Pegged-Out Endgames

Pete Trimmer[1], 2014

With thanks to the many players, most particularly Chris Clarke, Dave Maugham, Keith Aiton, William Ormerod, Stephen Mulliner, Reg Bamford and Rob Fulford, who went out of their way to help me understand the game more clearly.

This is primarily aimed at improving players who enjoyed Wylie's book[2] and are looking forward to entering the top 50 in the world rankings. Consequently, much of the analysis will assume that two 'experts' are playing; say ranked 5–50. (There are tactical exceptions against hyper physically skilled players like Bamford, though the general principle is always to maximise your odds of winning.) The main aim is to help readers to order their thoughts more clearly, ready to absorb tactics in the future. I think this is best achieved by thinking through a few examples rigorously (to identify core principles) rather than whiz through many situations vaguely.

One of the joys of pegged-out endgames is that, even at the top level, each 2- or 3-ball contest will produce a vast array of situations at the end of turns, rather than the 'standard' positions of openings, diagonal spreads and NSLs. In some ways, this makes it more difficult to learn the tactics of endgames, as situations are so often unique. The best that I can do is enable a player to develop their intuition/logical skills through examples. Seeing a problem and reading the logic of the answer will teach you almost nothing, as you won't ever face that exact situation again. To learn anything useful from this text, I recommend that you pause before reading the answer, working out what you think (what you would choose to do). That way, anything missing from your knowledge is more striking (and thus more readily learned) and your logic becomes more fine-tuned for real matches. Even an expert would have to pause to know which option is best, so don't feel bad if it takes a while to decide for some of the situations.

<u>There's an obvious advantage to being able to control two of the three balls on the lawn – but how should that advantage be maximised by the two ball player (and minimised by the single ball player)?</u>

The two ball player can endeavour to win in more than one way: by establishing a 3-ball break, or by slowly making a hoop or two at a time (and pegging out their peg ball to leave one ball each if sufficiently far ahead). The single ball player can also win with a 3-ball break but (at the top level) does not have the option of making a hoop at a time (unless for 4-back or beyond). Tactically, the endgame can almost be described as having two halves: pre- and post- 1-back. Once the two-ball player has made 1-back, the single ball player needs to be more aggressive. The single ball player usually has a relatively simple choice of shooting, defensive cornering, aggressive positioning (such as triangulating) or occasionally, if the opponent has separated, taking position at the next hoop. Consequently, much of the subtlety relating to pegged-out situations comes through the choices available to the two-ball player.

First, let's imagine that the lawn conditions are very easy, so the first person to get a 3-ball break should win; this makes it easier to analyse the tactics. Much of the time, the two-ball player will have the innings and be setting leaves, so we'll start there.

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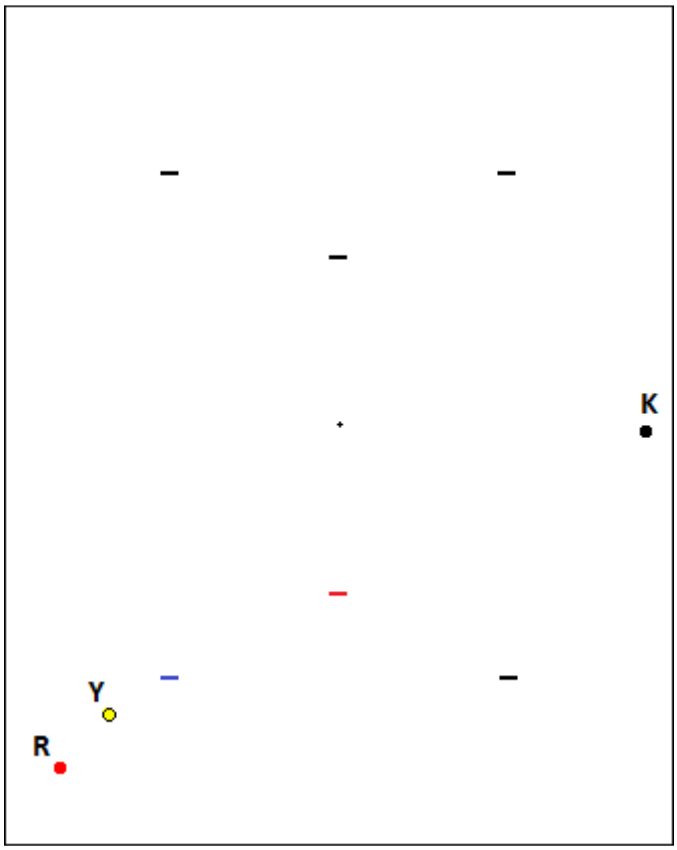
[1] Much improved by detailed comments from Rob Fulford, Chris Clarke, Ian Burridge, Dave Maugham and Gabrielle Higgins.

[2] Common notation and terms: K = black, R red, Y yellow (Y always for peg). c1 = corner 1, etc.
For brevity, I write go 'into' c4, etc., but it's usually best for the single ball player to go a few inches outside a corner, to prevent oppo gaining an easy cannon. By 'NZ tpo', I mean peeling oppo through 4-back and stopping at 1-back, then doing the remaining double peel with partner in the next turn. Most of the text assumes normal advanced rules, with occasional comment on the differences for super-advanced.

When the 2-ball player has the innings

I'll take a round-about route to understanding 'optimal' leaves. Consider this situation:



R and K are for 1, Y for peg. K & Y are wired. Is it better for R to also be wired from K, or open?

There are 4 options:

1. Better to be wired.
2. Better to leave oppo chance to shoot.
3. Doesn't matter (oppo won't shoot).
4. Depends (if so, on what?)

(Let's ignore the special cases, which mean that the answer would certainly be 'depends': If K had been used in setting up the leave, a ball must be left open to avoid giving a lift! If there were only 5 mins to time being called, it's better to be wired, to then make a hoop or two and peg out the peg-ball to win on time. Also, more weirdly, people occasionally go round and peg themselves off; if this were how blue left the game then it's best to be wired, as R&Y can repeatedly make a hoop and wire, or leave a 30+ yard shot, even after what would otherwise be 'lift' hoops.)

Decide clearly for yourself before reading on. If you come up with the same reasoning that I provide below, then you probably already understand pegged-out games at a depth beyond this text.

There are some quite rational reasons for each option.

- Some will say it's better to be wired as it gives the oppo no chance to shoot, and this is especially important as oppo is for hoop 1, so if they hit, they'd have an easy break to win.
- Some will say it's better to leave the shot open as the oppo shouldn't take the shot; it will be to your advantage if they shoot.
- Some will say that it doesn't matter, as the expert playing the single ball won't shoot anyway.

- Some will say that it depends on how well people are playing, how well they are shooting, and what the lawn conditions are like. But would these factors really affect *this* choice?

There are many different 'levels' at which it can be thought about.

The first thing to decide is whether the shot *should* be taken or not. In this case, for most players, it's a pretty clear 'no'. There are exceptions at the top level; if Fletcher (one of the best shots in the world) were playing Bamford on an easy lawn, it would probably be right to shoot (rather than going to c4); we shall see later that this depends more on the ability of the 2-ball player than the single ball player. For matches against players outside the top 5, the answer is that K shouldn't shoot. The fundamental reason is that K is likely to get less risky opportunitie**s**. By continuously cornering, even without R&Y making any errors in Aunt Emma-ing round, K will get a much shorter shot after the 1-back lift (though hitting after a lift is likely to give K much less), and doubtless another shot at some point after that; in easy conditions then, this prospect of shorter shots which don't give the game away is decisive. (Despite this, various players in the top 50 are likely to take on that 28 yard shot.)

Note that the answer can change considerably if a non-expert player is involved; e.g. Fulford vs a scratch player (who needs a good 3 ball break to have a sensible chance of winning). If the scratch is very unlikely to dig out a break from defensive ball positions, it would be best for the scratch to take that shot … so it would be better for Fulford to have wired. (Of course, consequently, Fulford wouldn't be having a leave down near hoop 1 in such a match!) Thus, the better that K is at digging out breaks (especially by playing big rolls), the less inclined K should be to shoot.

In the appendix, I show that K should not take this shot (under normal circumstances), and demonstrate a couple of handy rules of thumb:

- **Take any shot of 20 yards or less if it will give you an easy 3-ball break.**
- **Don't take any shot of more than 30 yards that would give R&Y an easy 3-ball break (before R has made 1-back).**

Let's continue with the case where K <u>shouldn't shoot</u>. Many people might think that it's therefore automatically better to <u>deliberately leave the shot open</u>, as it gives the single ball player the chance of making the error. However, this **does <u>not</u> follow**; just because they shouldn't take the shot doesn't mean that you should give them the option.

To see why not, imagine that you 'knew' that the single ball player would take the shot. (They are busy warming up on the side line and, from previous games, you know they are absolutely psycho about pegged-out games and will take *any* shot they get.) Should you leave the ball open?

Clearly not, because it would be better to make hoop 1 and lay up elsewhere, like hoop 2, hopefully leaving them an even longer shot (ideally from c4 to you near c2!) which is of much less use to K if hit.

The concept, then, is one of trying to *maximise the opponent's error*. Give them too unrewarding a shot and they won't take it; give them too rewarding a shot and you've obviously given them too much. It's arguably a fine balance – but one side of that critical line is very safe; if you give them too long a shot, so they don't take it, you can have another leave (usually after making a hoop or two) which is, perhaps, fractionally more tempting.

In this case, a tactician like Clarke would avoid having this leave (with a ball open) even if he were sure that taking the shot would be an error, because it would be approximately the smallest possible error, rather than a much bigger error (that he could get from most players).

At this point, some of those that went for option 3 (it doesn't matter because an expert won't shoot anyway) might be feeling pretty smug. But you'll be surprised what irrational shots many players in the top 50 will take on, and does it really make *no* difference even if they're sure not to shoot? If you leave the balls open, you're demonstrating that you understand the game (do you want them to know that?). If you wire both balls, it demonstrates that you have good ball control, but suggests that you might not understand the tactics so well. If you've recently entered the top 50 and haven't played the other expert before, which picture do you want to paint? If the answer is likely to affect what length of shot they'll take, then it does matter. This is small percentage stuff though (in the case where a shot won't be taken), so in general, the answer is that in this particular case, it shouldn't really matter whether the balls are wired or not.

From which we see a crucial rule of thumb for the two-ball player:
It's fine to leave balls open so long as the opponent can't risk taking the shot.

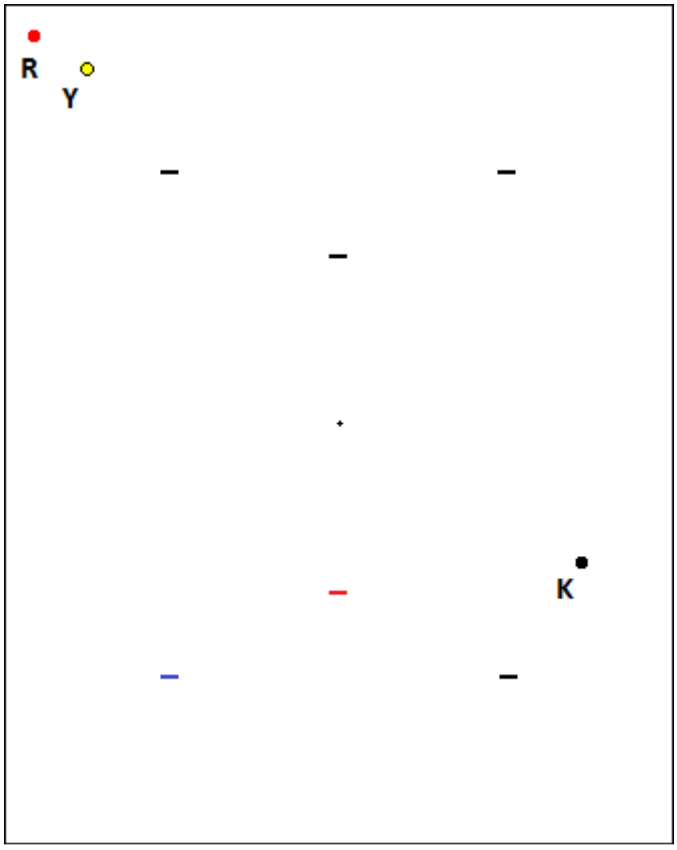
Knowing this gives various advantages:

- Having not rushed perfectly to a hoop, rather than take any risk of the approach going wrong, just roll back to defend against any shot and lay for another rush next turn! Note that it is often not necessary to lay another rush immediately; just make sure that you have the innings and that K can't risk shooting. Note however that with R beyond 1-back (and even more so beyond 4-back), it will be difficult to stop K from shooting!
- Tactically weak players will sometimes try to move balls a couple of feet to get a fancy wiring in the middle of the lawn, rather than roll to somewhere the oppo can't afford to shoot. When a ball is left open, the two-ball player then needs to separate (after doing the exasperated, "That shouldn't have happened!" face), giving the oppo at least one extra shot.
- Players often try to cross-wire balls when there's no need to, and having failed to get one of them wired, they then shoot off to a corner rather than protecting the (now free) shot which the single ball player couldn't have afforded to take.

