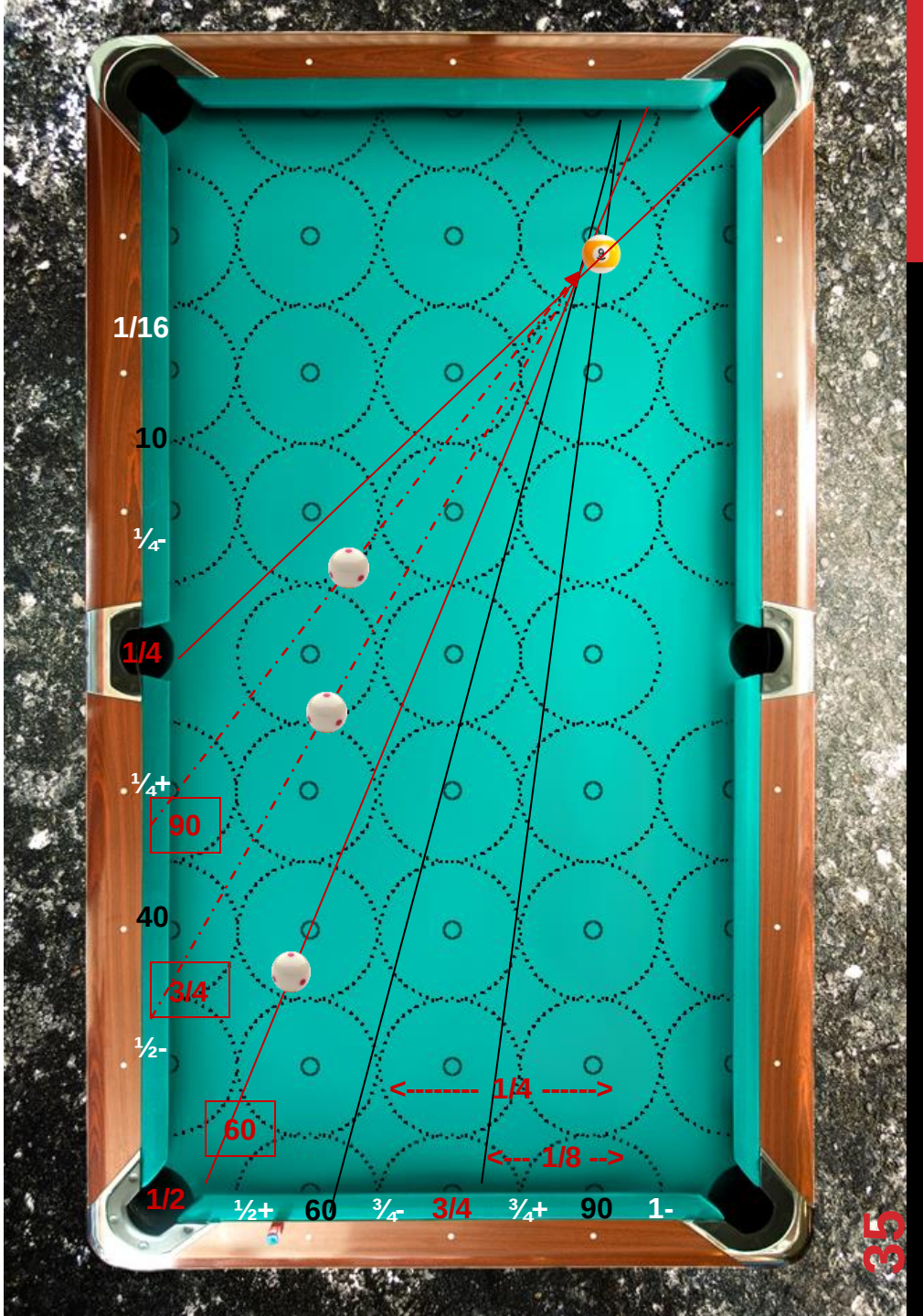
- Three-Quart is about one third toward the middle pocket
- Ninety is about two thirds toward the middle pocket.

For this particular shot.

