

British Endgame Study News

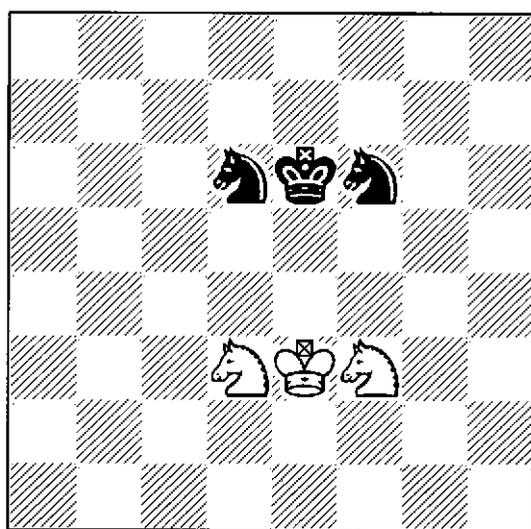
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Endgames in Chess Variants (3)



Progressive chess : White to play can only draw, but Black to play wins!

Computer discoveries in the Losing Game

Elementary endings in Progressive Chess

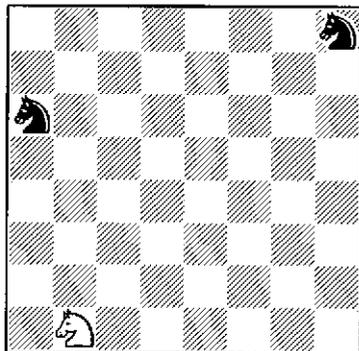
Desargues and Pappus on the chessboard

Queen against rook on a rectangle

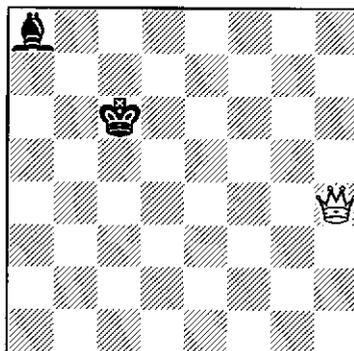
Computer discoveries in the Losing Game

In the Losing Game, capturing is compulsory (if a player has more than one capture open to him, he may choose between them) and the first player to lose all his men wins. The king is an ordinary man; it can be captured, and a pawn can promote to it.

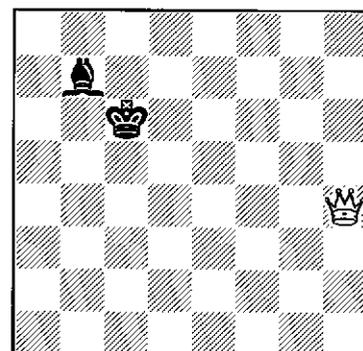
In ordinary chess, all three-man and four-man endings can be resolved by hand (a fully detailed resolution of R v N had to await the computer, but the general principles had been known for a thousand years), and only in the fields of five-man and six-man endings has the computer significantly added to our knowledge. In the Losing Game, even a three-man ending can be difficult to analyse by hand, and few such analyses have been attempted. By computer, however, the task is straightforward, and it is a little surprising that nobody appears to have done it before Gyorgy Evseev published his analysis of N v 2N in 1992. At the time, I assumed that he must have done the other three-man pawnless endings as well, but nothing appeared either in print or on the grapevine and eventually I sat down and did them myself. Subsequently, Laurent Bartholdi has regenerated the data independently and has added the endings with pawns, but the present notes cover only pawnless endings. A more extensive exposition is contained in a document *Three-man pawnless endings in Losing Chess* which is available from myself without charge.