Note that the most basic logic assumes two perfect tacticians; under this assumption, any shot which should not be taken will not be taken.
But because players make tactical errors, you should err on the side of caution: don't leave balls too close to that threshold range; try to get the maximum error from the opponent that you can. (This also reduces the risk of you making a tactical error!) You're likely to be surprised by how long a shot you can often get the opponent to take.

With all this in mind, various leaves can be understood quite easily.

Consider this approximate leave, with R for hoop 2. K has been used. Is it better to leave R, or Y, open?



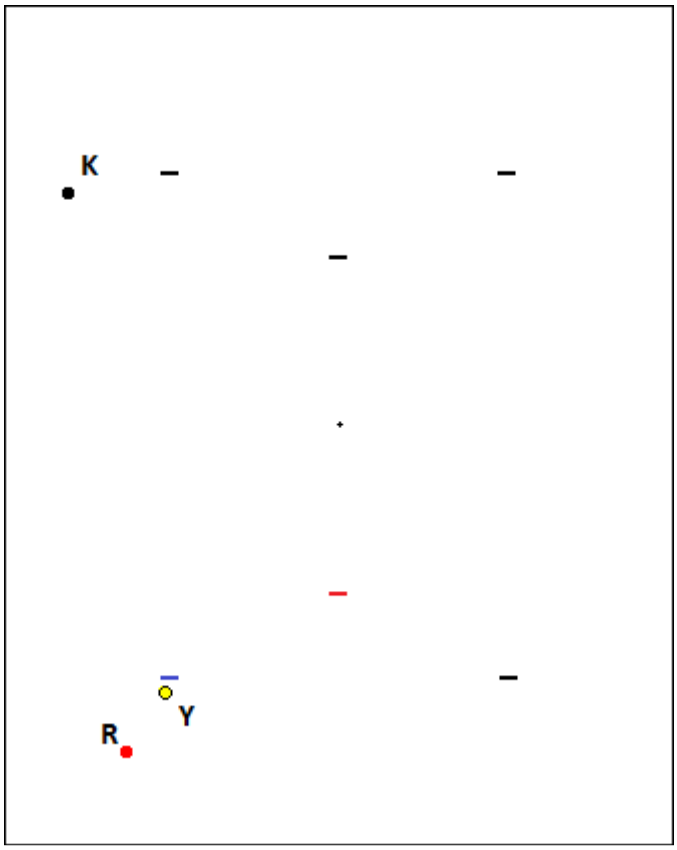
It makes no difference to R's break chances, but it makes a great deal of difference to K's break chances (almost no matter which hoop it is for); if it hits R first, K's chances are much higher than hitting Y first. Consequently, it's better to leave Y open, despite it being a couple of yards closer to K. Note that Y is almost too close to R here; it is almost always best for Y to be in a position where R has space to stop shot K out if K shoots. In other words, don't sacrifice your own break chances when deciding on your leave!

Having recognised the general mechanism here of being pretty safe if the boundary ball is wired, this general result has been taken as 'gospel' by many players. However, there are of course exceptions. The boring one is that if K is for rover in the above, then it's better to add a couple of yards to his shot. The more interesting one is that if K were instead positioned near corner 4 in the above leave, then most players would (or should) be delighted if K took such a huge long shot to give you a 3-ball break, especially if K is for hoop 3 or 4 (or past 4-back). Leaving R wired (against players who understand that they would have very much reduced chances of making a break even if they hit) is likely to guarantee that K won't shoot. I would therefore argue that if K were near c4, it would be better to leave R open. Others may object that anyone sensible enough to shoot only if R is open will also have the sense to decline that shot; I disagree with that belief. However, there does seem to be a remarkable tendency for players to underestimate the difficulty of digging out a winning break if they've hit the in-lawn ball first (evidenced by shots taken when both balls are open), so the principle of leaving the ball on the boundary wired is usually sound.

In general, it's always best to have one of the balls wired if it's easy to do so. More than once, I have lost pegged-out endgames where the opponent has taken a length-of-the-lawn shot, missed the ball they were aiming at by a yard and hit my partner ball. Trying to wire one of the balls cuts down this possibility, but don't sacrifice the structural integrity of the leave (stop-shot distance, rushing distance, etc.) for the sake of having one ball wired. The most important thing is to have a guarded

leave without K having anything like a double; this is much more important than leaving a rush to your hoop because with the shot guarded, R&Y can keep having leaves until they do have a rush.

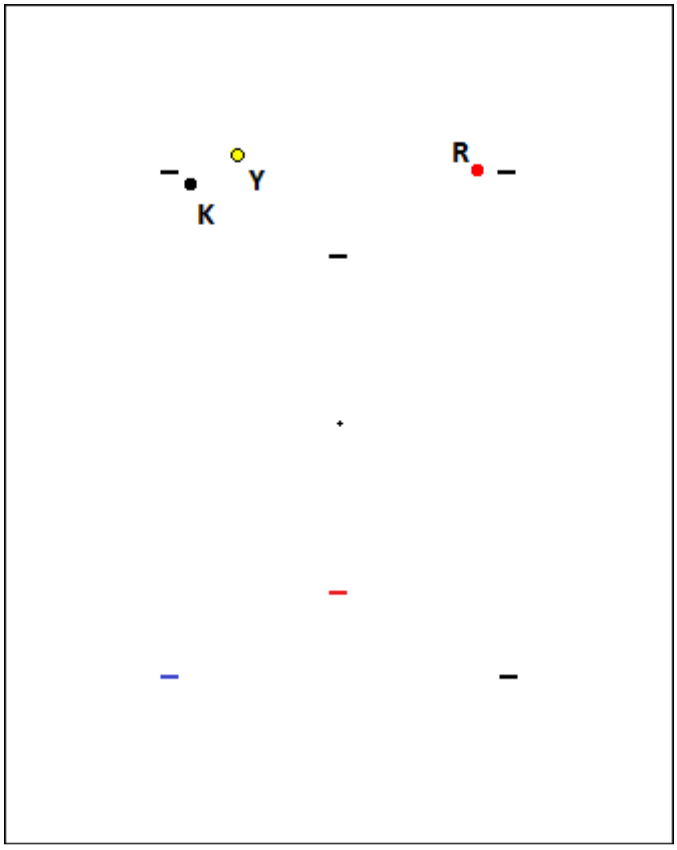
Propping a ball on a hoop (or near it) is a clever idea. For instance, a nice leave with K for 3, R for 1:



A sensible opponent would be crazy to shoot at this, but it does happen. However, if K were even further away, like corner 2, it's difficult to conceive of anyone taking on the shot, so again it becomes questionable whether it's really best to prop the peg ball on the hoop. (We've seen that K shouldn't take a 30+ yard shot even if it gives them an easy 3-ball break, so with K in c2, it would often be better to tempt them by not having Y propped on the hoop.) In this case, if R is too far from the boundary, the shot is still defended by the potential for an easy stop-shot approach to 1 if K shoots but usually when hoop-propping, R must be accurately placed: within range of the boundary but also have a guaranteed shot on Y; there's no point propping the ball on the hoop if it means giving yourself a 4 yard shot on partner (after K cornered, there would be a good 5% chance that R misses Y, giving K a free shot)! Consequently, I very rarely prop balls on hoops; before having made 1-back, it is usually only sensible for players with tremendous physical skill (playing a match where oppo will shoot at just about anything). However, propping is good when R is for 2-back (or beyond) and K is behind (needing a 3-ball break); e.g., a leave like the above would be good to go for if K failed hoop 3 off yellow on a 3-ball break.

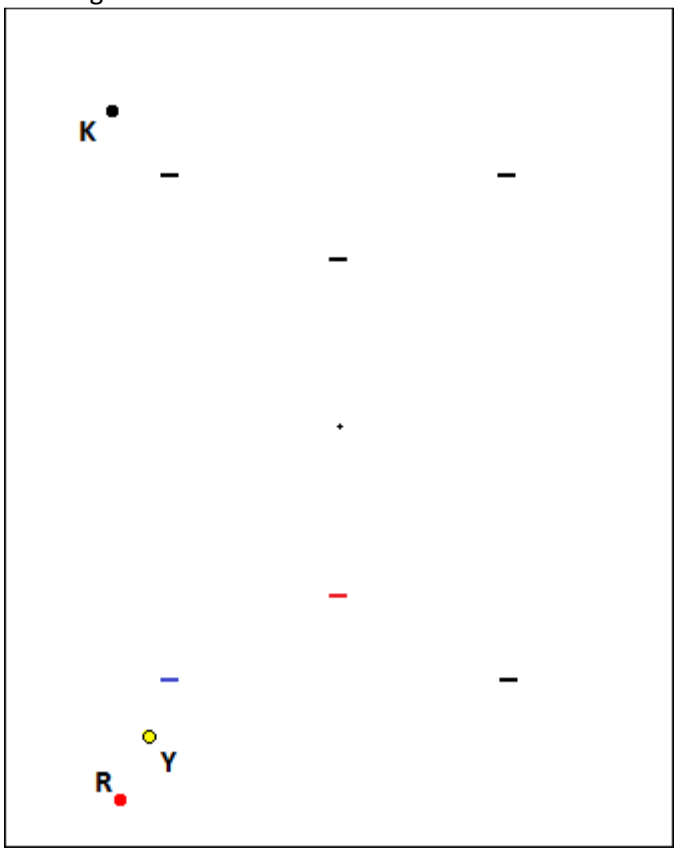
Another idea for R&Y is to try and 'wire' K from shooting into their preferred defensive corner; e.g., with hoop 2 blocking K from shooting in/near c4 encourages them to shoot at balls down south of hoop 1.