It happens that when you cross the corner that you have to measure in thirds.

Now this is also guesswork. But it's anchored guesswork and rather precise.

Comes time you will know a bazillion of shots. Not only from having seen them.



MORE MADNESS

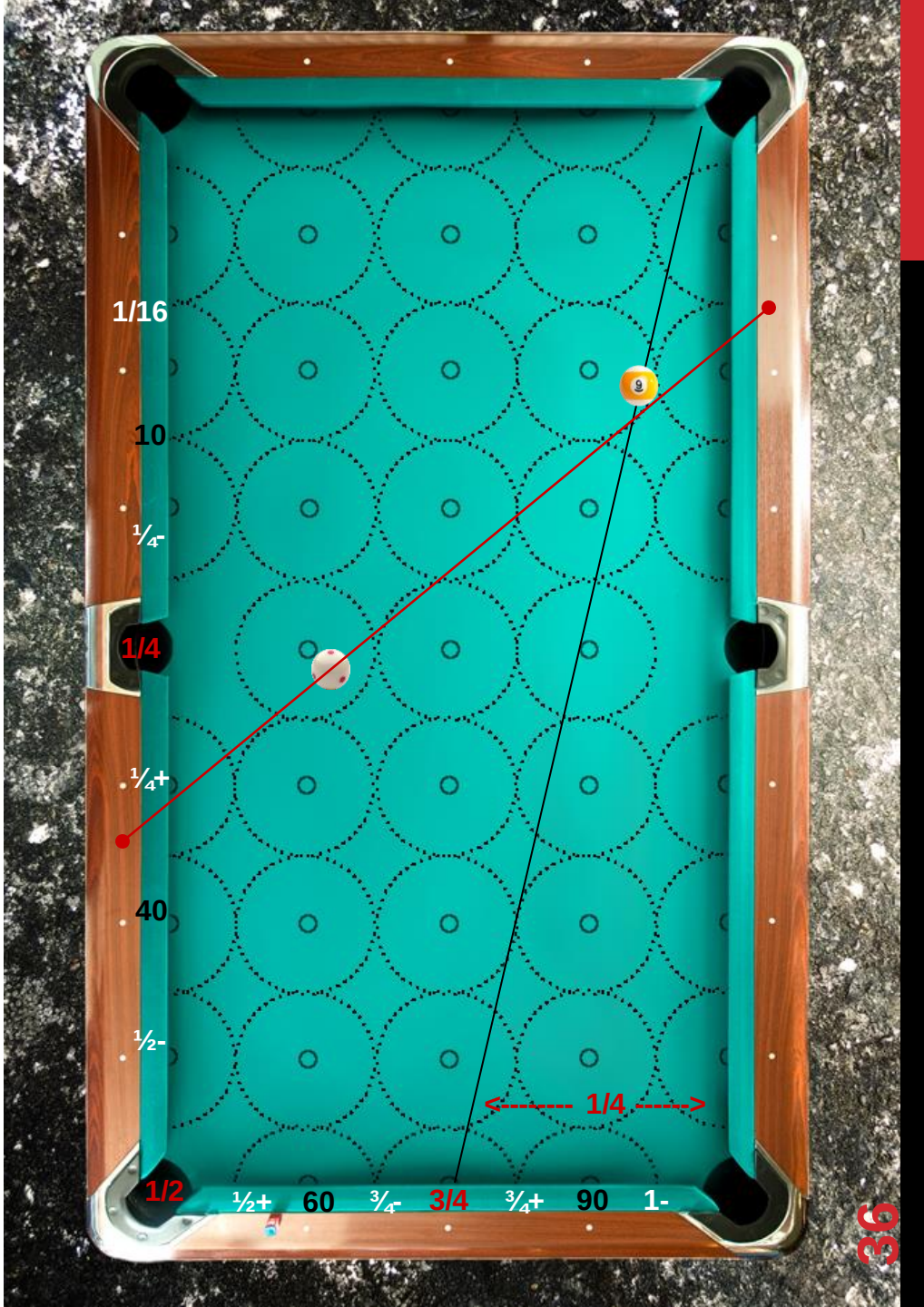
This madness also works for balls which are off the cushion.