1 - win



2 - draw

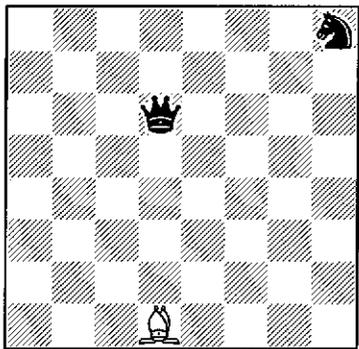


3 - draw

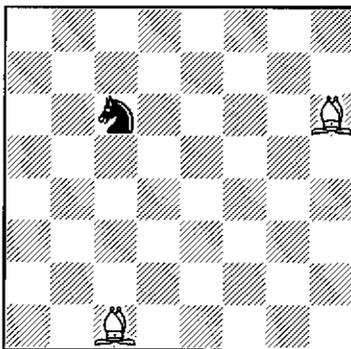
The ending N v 2N is in general drawn, and Evseev found **1** to be the longest win. The play is difficult rather than beautiful, but we ought to give it in the interests of completeness: **1 Nc3 Nb8** (1...Nf7 2 Nb5/Ne4 or 1...Ng6 2 Nd5, forking the Black knights and winning because if Black sacrifices a bN he will lose the N v N ending) **2 Nd1!** (the only move to win) **Na6** (Black is dominated after 2...Nf7 3 Nf2 Nd8 4 Nd3 and 2...Ng6 3 Ne3 Nf8 4 Nd5, so the other bN must stay put) **3 Nb2/Nf2 Nc7 4 Nd3 Nb5 5 Nc5 Na3 6 Ne6 Nc4 7 Nd4 Nb2/Nb6 8 Nc6 Nd1/Na4 9 Nb4 Nf7/Ng6 10 Nd3** and Black is finally forked. This was set as a solving challenge at the international problemists' meeting at Bonn in 1992, and none of us got near it.

2 and **3** introduce the more recent discoveries. These two positions are not strictly computer discoveries, since Paul Byway had already found them and had exploited them in a study published in *Variant Chess* in 1995, but the computer showed them to be the only drawn positions with this material. From **2**, White's only safe move is

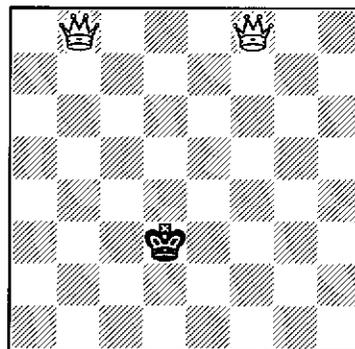
1 **Qe1**, and Black's only safe reply is 1...**Bb7** giving a position equivalent to 3. White must now play 2 **Qh4**, Black must reply 2...**Ba8**, and we are back where we started.



4 - unique draw!



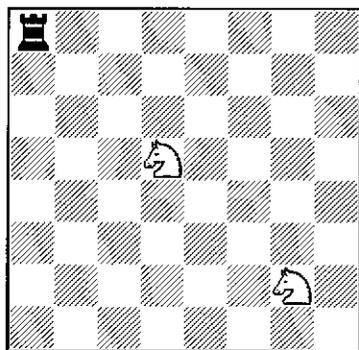
5 - reciprocal zugzwang



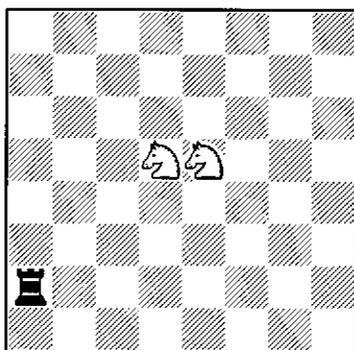
6 - reciprocal zugzwang

4 is a remarkable position: the only draw with B v Q + N. At first I suspected a programming error, on the grounds that a draw by repetition must pass through at least two separate positions, but here we have 1 **Ba4** (only safe move) **Qf4** (only safe reply) and we have a reflection of the position in which we started.

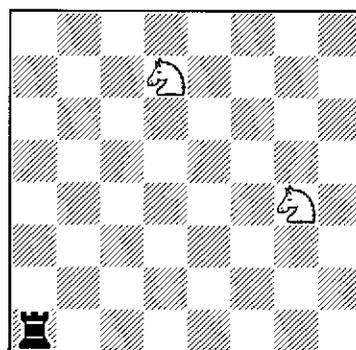
5 and 6 show two of the more interesting positions of reciprocal zugzwang. In the two-man ending with wBc1 v bNc6, White's only winning move is Bh6; in 5, this move is unavailable, and White to play loses. The analysis of 6 is similar.



7 - win



7a - after 3 Ne5



7b - 3/5...Ra1, 6 Ng4

But the star of the show is 7 (*Variant Chess* 1998). Black to play would lose immediately (for example, 1...**Rb8** 2 **Nb4** **Rxb4** 3 **Nf4**). White to play starts 1 **Ngf4** (1 **Nge3** is equivalent by symmetry) **Ra1** 2 **Ng6** **Ra2** 3 **Ne5**, and we have 7a.