Time for a test, then. Consider this:



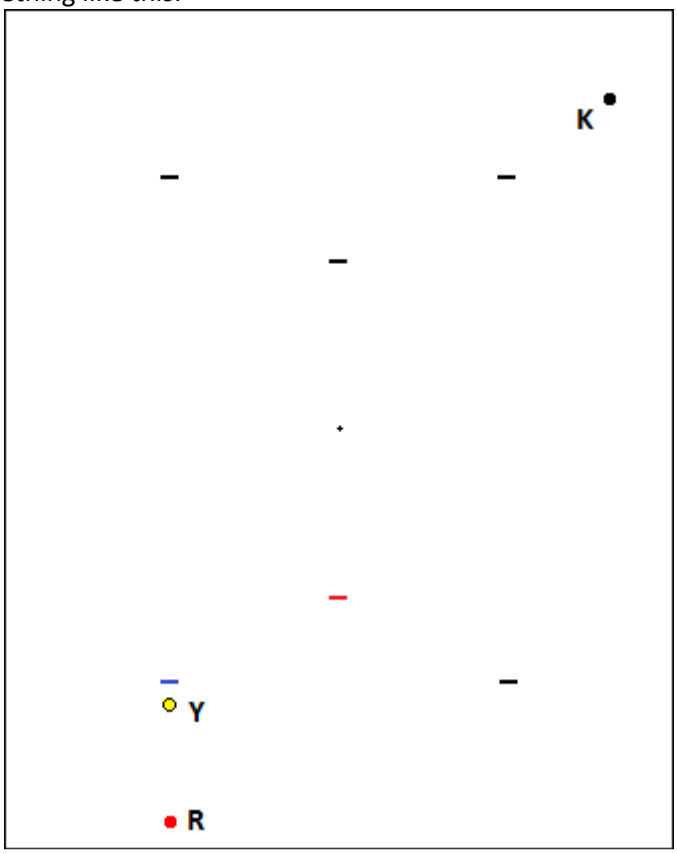
K hit in and had just constructed a break before failing hoop 2 off Y, the peg ball. R is still for 1. What leave should Y try for? Decide before reading on…

If you're thinking of something like this:



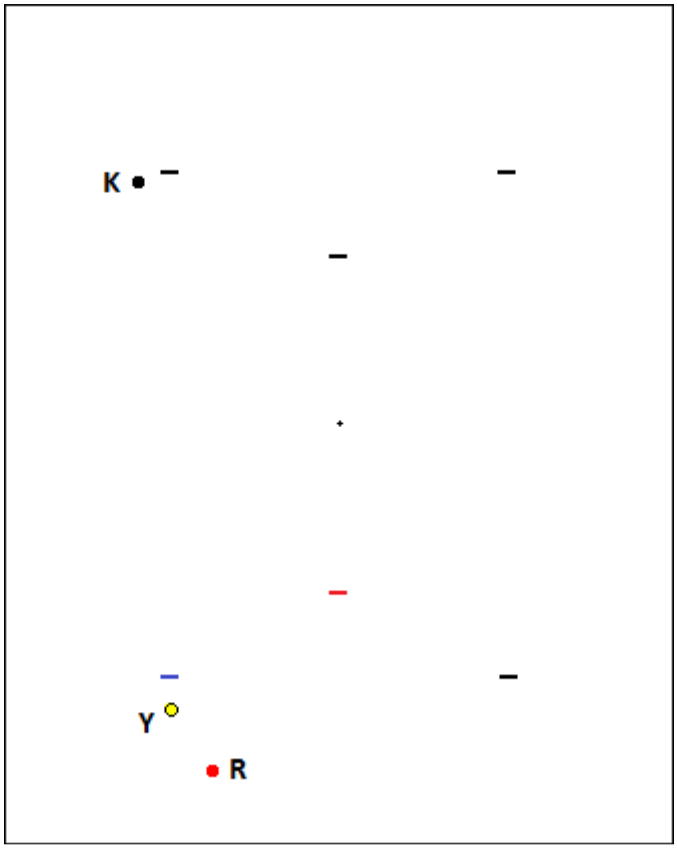
Then great! Certainly K should not shoot, but with a lot of furniture between it and c4 (the natural defensive position), it may opt to shoot into c3 instead. (Or, better for R&Y, it may mistakenly elect to shoot.)

If you decided on something like this:



Then you need to do more thinking. First, this would involve trying to do too much with the first croquet stroke; K could go off, and it's important to have a good rush on R south (to avoid having to play a big roll to a useful guarding distance from the boundary). The shot for K is so long and gives so little that only a nutter would be tempted into taking it, so K is almost bound to shoot near c4, which would be fine except that R then has too long a shot to guarantee hitting Y.

This leave would be cute:

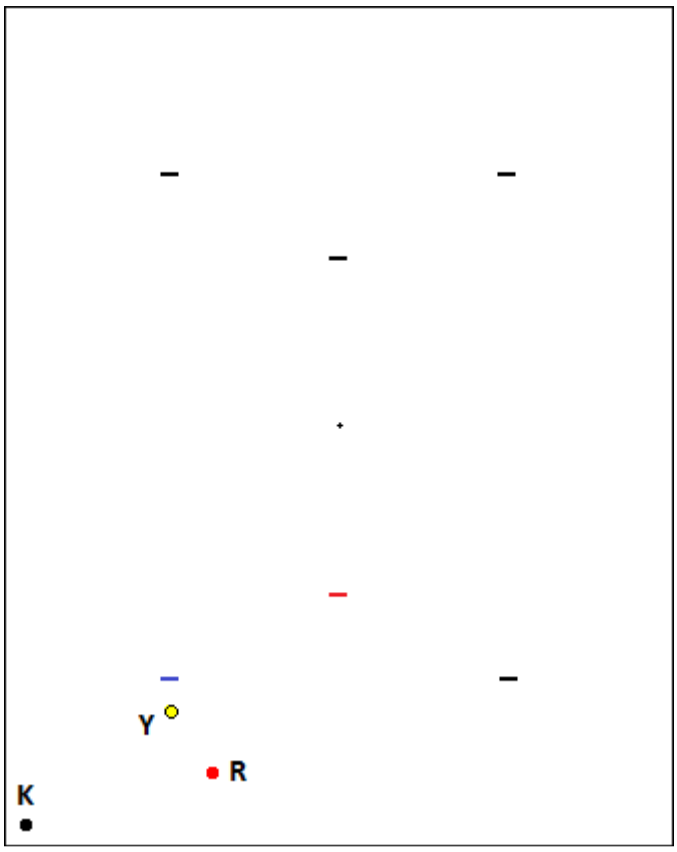


K is wired on Y (which doesn't rush to 2), c4 (by the peg) and c3 (by hoop 2). The leave is arguably even better if R is on the boundary south of 1 (wired from K) and Y is open because then, if K hits, it's much more difficult for K to dig a break out.

Of course, having failed to get a good enough rush on R to get this leave, approximately the same leave can be made but with R and Y both open. From this position, K would usually then shoot to a little north of c4 – but there's always a risk of a miss-cue going into the peg. I would argue that it's generally better to have K more fully wired (by hoop 2) from c4, so would try to move it further north on the take-off to R, especially as K may make the error of shooting anyway.

Most of the time, R&Y don't have the option of wiring K from corners; I mention it here largely to encourage readers to keep their minds open to possibilities – especially when K has broken down off Y.

With good leaves like these where K shouldn't shoot, rather than run to a defensive corner, players are sometimes more aggressive; e.g., in this case going to c1 or c2 with K. We shall see that this is generally a mistake by K. What should R&Y do against an aggressive defence? For instance, from this position with R for hoop 1:



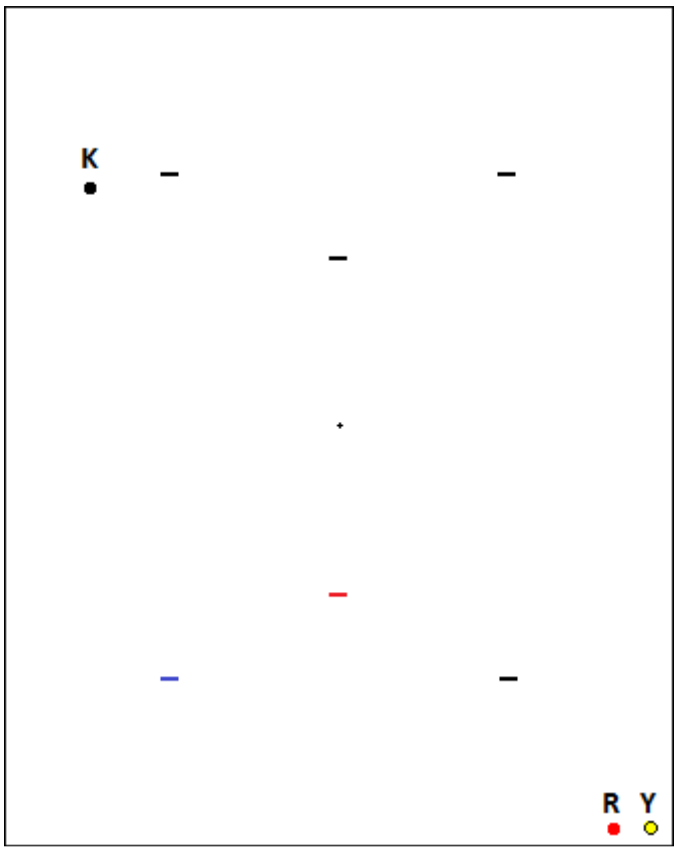
One option is to ignore K; just make hoop 1 and scurry up to hoop 2. But in most conditions, good players can do better. The 'precision' route in this case is very difficult: make hoop 1, rush to K, get a rush to 2, rush back to Y, rush to 3, etc. It's all tough!

For most players, I would recommend knocking Y a couple of yards west of 1 (and fractionally north of it), taking off to K, hopefully cutting it slightly out of the corner on the S boundary, and stop-shotting it up to 2 trying to get position at 1. Make it and, with one more decent croquet stroke, the game is yours. If the approach fails, you can still guard the shot back at Y (some would send R off in c1 at this point). Note that it's better to err on the side of hitting the approach too hard than too gently; good distance is needed between K and Y. To achieve this with a poor stop-shot ratio, send K to the east (and slightly north) of hoop 2 trying for close position in front of 1. Note that you don't want Y 3 yards north of 1 (where you'd like it to maximise your break chances), as it's preferable to defend the shot if you mis-approach 1 (in exchange for playing a tougher croquet stroke after 1).

In some situations, it is sensible not to send K as a pioneer to the next hoop, but to the subsequent hoop. For instance, approaching hoop 4 off K, it can be good to have Y near the boundary (south and slightly west of 4) and send K slightly north of 6 (rather than to 5) on the approach, hoping to make 4 and 5 off Y.

The advantage of the possible 3-ball break means that, at the top level, these sort of plays (aggressive defence) aren't made by the single ball player.

Sometimes things go wrong for the two ball player; a ball is placed too close to the boundary or not close enough. In the case of being too close, it's sometimes possible to lay a reverse rush for a cannon (if oppo were to shoot), or even to deliberately lay for this from the outset. For instance, with R for 1:



This sort of leave means that K has little space to dig the balls out if it does shoot and hit – but it's only worth making if you are happy with playing the subsequent cannon. Otherwise, K gets an extra shot from which it might manage to dig something out.

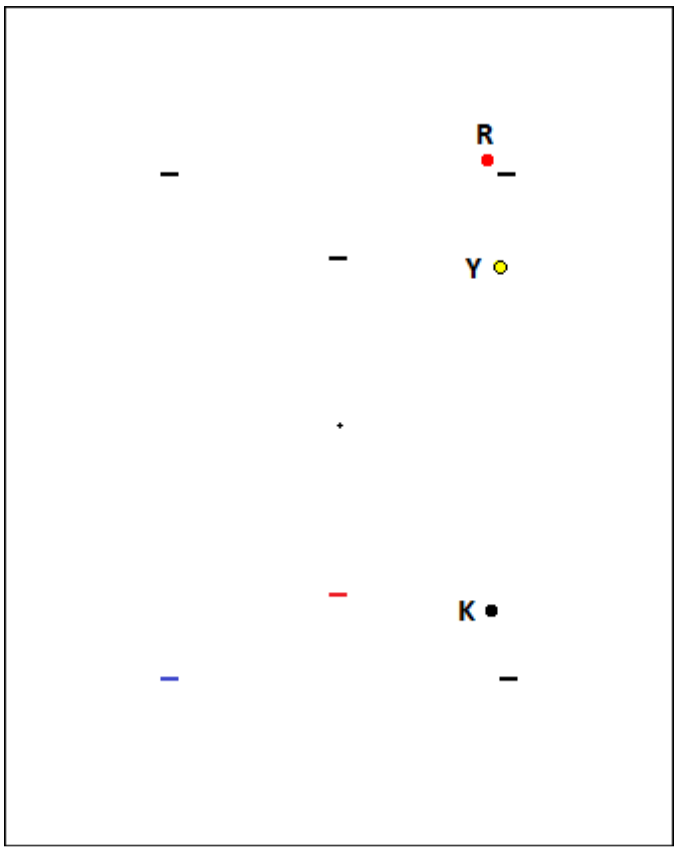
Note that the reason that K typically plays *just* out of corners is to avoid giving cannons. 4 inches is plenty; when shooting there from distance, it's often better to end up in the corner than several feet out!