I see people make a **ton of mistakes** hitting those balls too thin because down on the shot they look thinner than they really are because of the dark light around the cushions.

This cutie suggests to be a **quarter ball** by counting 4 diamonds across half a table (the red line). Interestingly that‘s the **subcoscious impression** you get because you **face the table at an angle of 45°** when approaching the shot.

Some people would think „**a tad thicker** than a standard foot spot cut, because it is a bit off the cushion. But let‘s look at the math. Stepping behind the object ball we see that it‘s in fact **a quarter thicker**! Using our system we now know **how much thicker it plays**!

That makes this baby not a quarter sharp or even forty, but a **fully flagged half ball!**



YOUR EMERGENCY RULER

IF NOTHING HELPS

FIRST AID

CUE STICK PIVOTING

You place down your cue stick in line OB → pocket **half a ball width** behind the object ball. You let the tip rest on the cloth and **pivot the back of your cue** so it rests above your object ball.

Then your cue tip gives you a **rough impression** of your target. Sometimes this method can be used to estimate quarter shots or to see if you‘re within or outside the edge of the OB.

But this is not a very precise method since you guess half a ball width and there‘s a huge margin for error.

Sometimes the ghostball people also use this method to try to find the center of their ghost ball when they‘re not sure.

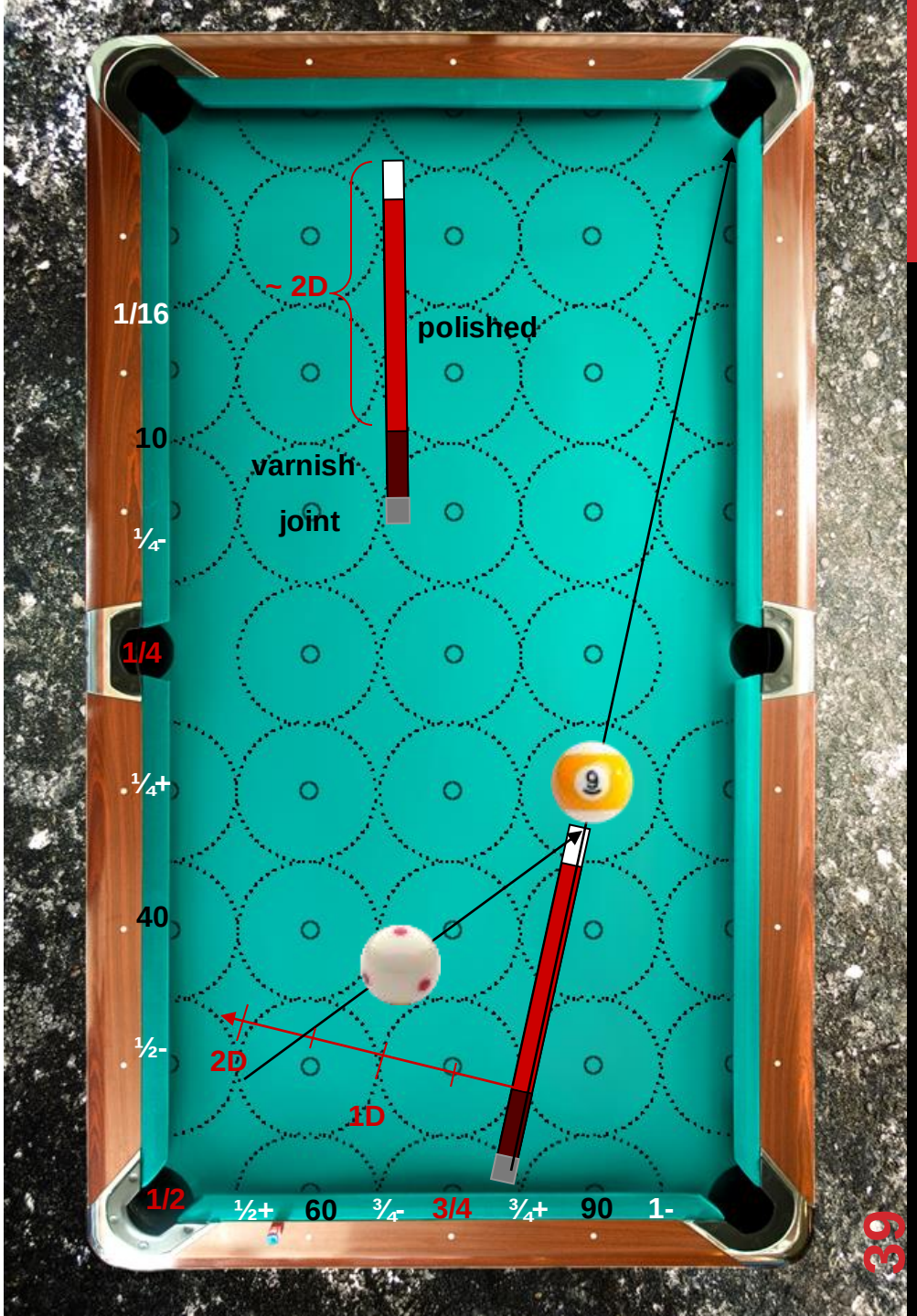
But on to something more precise …

CUE STICK AS RULER

Your cue stick is an **excellent ruler**, since it knows **one important length**. If you look at your cue shaft then the part at the back of it is usually covered with varnish whereas the rest of it is polished.

The **polished part including the tip measures about two diamonds**. That‘s an important measure. At 2D distance from the OB, which your lacquer indicates, you can mentally **draw a rectangular line**. Then look where the **line through the center of the cue ball** cuts that line.

It helps to know that if you place your **palm on the table** with fingers loosely together that it measures approximately **half a diamond**.



NUMBERS FOR THE RULER

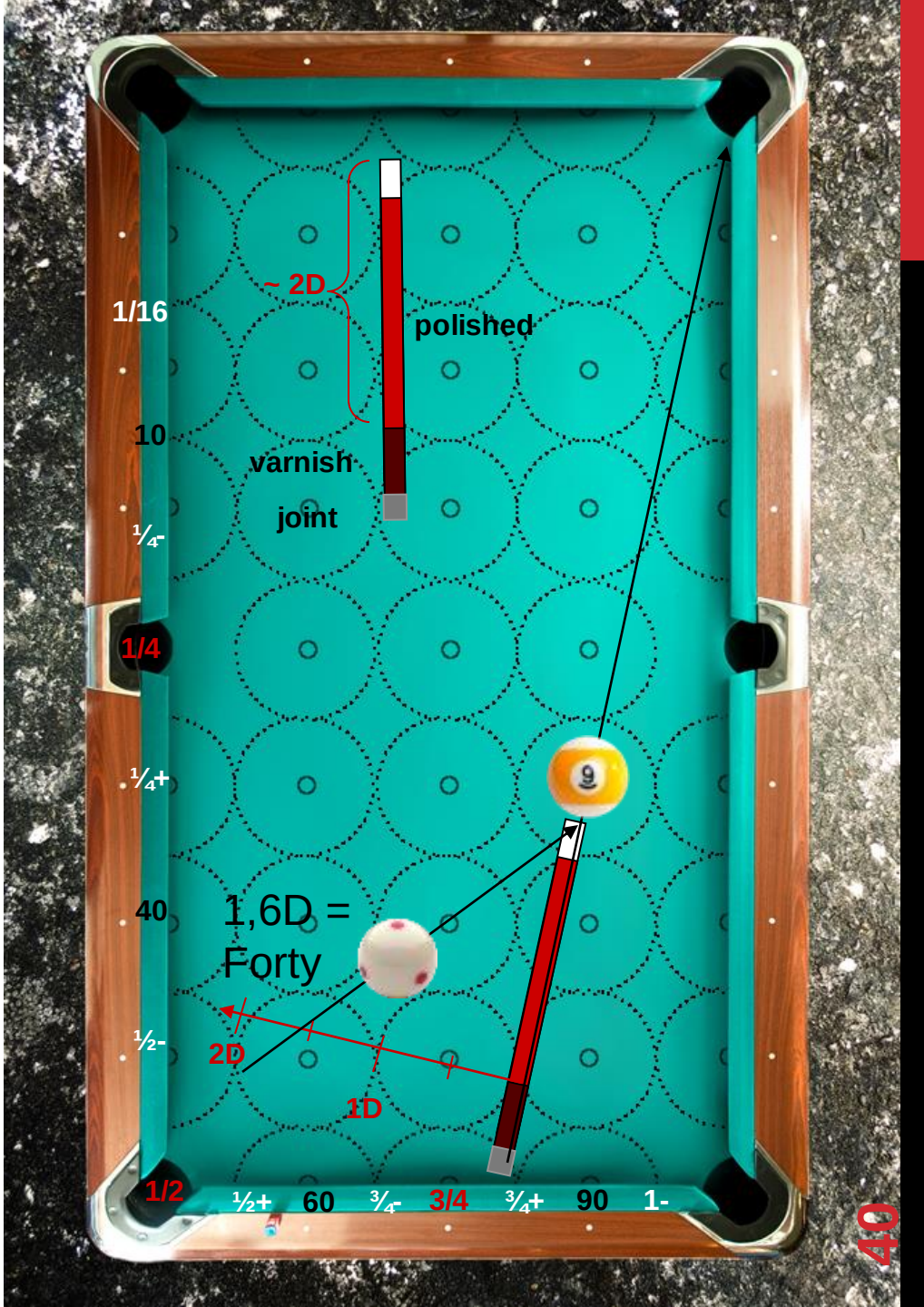
Now you need to know what 0,5D, 1D, 1,5D or 2D off mean.