A great many of the players in the top 50 will take shots (as the single ball player) which they shouldn't take – so don't go out of your way to tempt them! Against the better tacticians, you'll need to give something which feels tempting to be gifted an easy 3-ball break.

When the 2-ball player is separated

Due to the nature of giving contact, every tpo game involves R&Y being separated. During the endgame, there are two reasons that the 2-ball player will choose to separate; either they've made a mess of things (like mis-approaching a hoop) or have made a lift hoop and don't want to give away too short a shot with both balls together. In neither case is it *necessarily* right to separate – but often it is, so it's important to know when to separate and, if so, how to get the balls back together.

Here's a typical situation where R has just mis-approached hoop 3 on a break, stopping at an un-runnable angle. K is for hoop 2.



After finding a replacement for the mallet that has just been broken over the player's knee, the question is what R should do with the final stroke. There are lots of options (and plenty of worse others):

- Float back to 4 yards off the north boundary, to defend the shot.
- Drop into the jaws of 3, so not rushable to 2.
- Go off the north boundary 3yd from c3, to have an easy break if K misses Y (shooting hard).
- Shoot into c3.
- Shoot off the east boundary level with hoop 3.
- Shoot into c1.
- Shoot off the west boundary just south of 1 to be wired from K.
- Scatter Y, so that both balls are on boundaries.

As R, which would you choose?

The first thing to recognise is that K is sufficiently close to Y (14 yards) that it can justify some kind of shot, no matter how R guards. Leaving the ball 4 yards off the boundary is just asking for K to hit and finish; this would give K > 40% chance of winning the game, so this cannot be right!

Dropping into the jaws of 3 is poor. If K hits Y, it will likely be able to cannon R out for some kind of rush and, even if not, it is one roll away from having a 3-ball break.

Going to the north boundary, 3yd from c3, is much more interesting. K would now have to decide whether to shoot hard (giving away the game if missed), go 7 yards south of c3, or dribble at Y to go a yard or two past (and possibly leaving a double for R). The value of this position to R&Y is reduced considerably if K has great 'touch' (to still take-off from Y to get a rush to hoop 2), as K can then afford to dribble at Y. But even with no touch, K can shoot hard at Y with good prospects of an easy take-off if hit. Therefore, this option is also duff. (But, again, things change if a non-expert is

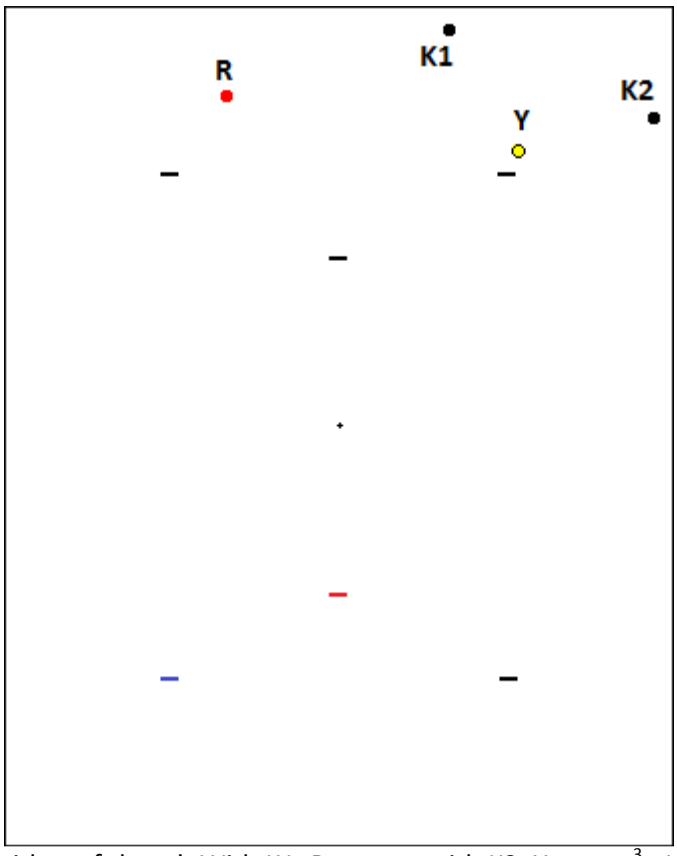
involved; a scratch might well be best choosing this option as their best odds of winning against the likes of Fulford – though the tpo on Fulford would have been rather fool-hardy!)

Corner 3 considerably reduces K's prospects of getting a rush to 2, especially if corner 3 has a hill going out (as many lawn corners do). However, even with K shooting hard and missing, this would give R a 6 yarder for the break, ending near c2 if missed. Corner 3 is therefore playable by a good shot, but is pretty aggressive. If corner 3 hilled out and I felt good about the impending 6 yard shot, I would like corner 3, so let's not rule it out yet.

By now, it should be clear that going level with hoop 3 is obviously a nonsense; much worse than c3 as it doesn't give the subsequent shot at K (if K misses), whilst giving K slightly more (if K hits Y).

The shot to about 4ft south of hoop 1, to be wired from K, is clearly fraught with the danger of missing the tiny wiring area. However, in other situations, such wirings are often easy to get. For instance, if Y weren't in the way, R could shoot off the south boundary wired from K by hoop 4. (Simple geometry shows that if the hoop were only as wide as a ball, with K 3 yards north of the hoop, you could line up 6 balls next to each other on the south boundary that K couldn't hit, so with the added angle introduced by the hoop uprights, the area is surprisingly large.) So for the sake of argument, we'll assume that K has the 'option' of shooting perfectly to that wired position on the east boundary, wired by hoop 1. Would this be better or worse than going into c1?

If R is in c1, then should K shoot at it or Y? Whichever shot is missed, K is giving R& Y control. If K missed to north of c1, it's game over, but with a powerful roll, R might still finish if K misses R – but let's assume for the moment that R doesn't have that stroke in the kit-bag, so K can consider shooting at R. If K hits R, then it will need to play a *massive* roll (avoiding hoop 1) to try to get a rush on Y to 2; if it fails to, then it needs to play a large roll (but not absurd) to 2, with peg-ball beyond, so can take on a toughish hoop. So a double-chance with the big rolls if it hits the 21 yarder, with some kind of 'triangulation' (see later) if it fails to approach. If K first hits Y, then it will take off to R and play a similar sized huge roll to 2, but will be loathe to take on too long a hoop for giving away a 3 ball break to R. A single chance with a roll after having hit the 14 yarder, it would seem. But having failed to approach 2 from c1, K can still have a nice leave, like one of these positions:



R&Y would not enjoy either of these! With K1, R moves; with K2, Y moves[3]. In neither case can R/Y justify shooting at anything. Note that if R were a couple of yards further east, and Y a couple of yards further north, K1 would not be an option, but K2 would still be good.

The power of this kind of outcome (if a shot is hit), on top of the big difference in probabilities of hitting Y rather than R (for someone with a 12 yard cd, K hits Y almost twice as often as R), it becomes clear that shooting at Y is best if R goes into c1.

Knowing that K should shoot at Y with R in c1, it's clear that c1 is better for R than the wired position. Having gone to the wired position, K is forced to shoot at Y (rather than having *the option of making the mistake* of shooting at R!) and has a much greater chance of making hoop 2, especially as K can try to land south of R on the take-off, to rush it further north before the approach.

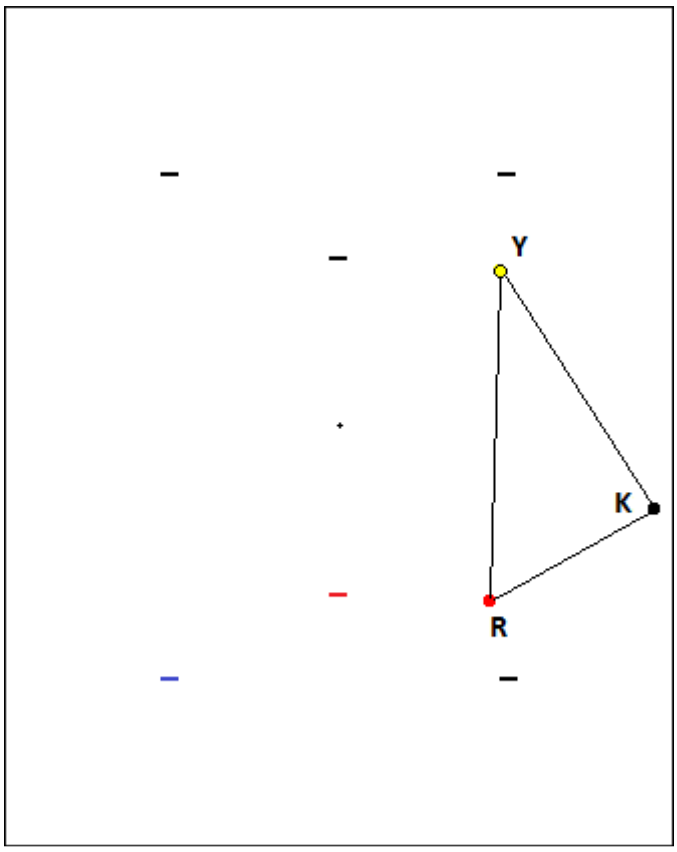
The final option listed was the scatter shot on Y. Scatter shots are sometimes useful but, in this case, we see that there is no way to get both balls further away from K than Y currently is. Consequently, c1 is better.

In summary, the main options from this position are c1 and c3, with c1 being preferable unless the opponent is *very* good at huge rolls.

That was tough; now for an easier one! This time it is K who has broken down on a chance to finish, K is for 3, R is for 2. In frustration, rather than a squeeze[4], K has shot to a position of 'triangulation':

[3] K2 is called a 'cuddle' of Y. R&Y don't like being cuddled (or squeezed, let alone kissed!) by K.

[4] It would be far better to leave K in front of the hoop (unless it was just south of the wire, so couldn't get there). This would create a 'squeeze', where both R&Y are under pressure to move, as K would advance toward them through the hoop. A squeeze is worth more to K than a triangulation, as we shall see. In general, squeeze > triangulation > cuddle.



K has a sensible shot at R if Y moves and at Y if R moves, so unless they're going to shoot at K, the only way that R&Y could avoid K having an easy shot is would be to go down the third line of the triangle (Y at R). (The shape of the triangle doesn't really matter; the term 'triangulation' is used even if K is on a straight line, half-way between R and Y.)

So, what should R&Y do?

It is clear that Y won't shoot at K, and that R won't shoot at Y (giving a three ball break away for the sake of a hit-in and a stop-shot by K).
In terms of possible shots, this just leaves two possibilities. If Y shoots at R (in the hope of hitting and rolling to the west boundary), then missing the 14 yard shot would give K a 14 yard, perfectly safe shot for a great chance of a break (and that's if in missing R, Y hasn't hit hoop 4). In other words, Y should *certainly not* shoot at R!
If R is a great shot (and has big balls!) it could shoot at K. But at about 7.5 yards with a 12 yard cd, it would have about a 70% chance of hitting. Is it enough?

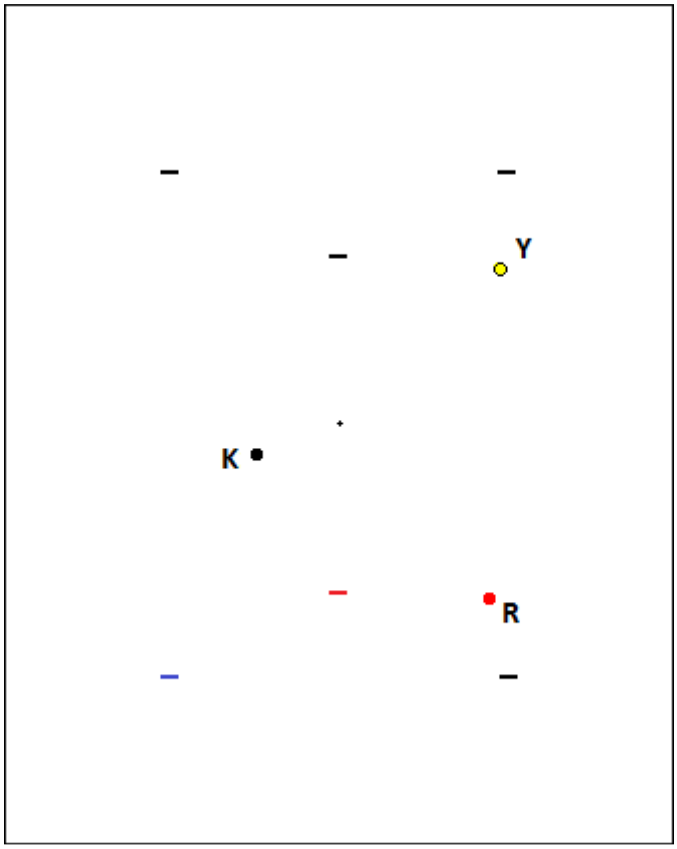
Probably not (as, having hit, R is still not sure to make hoop 2), compared to R or Y running away and letting K get on with it! Playing R, the obvious choice is c1 (going to c2 would result in K shooting at Y (triangulating if missed). Playing Y, c1 or c2 are the obvious choices. Corner 1 is a lot further from K's hoop (3) than c2, but K has a line on R which would naturally finish somewhere south of hoop 1 (not far from c1). Should this affect things? Anyone that's tried long-range hard rushes will know that the possibility of K rushing R near to Y is not to be worried about! How about the possibility that K will have a double chance to hit in (by shooting relatively gently, it will be triangulating)? That's a nuisance, but the main issue here is that K is 70% likely to hit R. Putting Y in c2 would give K the possibility of rolling off 3 from c2 for a winning 3-ball break, with another similar leave if it doesn't land in front! So it's clear that going to c1 with R or Y is best.

For good tacticians, this sort of move is almost second-nature. They will think briefly about R at K before deciding on R or Y to c1. Don't worry if this takes considerable thought at the moment; just like learning to drive a car, it can seem very difficult at first with so many things to think about.

Knowing all this, we can now discern the logic behind K's previous choice of exactly where to play (given that it was going for a triangulation). If K had been further north, Y would then play (and K would be left further from R), if further south, R would play (and K would be left further from Y). So for K, choosing a position of triangulation, the method of working out where exactly to play is to start with an approximate position (like peg-high east boundary) and decide what R&Y would (or should!) do. In this case, it's clear that Y would run away to c1. Knowing this, mentally move R a bit closer to the other ball (so moving south closer to R) and again ask the question of what would be expected from R&Y. Using this, K can converge on knowing the best position to go for a triangulation.

This kind of decision, of working out what should be done, is typically achieved by contrasting 'which is best', rather than trying to quantify exactly what the odds are of winning with each position. This is where 'feelings' (which become honed with experience) play a large role in good decision-making.

Very occasionally, it is better to triangulate in the middle of the lawn, where K dominates the lawn and can afford to shoot at Y for a break if Y isn't wired. Too see that it is usually worse, consider the effect of in-lawn triangulation (to 'defend' c1):



A little thought again shows that R&Y probably shouldn't shoot (though doing so is less risky), and Y cannot sensibly now go to c1; K would shoot at it, having much greater chances of getting a break going than the previous scenario. Y would like to shoot to a position south of hoop 1, wired from K through hoop 1, but due to the risk of missing the spot (which is terrible), it may be best to go into c2 instead.

Overall, the leave is certainly no better than the previous triangulation for K, because being in-lawn, K has had to choose a position further form the other balls to avoid being shot at. In most situations, in-lawn triangulation is worse because:

1. K doesn't automatically get to take croquet if R/Y miss K.
2. R is more likely to get a break (if it shoots at Y or, given point 1, can justify shooting at K).
3. Due to points 1 and 2, K has to be further away from R&Y, so is less likely to hit after a subsequent cornering.
4. K will be moving whatever it subsequently hits further out of the lawn; in general this is bad for K.
5. Lagging to a position is less precise than shooting off for a triangulation (so K may inadvertently leave something shorter for R/Y, or longer for itself, than intended).

Despite the previous example (where Y shot into c1), as a general rule of thumb, if both R&Y are in the lawn, Y (for peg) often needs to find a wired position to shoot to; it is much less important for R to be wired, as shooting at it will often give R a potential break, so sending R to a corner is more often best.

Sometimes it is beneficial for K to repeatedly triangulate for a while, rather than shooting. Very few players ever think far ahead in real matches – and players will often make blundering errors in these sort of tactical exchanges – but thinking through a few games (on a magnetic board) where K keeps triangulating will very quickly illustrate what's good and what's not.

Occasionally, players will reach a 'stand-off' of R & Y both being in corners with K directly between them; e.g., with K for hoop 2, R&Y in corners 1 and 4 or 3 and 4. K will be almost mid-way between the balls, but should always choose to be slightly closer to the 'worse' ball (in this case c4, as K is for hoop 2). Usually, these situations have arisen by K not having taken a shot when it should, but it can happen through optimal play. I've heard a really great tactician say that in such situations they are usually happy to shoot with R/Y (e.g., from c1 to c4). I think this is ok if R is for a hoop that gives a lot if K also subsequently misses (e.g., if R is for hoop 4) but if R is for the same hoop as K, I'll get them to take a shot (or punish them for not doing so!). There are various methods of R&Y re-grouping without giving K a 13 (or 16) yard shot with R&Y together. For instance:
Send the ball in c4 to c3, to be in c1 and c3. When they lag to the middle (the only way to continue without shooting, R&Y have the option of continually moving back and forth across the south boundary, c1, c4, c1, etc. At some point, lagging out to the middle of the lawn, K will make an error, being wired from one of the balls (by hoop 1, 3 or the peg) or hampered on their back-swing. e.g., if they've landed 3 yards east of the peg, wired from c1, the ball in c3 can now shoot through K (nice to have the chance of hitting!), finishing south of 1 (about 6 yards apart on the south boundary), with them only having a shot on that ball. Note that even without K being wired, this is a very long shot for K to c1 (21 yards from the peg), so this could be done immediately if R&Y feels like getting on the with game!

The long-and-short of this section is that it's not always easy for R&Y to get back together safely, and K may have more than one chance before they do (especially if K is for an odd hoop which allows a squeeze). Consequently, **R&Y should think very carefully before giving up on the innings**. Having separated, R&Y will often need to wait for K to make a tactical blunder which gives them a free shot (or overly-tempting short shot) or for K to shoot (and miss) at R/Y. Knowing this, **K should think carefully before taking any shot: often a triangulation or two first will pay dividends**. Unlike R&Y's choices when they have the innings, when R&Y are separated, K's **triangulation positions should always be brinksman-like**; if there's an obvious decision for R/Y, then K has chosen badly.

Nevertheless, K should always choose positions where it's slightly worse for R/Y to shoot at it than not (to allow R&Y to make that error).

Dealing with lift hoops

Without a break, 1-back is a problem for R&Y.

To minimise the chance of R making the hoop and digging out a break, K will usually have gone near to c3, so R&Y will need to choose a line of play, usually having crept up the wired line first, so will be very close to 1-back before it is made:

1. Make 1-back and separate to the 4 winds (e.g., c2 and c4).
2. Make 1-back and separate with a wide join (e.g., c2 and 10 yards south)
3. Make 1-back and remain joined up.
4. Try for a break (especially if K has crept out of the corner).
5. Turn the balls round, then rush R in front with Y and go for the peel.

Readers by now might not be surprised to learn that the answer for which is best is, 'it depends!'

Many players like option 1, but we have seen the difficulty of R&Y re-joining if K is tactically sound.
If K is for penult (or beyond), I do not like option 1 (option 2 seems better).
If K is for 3 or 4 (or 3-back or 4-back), I strongly favour peeling. (R in c2 with Y 10+ yards south is also very strong.)
If K is still for 1 or 2, peeling whilst going to the peg and pegging out is strong on a very tough lawn.
If K is for rover, R&Y need to stay together – again, I must recommend peeling for this, as it gives a much longer shot for K!

To be brief, and in contrast with some top players, I am greatly in favour of peeling 1-back, so long as you are good at powerful roll strokes. This is because it should give K a very, very long shot. Even if the play goes wrong and R only just goes through the hoop, K still has a 21 yard shot, and Y can have gone to c4 or c1 (depending on where K is for). The aim is to peel R close to the south boundary (if it gets no wire), where Y can join with it, then highly likely to win. Having peeled R by say 15 yards (so it's still well in-lawn), Y must make a judgement call on whether to run away to a corner, stay with R, find a wired position on the east boundary which 'defends' the current shot K on R (so R&Y have the innings again after that one shot – but note that K should usually then triangulate!) or, if the player has played a half-roll going to the east of the line and slightly south of the peg (personally I find this more difficult to judge the weight for trying to get R a few yards off the south boundary than with a full roll), there is the option of scattering R to the boundary (it is far better to have R on the boundary than Y). The decision will depend strongly on where K is for and how good they are at playing big rolls to hoops.

Except when K is for 1, 2-back or 5, the peel attempt can even be full-power, sending Y off the south boundary in the stroke 3 yards east of c1, and hoping that R will be joining it. However, some players don't have the power for this (depending on lawn speed) and it's better to try to keep Y just on the lawn in the stroke, for the option of how to finesse (and ensures that K doesn't get a random double-target).

With K for 1-back or 2-back, the peeling option is much less attractive. I would recommend the wide join method against 1-back; c4 and 13 yards north of it if K is for 1-back. Note that you want R in the corner; this is the shorter shot for K and if it misses on the left, R has a rush to Y for a potential finish.

Option 1 (going to c2 and c4) is a good option when K is for 2-back, as it's not possible for K to get a squeeze.

It is also possible to combine two of above lines of play, on a conditional basis. For instance, with K for 1 or 2, if the lawn is fairly tough, the odds of winning from 2-back and box may be as good as making 1-back and giving a lift – but peeling R to the middle of the lawn and not pegging out Y would be worse than either. In such conditions, the play is to peel R going to the peg; if R ends south of 2-back, Y then joins with it; if R ends in the middle of the lawn, Y pegs out. It's worth practicing this peel stroke a couple of times to see if you're happy with judging the pace; it feels a bit weird the first time!

Despite my favouring peeling, it is worth noting that the worse the opposition is at croquet strokes, the better it is to make 1-back and have a wide join, because them hitting with nothing in-lawn (or joined up) gives them much less.

One advantage of setting up for the peel (only turn the balls round when already very close to 1-back on the wired line) is that it encourages K to come out of c3 to have a shorter subsequent shot.

If K comes 3 or more yards out of the corner (usually, sensibly, remaining on the north boundary), R&Y can take a very different line of play, with R playing, taking-off to K before playing a big split approach shot to 1-back. If R is able to take-off just beyond K, then it can often cut K several yards closer along the north boundary, which massively increases the odds of success with the approach shot. If it fails the approach, it will then defend the shot at Y, so again, the emphasis is on sending K deep on the approach.

There's one other line of play which is interesting enough to mention, if only for the concept. This is to rush R *just* in front of 1-back and drop it into the jaws in a tiny split shot. (If the rush in front didn't go quite right, it's easy to return back to the wired position.) Now, with R in the jaws, it presents a small (and risky) target for K, and Y can lag to a couple of yards off the south boundary, south of 1, ready for R to shoot off the south boundary and have an easy 2-back. My view is that it's only sensible for really excellent players on really easy lawns (I'd hate to see Bamford setting up for it against me) because, without R finishing, K will still get the 1-back lift.

So much for 1-back. 4-back is often not an issue because, fearing R finishing on a 2-ball break once it gets there, K will often have taken some shot by then, giving a 3-ball break to R (to be discussed shortly). Without this having happened, K will usually be in c4 and R&Y can creep up the wired line, ready to go for the 2-ball break. It is better for K to be in c4 than c2, as the rush out of 4-back then has to go to penult, rather than having the 'back-up' option of rushing to K. The two-ball break is usually the best option for R&Y, but there are amusing options like turning the balls round having crept up the line, to threaten a gentle peel followed by more wiring, to flush K out. Also, on a really really tough lawn, with K still for 1 or 2, it can be best for Y to rush R in front of 4-back and take-off to the peg to make it a 1-ball game.