I have a little table for you ☺

Shot	2D Distance
Ninety	0,25
Three-Quart	0,5
Sixty	0,8
Half-Ball	1,1
Forty	1,6
Quarter	2,3

So you see there is a slight progression toward higher angles. But „half ball is a good diamond“ is a neat reference. A good hands width makes a three quart.

This method is not feasible for anything thinner than a quarter, but you can measure the shot and rifle away.



YOU COULD EVEN USE IT TO ADD AND SUBTRACT FROM YOUR TABLE LINES ...

NOW ...

STACCATOS

Until now we made everything for a mezzo follow shot. But since we also have to play other shots we need to know the influence of those on our aiming.

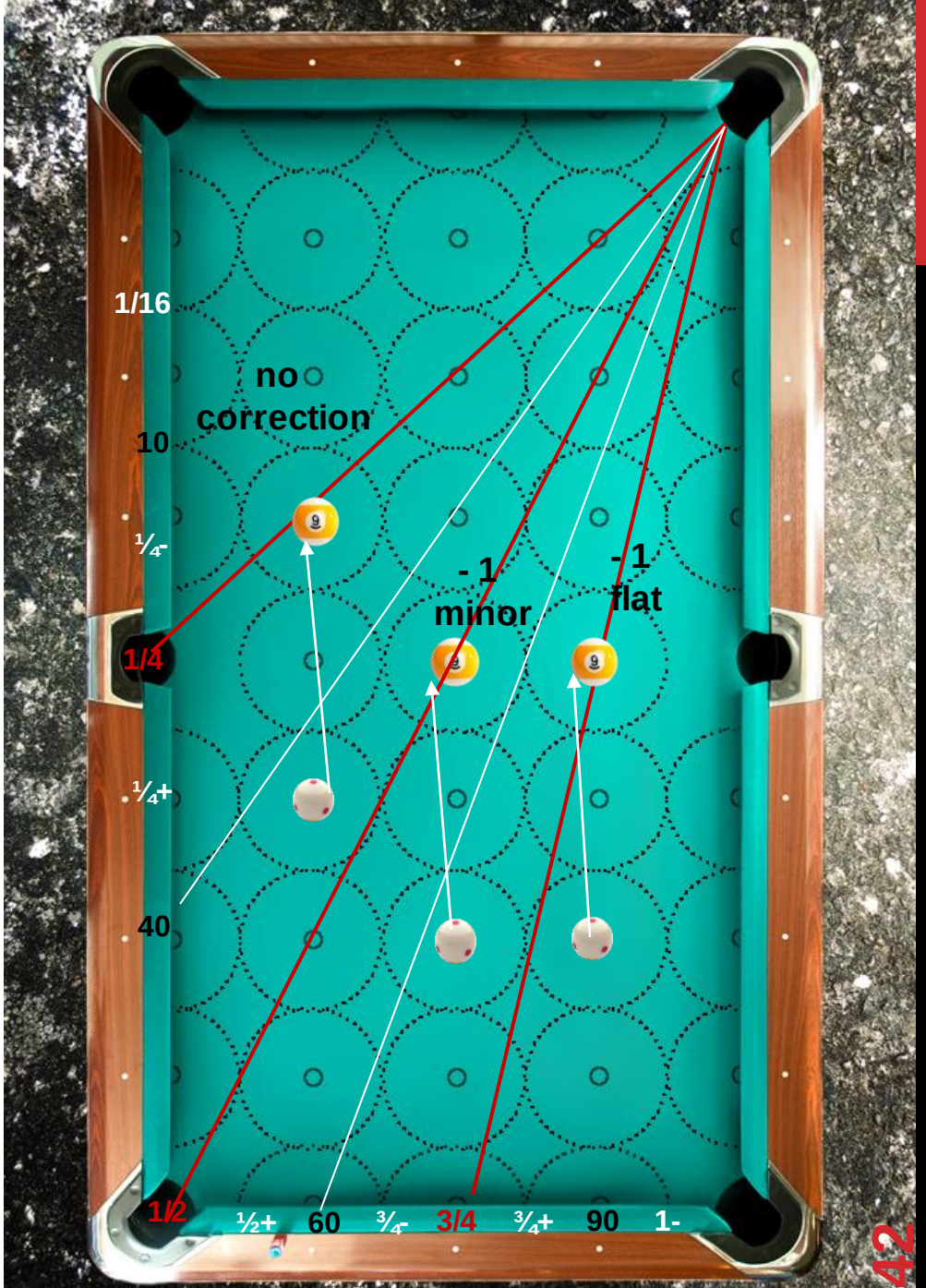
If you have a mezzo staccato shot, there is throw. We need to adjust for that:

- If you aim between 40 and 60, play one minor step thinner, i.e. 40 instead of a half ball, half ball instead of a 60.
- If you aim between 60 and straight in, add one flat (1/16), i.e. three flat instead of three quart, three quart instead of three sharp, ninety instead of hair off.
- If you play thinner than a 40, forget about the throw.

If your play a forte staccato, cut those corrections in halves.

If you play fortissimo, forget about the correction.

If you hammer on it, even play a tad thicker.



A SIDE NOTE

If you‘re playing almost straight ins, playing them as mezzo staccato increases your precision if your shot is free from spin.

The hair off is quite difficult to hit, especially from long distance.

If we now play a staccato, we can go for a ninety instead. The margin for error has just greatly improved, because 1/8 off center on long distance is much easier to aim for and hit than 1/16 off center. Additionally, if we hit 1/16 off center the ball will often still be within pocket tolerance.

If you however have unwanted spin in your shot, mezzo staccato is the one which will throw your object ball off most. So you better have solid fundamentals.

DRAWS

If you play **medium draw shots**, and I mean draw shots, the stuff with 2 or 2.5 tips low, you also need a correction.