The above begs the question of how long a shot K should take when R&Y is for 4-back and peg, preparing to finish on a two-ball break. This is arguably one of the most difficult judgement calls to make in the game, as it depends on many factors; primarily: how good a shot K is, how flat the lawn is, how firm the hoops are, what hoop K is for (whether K is a long way behind; how easy it is to get a break having hit; if K is for an even hoop no squeeze would subsequently be possible, so it would be more important to hit with R&Y together for a break). But, *by far*, the most important factor is how good R&Y is. Let's assume that K is for 4-back also. Against Bamford on an easy lawn, I would shoot even from c1 if he has an easy rush to 4-back from the corner, as he would be over 90% to finish.

This longest-shot can probably be justified against anyone in the top 5. Between about 5 and 20, I don't think the shot from c1 can be justified, but shooting from c4 is arguably correct *on an easy lawn*. Against players outside the top 30, I would remain in c4 even in easy conditions. The chances of the 'average' world number 20 finishing on a 2 ball break (on an easy lawn but in a match that matters) is only about 60% (same estimate produced by Clarke, Burridge and Trimmer), though it always feels more likely. Aside from physical playing skill, there are a couple of mental aspects which can make R&Y more dangerous in this situation. The first is that 4-back should only be approached from *very* close, to ensure a good rush to penult. Without rushing to within a yard of being in front of 4-back, R&Y should run back behind the hoop again. The next is that when it goes wrong, the 2-ball break most often falls apart with the rush after penult; knowing this, R should concentrate on running it gently to have a forward rush. The last is that, if R doesn't get a good rush after penult, it is often better to run away and give K a final 17 yard shot than approach rover from distance. Again, the threshold for how far away to take one or other line of play is a matter of judgement, but note that if K has only a hoop or two to run, it is much more important not to let them take croquet (as K is liable to finish without a 3-ball break). Consequently, if K were already for rover, it is probably best to remain in c4 against anyone outside the top 5.

For completeness, I'll also cover the Super Advanced lift at hoop 4. This one is easier to deal with than 1-back because the option of peeling 'out of the lawn' (rather than into the lawn) encourages the oppo to be in c1 rather than c3 but, as c1 is on the non-playing side of the hoop, this allows the player to creep up to the hoop and pop into the jaws ready for a cut-rush peel, followed by the croquet stroke to make the escape. This is surprisingly playable.

The strategic choice of whether to go for a peg-out

Imagine that two well-matched players are competing to win; one has gone round to 4b and the other hits the lift. Should he go for a tpo? The answer, usually, is 'no'.

To see why, let's first suppose that the players are both absolutely brilliant at peeling. Following a tpo, the two-ball player typically wins about 2/3 of the games. But the players will typically only hit 1/3 of their lifts. So if there are zero errors in peeling turns, if R&Y just goes round to 4-back instead of doing a tpo, his odds of winning will also be 2/3; i.e., it makes no difference whether he does a tpo or not! Some astute readers might object that following just going to 4-back, a long-lift missing into c4 means that there's a greater chance of subsequently failing the tp (than doing a standard tpo), so it's better to go for the tpo – but note that whilst going to 4-back, the player can pop oppo to hoop 3, so the oppo definitely has a delayed tp themselves. So with zero peeling errors, there's very little in it. Now introduce the possibility of errors in the peeling turns and it quickly becomes clear that the tpo is not a great tactic; the errors have a double-whammy of being really bad if failing on a tpo and introducing the possibility of the oppo failing to finish (with their tp) even if they hit the lift after you've stopped at 4-back. (Note, however, that if things are going badly with a tpo, it's possible to stop at 4b instead and then have a tp instead if oppo misses, so the full argument is a little more convoluted than above!)

This result is further amplified by a slight modification to my estimate above of the tpo player winning 2/3 of his matches against an equally-matched opponent. For really weak players, the two ball player has a stronger advantage than this in a 3-ball game; the stronger the two players are, the closer the figure gets to 50%. (Don't be mis-led by players stats showing the strong players win over 70% of their tpo matches; they tend to do more tpos against weaker opposition, and even without that effect, they aren't usually playing their equals.) So for top players who are unlikely to break down on tpos, their equally-matched opponent has a greater than 1/3 of winning, and lesser players

are more likely to break-down on the tpo. In summary then, popping the opponent is often tactically 'better' than a tpo when playing an 'equal'.

There are also some obvious reasons to go for tpos, of course. One is that tpo games are much more fun. Another is to learn and stretch oneself, and give yourself confidence for future tps and tpo games. Sometimes the oppo is tactically weak so there's a real advantage to taking them into a 3-ball game. Or they may be great at shooting but otherwise rubbish; they might hit and finish in two turns (with you having only one more shot), so a tpo is best. Finally, the main reason for going to tpos these days is super-advanced. It's obviously much more worth doing a tpo when playing SA – and that's despite giving an extra lift at hoop 4. (This lift is pretty irrelevant; see previous section.)

There are, of course, many other routes to pegged-out games (like NZ tpos, taking 2 balls off) but one of the main ones is oppo already being for peg. Whilst covering the pros and cons of pegging out the oppo, this is one of the most important to understand. Imagine that oppo has failed a tp and is for penult and peg; you have subsequently failed to get going with your own tp and will end on 4-back and peg. Should you peg out the oppo ball to leave them for penult alone?

The 'natural' answer of many people seems to be a resounding 'Yes!' but it should often be 'NO!' If you don't peg them out, you can have a diagonal spread and are bound to finish if they miss their shot. Yet I have often seen the equivalent leave with the ball at the peg removed from the game. The opponent has the same c3 to c4 shot to win but, if they miss, the two-ball player is still far from having finished. Such a strategy is terrible! It's slightly more acceptable to have then separated, so even if oppo hits, they're not sure to finish. But with only two hoops remaining, what are you to do when they take position at penult if you are separated? Or they could shoot at the peg ball (trying to finish on a 2 ball break) with at least one more shot to come even if they miss. In summary then, it is not always best to peg out the opponent even when it's easy to do so.

In many situations, it is of course beneficial to have pegged out the opponent. All else being equal , the option is generally more attractive when:

1. The lawn is tricky due to being fast (or extremely slow).
2. The opponent is tactically naïve.
3. You are a good tactician.
4. The opponent is not a good shot.
5. The opponent is not good at big croquet strokes (requiring lots of power).
6. The opponent doesn't like spectators (is bad 'under pressure').

Point 1 is due to the ability of the two-ball player to keep having easy hoops 1 at a time and to govern leaves which give potentially easy 3-ball breaks for themselves, whereas the single player probably has a tough first couple of hoops to get going on a break. The other points are obvious; the last being due to the tendency for pegged-out games to garner the interest of any possible crowd.

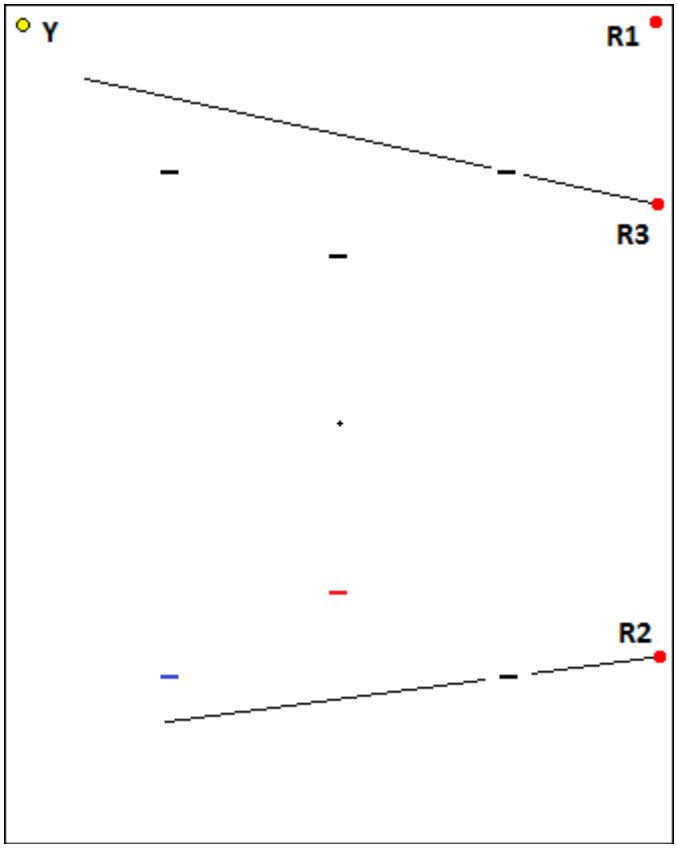
As a final aspect of the strategic choices in going for a peg-out, it's worth covering the main differences between a tp and a tpo. The key difference is that it's important not just to peg out the ball but to have a good leave. (Pegging out oppo but leaving partner ball in the middle of the lawn is lousy!) With this in mind, many people 'push' harder for the peels, trying to get them all done by 3-back to ensure an easy (and thus good) contact leave. However, many players over-cook this aspect and push too hard; breaking down on a tpo (after achieving some peels) is usually game-over. Irish peeling rover with partner to the east will normally allow you to make an adequate leave with partner on the east boundary and putting the peg ball in c2. If things are going wrong earlier than 3-back, it's often worth stoppiing at 4-back, just giving a lift. Even after failing a death-roll peel going to 2-back, it's usually easy to have an NSL - but any kind of leave which gives them a long shot and

you a tp to win is a good outcome. With an NSL, the penult ball would preferably be at hoop 4 (which is probably the ball they should then lift), so in many situations it could be argued that as soon as you've failed to get the peel after 6, it's best to abandon the tpo.

Every situation has its exceptions though; it's ultimately always up to you to decide what to try, no matter how the crowd may tut! As my most extreme example, I once finished a turn with a straight tpo. This was justified on the basis that, by missing a series of 2ft shots, my doubles partner had demonstrated that he had a critical distance of approximately 1 yard. (And to save anyone asking, alas, we lost!) It's always worth bearing in mind that players can always justify the absurd, such as sxpo's, tp&tpo (in one turn; Cunningham), straight sextuple (at the end of an octuple; Death), nontuple (Fulford) and even attempted duodectuples – on the very straight-forward basis that they're playing for enjoyment. My favourite example of such nonsense is Keith Aiton's 3rd turn tpo, pegging out both, so there were 3 balls on the lawn for only one turn in the game.

Good leaves after a tpo

K for 1:

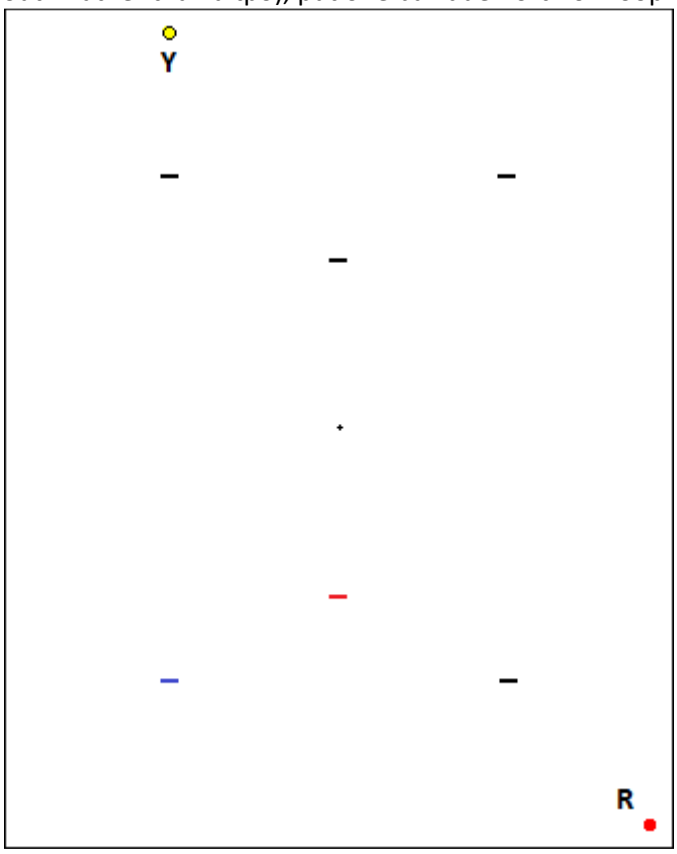


There's only one standard play from R in c3 is to split it between 1 & 2 going to Y; take-off to 1 for break or squeeze.
There are two choices from R being wired from 5ft south of hoop 1; either play the split approach directly or take off from Y to R first to have moved R a bit before the split for break/squeeze.
For some reason, people don't use the third option, though it arguably makes the squeeze more difficult than from c3 due to the distraction of hoop 3 in getting to Y. Note that hoop 3 is not directly between Y and R; R3 is wired from a spot a couple of yards south east of Y.

Some people have views on polarity of the colours. For instance, if the ball in c2 is for hoop 1, then if the ball on the east boundary is sent too far north, then following the squeeze, it may have a shot for the game. I don't have strong views on the polarity though.

A modern tactic is to also pop the other oppo ball (K) through 1 on the tpo so that K can't have a squeeze. Producing a contact leave against K for hoop 2, corners 3 & 4 are generally better than 1 & 4. (Corners 1 & 3 are too tricky to play for!) Why is this? The approach shot to 2 yd in front of hoop 2 is 4 yards further from c1 – but this one is playing up the line and with less than a full roll, so arguably more likely to make the hoop. Also, the previous croquet stroke (from c4) is considerably easier (after a few minutes of practice), splitting from c4 to c1 rather than playing a huge pass-roll from c4 to c3.

Occasionally balls are for unusual hoops. If K is for 2b when making the contact leave (probably after a 'Riggall' – just a peg-out – rather than a tpo), put one ball due north of hoop 2, the other in c4:



From this leave, K needs to take-off from R to move Y east or west, just to have a line to roll down to get in front of 2-back. It has no squeeze opportunity (as second prize), so some players regard this leave as so powerful that they peel 1-back to reach it. However, rather than a squeeze, K can triangulate (as a third prize if they fail to approach hoop 2) and have more chance of subsequently finishing on a 2-ball break, so although this leave is remarkably powerful against weaker players, I might not bother to do the 1-back peel against an expert tactician.

The first time I tried for this leave, I made a tactical error. Trying to rush R near to c4, I accidentally rushed it off the east boundary level with hoop 4. Now I had a choice between trying to get R near c4 (followed by a very long shot to position Y), or leaving R there and taking-off to enable Y to be accurately placed on the line of hoops 1 and 2. Which would you choose?

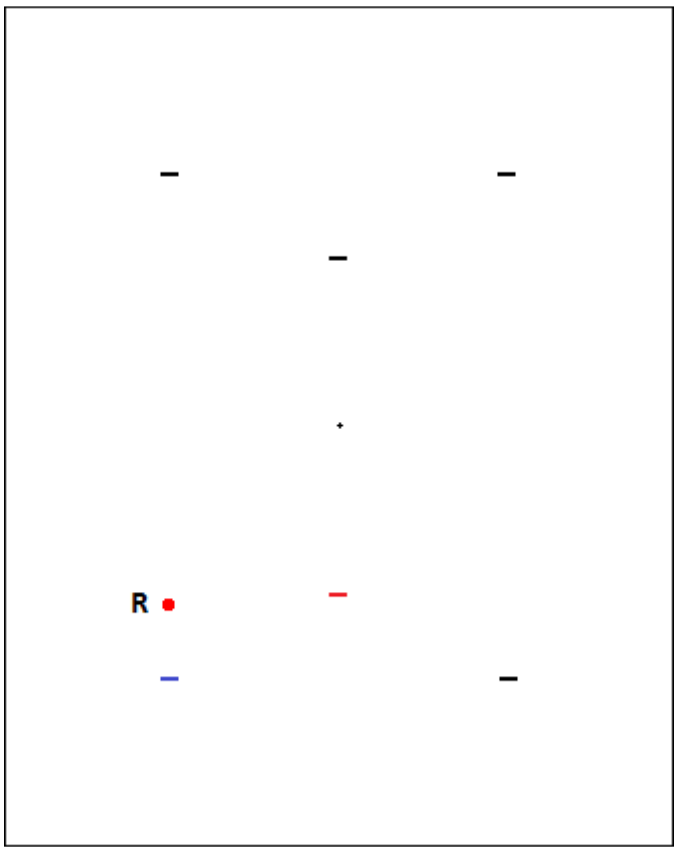
Due to the emphasis on making K's approach to 2-back difficult, I made the error of taking off. The more critical ball is R. With it tucked in the corner, it is much more difficult to dig out a break, and with it being several yards north, it was a relatively easy take off from it for my opponent to move Y anyway. It is much better to poke R as close to the corner as you dare and shoot for the spot you're hoping for; hoop 2 is likely to be a distraction even if you don't nail the perfect position for Y.

Pegging out own ball to become 1-ball

1-ball tactics are really a topic unto themselves; I will just cover the basics here.

If Y is also pegged out (at some point after a tpo), then K will still receive lifts when R makes a 'lift hoop', but R (still) doesn't get lifts from K. This shows that, despite the psychological statement, pegging out two balls after a tpo (to leave 1 vs 1) is tactical folly unless there is a considerable difference in abilities (or it hadn't been possible to have a decent leave at the end of the tpo).

First, let's suppose that K has been lucky enough to have been gifted a two-ball break but, in making hoop 1, rolled into R, 3 yards north of hoop 1. R is for 1-back (e.g., after an NZ tpo). What should K now do?



K (for 2) taking croquet from R (for 1-back). [Is this one dot really worth a whole diagram?!?]

There are various options: Try to roll off hoop 2. Punt R toward corner 4 and lag to position at 2. Take-off from R to hoop 2. And so on! What would you do?

From what I've seen, many players in the top 100 would split R to hoop 3, trying to get position at 2; this is lousy. The odds of landing in front of the hoop are slim with this split and, even having managed it, after 2 they face a long shot at the oppo. (Having missed that shot, they are likely to

reach 5 v 3-back, which is bad for K.) It would be far better to try to roll off hoop 2 and run away if the roll doesn't land in front than play this split. (Where exactly would you like R to land on that split? Short of hoop 3 threatens you if you decide to take position; beyond 3 is a long defended shot if you make hoop 2.)

Punting R toward c4 is not necessary. By doing a thick take-off sending R west, R will not be able to justify shooting with K in position at the hoop. This is because if R misses, K runs 2 to the boundary for a break. The only question, then, is whether to roll-off hoop 2 or play the thick take-off.

Note that playing the thick-take-off, there's no point in then taking on a 4ft hoop 2; it's much better to be guaranteed to make it next turn (rather than potentially finishing on the wire giving R a free shot – virtually for the game); whether hoop 2 is made in that turn or the next makes almost no difference.

Playing the take-off will therefore clearly lead to the situation of K making hoop 2 and lagging in front of 3 before R has had a chance to take position at 1-back. However, with K in front of 3, R can sensibly take position at 1-back. So the decision has boiled down to whether it is better to be for hoop 4 (or 5 if you're lucky!) with R making 1-back and giving you a lift, or better to try and roll-off hoop 2 for the 2-ball break. ?

And the answer to this question, of course, is that 'it depends'. The odds of rolling off hoop 2 and the abilities of the two players are obvious factors, but between players of approximately equal ability, 5 vs 2-back (as it will become) is only good enough to win without another chance at a 2-ball break if 5 is run and position at 6 taken before Y is in front of 2-back. (We'll see this shortly.) Consequently, between equals, I would usually advise K to roll-off hoop 2.

There are, however, different ways of being 'equals'. If K and R have similar rankings but K is significantly tactically better (and physically less good, e.g., at 2-ball breaks) than R, it may be better for K to play the thick take-off.

There are several things to draw-out in relation to the above example.

- The first is that running into R (to reach that situation in the first place) was a pretty calamitous error. When you need a two ball break to win, it is <u>crucial</u> that you run hoops gently to get the necessary rush, even if that means being more likely to blob the hoop.
- The next is that it's generally bad to send the other ball to the next hoop when approaching an 'even' hoop (which involves a corner; 2, 4, 6, 2-back, 4-back). However, it's fine to do so when approaching an 'odd' hoop, and often worth sending the ball beyond that next hoop. e.g., approaching 1-back from c3, send the other ball south of 2-back so that if you land in front of 1-back, you can slam through to the south boundary for a break.
- It is also worth noting that if R's clip were already beyond 1-back, it would be almost imperative to try and roll off hoop 2 from that position. The further ahead one player is, the more important it is for the other to go for two-ball breaks. (Solomon has a very strange section in his book, describing how, with oppo for peg, he made one hoop at a time and kept hitting in after oppo had lagged to the peg again, rather than going for a 2-ball break. In such situations, the odds say that you should go for broke with breaks!)
- Consequently, the further ahead a player is, the less interested they should be in trying for 2-ball breaks – but beware, players often become too timid!

It is never bad to be one hoop behind the opponent (so long as they still have at least one hoop to make), because you then have the greater break prospects.

Many 1-ball tactics boil down to recognising the end point of miniature 'races'. These are where the balls will naturally be passing near to each other. e.g., 3 vs 3-back, if the player for 3-back gets in front of their hoop first, the player for 3 can't take position, and vice-versa. This can make for a 4 hoop 'swing' (+2 or -2) in how big the lead is. The balls don't necessarily need to pass directly by; within 7 yards is important, so 3-back v penult is often relevant. There is one other race; that of taking position at penult v 'taking position' for the peg; this race can sensibly be back-tracked to 4-back v rover. This one is obviously very important!

For example, R has taken position at 4-back, K is one yard in front of 1-back. Should it try to run it firmly (for an easy lag to 2-back, with the off-chance of landing in front of 2-back for the next stroke), or run gently to take the 14 yard shot at R?

To answer this, let's first suppose that K has just run 1-back by a couple of yards and (only then!) is weighing up whether to shoot at R or lag down to 2-back. If it managed to hit R, it will clearly win the 3-back vs penultimate race, so K would be on level terms. But if it missed R, it would have lost that race and be in dire straits. If instead, K lags in front of 2-back, R runs 4-back and is now giving a lift. If R doesn't take position at penult, K runs 2-back and would win the 3-back v penult race (with one good lag in front of 3-back), so R needs to take posi at penult and hope that R misses the 10 yard shot (at an angle of course) from B-baulk. If K hits, then it's fair to say that should win the 3-back v penult race. i.e., lagging to 2-back means it will have a 10 yarder to hit, rather than a 14 yarder. So when in front of 1-back, it's certainly better to run the hoop firmly for an easy subsequent stroke – and happening to land in front of 2-back would immediately put the players back on level terms!

Other miscellaneous tips:

- When R runs 1-back, giving a lift, it is often best to shoot off the west boundary level with 1-back. This gives a very long shot from A baulk and gives too much away if shot at from B-baulk.
- Sometimes there is a stand-off at a hoop which results in an impasse (where different rules apply for a few turns). It can be useful for R to go for an impasse at a lift hoop, because R would gain a hoop and get rid of a lift (if R makes it first) whereas K would only gain a hoop.
- Time constraints sometimes loom in pegged-out games, but it's worth noting that in a 1-ball game, hoops tend to be made very much faster than in 3-ball games, so K can potentially have more chances at catching up quickly in a 1-ball game.

When should a player peg out the peg ball to enter a 1-ball game, then? There are obviously many dependencies, but the main one (aside from relative abilities) is the lawn difficulty (particularly how tough the hoops are to run).
On a really tough lawn, it is difficult to reel in a lead because hoops are usually made one at a time, roughly alternately, and taking croquet only gains a hoop or so. On an easy lawn, 2-ball breaks become much more dangerous, so the outcome of games is more random.