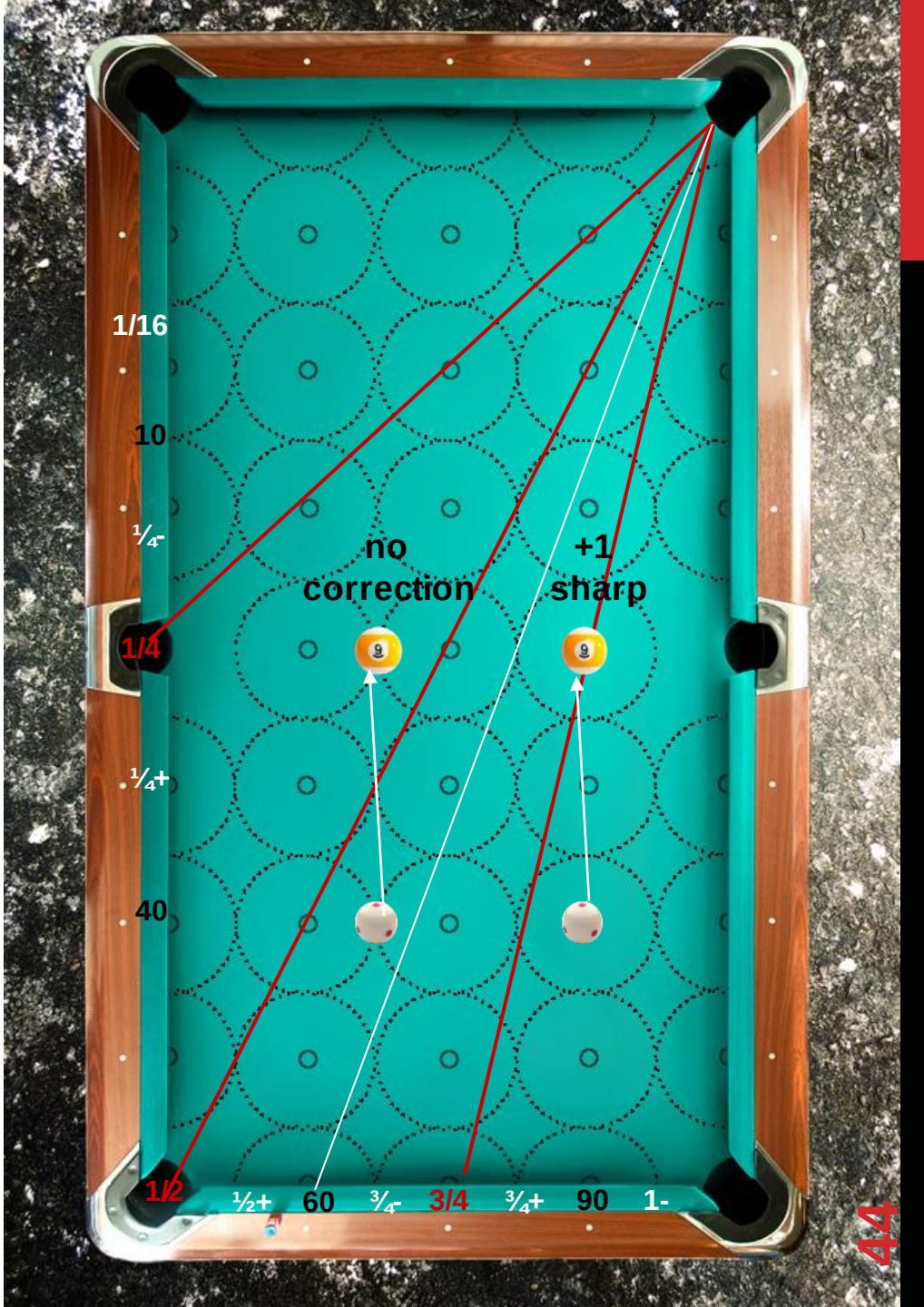
That‘s because if you have an angle on those shots, due to the **reduced throw** because of the spin on the cue ball they will come up too thin. Our system has been made for **mezzo follows**. Mezzo follows also **throw a little**, but not much. Some shots cancel even that out so they come up thicker.

So you have to hit them **a bit thicker**.

This especially goes for Sixty or thicker draws. Play them one sixteenth sharp.

You can neglect that for anything below half ball, there‘s not noticable effect.

The **harder you hit them**, the less that correction is necessary (i.e. the fuller you hit), because firing the CB onto the OB will **send both down the tangent lines**.



THIS ENDS
PART III

dana@danastoll.com