When the single ball is for the peg

Occasionally, the player of the single ball is for peg alone. For instance, having done 3 peels of a tp and missed the peg-out with the front ball, some players will (usually mistakenly) peg out the back ball, leaving 1&1 v peg, which typically soon becomes 1&peg v peg. This is a somewhat different end-game in two ways:

- The ball for the peg almost always has a shot available to finish.
- The two ball player isn't giving lifts.

The shot at the peg can often be deterred by guarding the shot, but it is not easy to do this continuously. I have often seen players shoot from c3 at the peg with balls in c1 guarding the shot, giving the opponent a 3-ball break to win if they miss the peg. Against most players, I see this as an error.

Against many players (especially if the lawn is at all tricky), I would prefer to go to c4. They will typically then make hoop 1 and lay up in c2 (again defending the shot). I move to c1; they make 2 and lay up in c3. I wait. Now when they make hoop 3, they have a dilemma: laying up in c3 is much less threatening to my shot – certainly better for me to shoot now than when I was in c3 and they were laid for an easy break from hoop 1. And even if they have a 'perfect' leave after 3 which I don't fancy shooting at, they have a lot of work to dig me out or make hoop 4 and get back to c3 for another perfect leave. By this point, players will often have made physical errors or mental errors of trying for too much. Many players will make hoop 3 and try for an immediate rush to hoop 4; the odds of them having a really tight leave are then slim. Fundamentally, the odds are that most oppos will leave a double of peg and ball at some stage if K is patient, so it is usually better not to shoot immediately at the peg when it gives away a 3-ball break.

In summary, although the single ball player does not have any lifts coming, against anyone but the very best (say top 5), they can still afford to be defensive and wait for fairly 'free' shooting opportunities. (If they also have lifts coming, then digging-in is obviously even more worthwhile.)

It is generally an error for a player to have pegged themselves out; this is because they deny themselves lifts. With the opponent for 1&1, with 4 balls on the lawn, the player for peg & peg will have a lift shot (at a ball, rather than a considerably longer shot at the peg) after the first break. Even with the opponent for 1 & 4-back at the time of the missed peg-out, going into c4 will often result in a delayed tp (to avoid giving that lift) which may very well break down. Consequently, against anyone outside the top 10, it is almost always best to keep all 4 balls on the lawn – and massively so when playing super-advanced!

3 BALL ENDINGS SUMMARY

General rules of thumb

<u>As the two-ball player:</u>
Wiring is often not necessary.
Only leave shots that you're sure shouldn't be taken; it's fine to leave R/Y open, so long as K can't risk taking the shot.
It's best to leave K a shot which it definitely shouldn't take but might find tempting. Try to 'obtain' the maximum error from the oppo; it's beneficial to get them to take a shot (that they shouldn't take) before you get to 1-back. But don't go out of your way to tempt shots!
When R&Y are separated but already on boundaries, corners are preferable to wired positions.

<u>As the single ball player</u>:
Take any shot of 20 yards or less if it will give you an easy 3-ball break.
Before R&Y have made 1-back, K shouldn't take any shot of more than 30 yards that would give away an easy 3-ball break.
When R&Y are separated, but R is defending the shot at Y (the peg-ball), consider shooting gently to triangulate if missed.
If the lawn is difficult and R&Y have a big lead (e.g., rover & peg v 1, so Y should peg out), shoot at R.

Being good at big roll strokes is very important for the single ball player, and this ability makes triangulations much more powerful than they otherwise would be. I therefore encourage players to practice these huge strokes (which aren't often necessary in games with 4 balls on the lawn).

Common errors to avoid

By the two-ball player:
Running away after failing to wire one of the balls.
Trying for hoops when there's no need after a poor rush.
Trying for wiring in middle of lawn.
Being too defensive when it comes to trying for 3-ball breaks.
Forgetting the option of pegging out the peg ball when a long way ahead.
Not leaving the peg ball far enough into the lawn to have an easy break if oppo misses.
Optimistically trying to leave a single-ball target (rather than two separate balls) and giving a double.
Shooting to a wired position (out of corner) when not necessary.

By the single-ball player:
Being too aggressive:
- Taking shots they shouldn't.
- Not going into corners (mid-boundary isn't good against top players; in-lawn is even worse!)
- Going into corners which are of too much use.

Shooting rather than spotting that triangulating first will improve their odds.

A FEW THOUGHTS ON PSYCHOLOGY

It's amazing how many tactical errors are made in pegged-out games. Due to the stochastic nature of the game though (when it comes to shooting, etc.) and most spectators not understanding tactics properly, good tactics will be criticized a third of the time and poor tactics will be congratulated a third of the time. Know this now (prior to the false praise or criticism), to be robust to either.

This article has covered the general logic of pegged-out games, but logic is not enough without data. You will need to come up with your own estimates (or feelings) of how capable your current opponent is to make much use of the logic: how well do they shoot, and how likely are they to make tactical errors or physical blunders? Such estimates take experience; by playing, watching, and talking to others. And how likely are you to hit your shots and finish from various positions? By combining this kind of 'ability knowledge' with the above logic, you will make very sound decisions in pegged-out games.

The early phases of a pegged-out endgame between players that don't know each other's games well can be a cagey affair. R&Y will often quickly learn how keen K is to shoot, and how tactically capable K is by their defensive choices. Similarly, K can rapidly learn R&Y's tactical ability by seeing how they react after rushing poorly to a hoop – if they still risk approaching it rather than having another guarded leave, K can be confident that they are likely to get a free shot at some point – so should be less inclined to shoot at anything guarded.

The psychology of early wiring. Arguably, R&Y should start by wiring (if possible!), then giving K Very long open shots, then gradually shorter shots, to obtain the largest possible error (either by shooting or by coming out of the corners). The advantage of wiring is that the oppo gets the feeling they might have to take on a desperate shot to win. But the only crucial thing is to guard the shot.

There are some obvious (but interesting) differences when playing doubles. Consider the unlikely scenario of Bamford & Burridge playing Maugham & Beast (with Maugham's identical twin, Beast, having identical playing characteristics; the two have yet to be seen together at a croquet tournament!). Maugham (or Beast) might be happy to do an NZ tpo with two balls off against Bamford (on the basis of tactical ability) or Burridge (on the basis of physical ability), but would not want to tpo Burridge's ball in doubles, where Bamford's physical ability is guided by Burridge's tactics. During a pegged-out endgame, K's choice of triangulation position is sometimes affected by differences in the shooting abilities of R and Y – but more likely, it will be affected by differences in each of the player's natural eagerness to shoot in those circumstances!

Much of the analysis in this text has assumed that players have reasonable knowledge of their odds of hitting, etc. A player will almost always have more knowledge about how well they are shooting than their opponent. This is another reason for playing things slightly on the safe side (whether R&Y having a leave, or K having a triangulation), as it prevents your opponent taking advantage (of you leaving too short a shot) if their ability has recently improved.

Mental trick: when unsure about which line of play to take, ask yourself what you would advise another player to do. This takes all 'ego' out of the decision, which can make it easier, especially in front of a crowd. (Or ask yourself what another top tactician would advise you to do.)

Most improving players need to develop their ability to separate tactical doubt (when choosing what line of play to take) from physical assuredness (when playing the strokes); this comes with time. Be aware of it now, practice mentally switching from the 'choosing' phase to the 'playing' phase during your games, and you'll then be good under pressure, with a crowd watching you win trophies.

Appendix: Deriving rules of thumb for whether or not to shoot

From a given leave, let's suppose that the single ball player is trying to calculate whether to take a particular shot or corner instead. There are 4 things they need to estimate to do the maths. There's a probability p that they will hit the shot; taking on the shot will give them P(win|hit) or P(win|miss). So taking the shot gives a probability of P(win|shoot) = p.P(win|hit) + (1-p)P(win|miss) of winning the game. If this is bigger than P(win|corner), then K should take the shot; otherwise they shouldn't. In the simple case of assuming it will gain/give a winning 3-ball break, then P(win|hit) = 1, P(win|miss) = 0, so the shot should be taken if and only if p > P(win|corner). People can quickly learn to estimate p. The difficulty, then, is estimating P(win|corner), which depends strongly on the ability of both players and the current conditions.
The better the two-ball player is, the smaller P(win|corner) becomes, whereas p doesn't depend on the two-ball player. So the better the two ball player is, the more prone the single ball player should be to shooting.
The better the single ball player is, the larger P(win|corner) is, but p is also likely to go up … so whether better players should be more or less likely to shoot depends on the situation.

All this having been said, it's worth noting that very few players do this sort of maths in their head; people go by their experience-based 'feelings' to compare P(win|shoot) with P(win|corner). All that matters is which probability is larger, rather than quantifying the probabilities or needing to know how much larger one is than the other.

However, let's see how it produces (or confirms) useful 'rules of thumb'. At what range should K shoot to give/get a winning 3 ball break, rather than corner and wait for the lift?
Let's say that K is approx. world number 25 and has a 12 yard cd. By my best guesstimates, K has:
26% chance of hitting a 20 yard shot. 17% chance of hitting a 30 yard shot.
14% chance of getting going off the contact (or subsequent squeeze); this one is tricky to estimate!
7% chance of getting going off a lift (or subsequent squeeze). This is the obvious figure given that after 1-back, R&Y may be in corners 1&4, so K needs to hit a 13 yarder (followed by a fractionally easier 'contact' turn).
10% chance of getting going off final shot (e.g., from c4) when R&Y laid to finish from 4-back on 2-ball break.

First suppose that K is playing against someone like an on-form World No 5, so R&Y will make no errors but won't dig K out of the corners for a 3-ball break either.

K's chances of winning the tpo game with cornering are then:
From contact (14%) + from 1-back lift (7%) + final shot (10%) = 31%
But having failed to get going off the contact, and now being faced with a shot pre 1-back, by cornering, it's remaining chances are 17% - the equivalent of a 30 yard shot. So even against a 'real' expert (who is not going to make any errors), **K should *not* take a longer shot than 30 yards if it gives away an easy 3-ball break** (prior to 1-back).

Now let's say that the same player, K, is playing a lesser opponent, like World No 40, who will, on average, give another opportunity which is the equivalent of an extra lift shot (e.g., through having mis-approached a hoop and run away).
K's chances of winning the tpo game against the weaker player (with the cornering tactic) are then:
From contact (14%) + from 1-back lift (7%) + extra lift-equivalent chance (7%) + final shot (10%) = 38%

But having failed to get going from the contact and now faced with a possible shot pre 1-back, by cornering, K's remaining chances are 24%, which is less than the (26%) odds of hitting the 20 yard shot. So even against a player who is liable to make an error at some point if K cornered, **K should take a shot of 20 yards or less if hitting it will give an easy 3-ball break**. By this logic, it would also mean avoiding shots of much more than 20 yards in this situation. Combining the above results, we find that prior to 1-back, the interesting range for whether or not K should shoot is 20 to 30 yards, with the decision being strongly dependent on the ability of R&Y.

The above analysis is, of course, thoroughly hypothetical! In reality, people break down on 3-ball breaks, sometimes manage to dig balls out of corners, etc., and critical distances vary enormously. However, there are a couple of things worth noting. The first is that if K is a better (or worse) shot, it makes little difference to the analysis, because although it is more likely to hit (or miss) the shot for the 3-ball break, it is also more (or less) likely to hit and get going from the subsequent lift, etc. if K had cornered instead of shooting. So the result is fairly robust to shooting ability. If R&Y are worse still, there becomes a significant chance of them breaking down on the 3-ball break, which is huge for K, so again the figures are fairly robust to that. If K were for 2 (rather than 1), then a squeeze would not be possible (e.g., after having hit the lift), so K should be slightly more inclined to shoot when there's an easy break prospect if for an even hoop.

The final point is that altering the odds of getting going from a contact (or hit lift with the balls apart) has a massive effect on the odds of winning (and means that K can afford to wait for a lift rather than take such long risky shots), so it really is worth practising the big rolls!