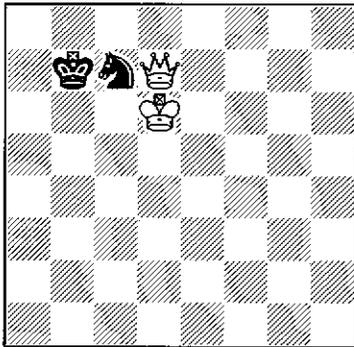
Black now has three moves. If 3...**Rh2**, we have 4 **Nb6** **Rh1** 5 **Nbc4** **Rh8** 6 **Nb2**, giving a reflection of the original position with Black to move. If 3...**Ra1**, we have 4 **Nf6** **Ra2** (4...**Rb1** is equivalent by symmetry) 5 **Nfd7** **Rh2** (if 5...**Ra1** then 6 **Ng4**, giving 7b, and bR is dominated) 6 **Nb6** and we have the same position as after 3...**Rh2** 4 **Nb6**. Black's best is therefore 3...**Ra8**, and we have 4 **Ng4** **Ra1** 5 **Ngf6** **Ra2** 6 **Ng8** (only move to win!) **Ra1** 7 **Nge7** **Ra2** (if 7...**Rh1** then 8 **Nb4**, giving a reflection of 7b) 8 **Ng6** **Ra1** 9 **Ngf4** **Ra8** 10 **Ng2** and we are back to 7 but with Black to move.

So we have another in the small and select class of positions in which White, moving only a knight, can contrive to transfer the move to his opponent.

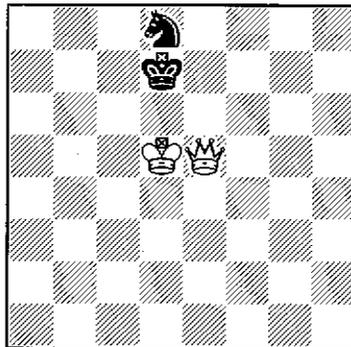
Elementary endings in Progressive Chess

The rule in Progressive Chess is that White plays one move, Black plays two, White plays three, Black four, White five, and so on. In the traditional or "Scottish" form, giving check before a player's last move ends his turn; in the more artificial "Italian" form, such a move is forbidden. A player left in check must get out of it on the first move of his turn, and a player who cannot complete his turn is stalemated. Not many games reach the ending, but those that do are fascinating. Much of what follows comes from *Scacchi Progressivi: Finale de partita* by Alessandro Castelli.

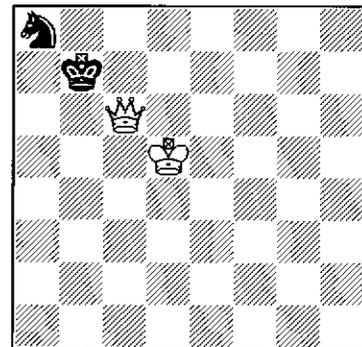
K+Q to play against K is a simple win, but K+R v K is a win only if the defending king is already on the edge. If it is not, White can drive it back only by checking, and such a check leaves an undefended wR open to capture. In an "ending", we always assume that a player's turns have become long enough to do what he wants.



1 - White can only draw

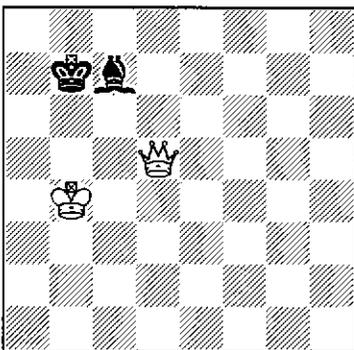


2 - White can only draw

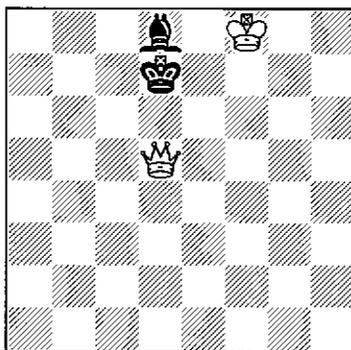


3 - Black loses

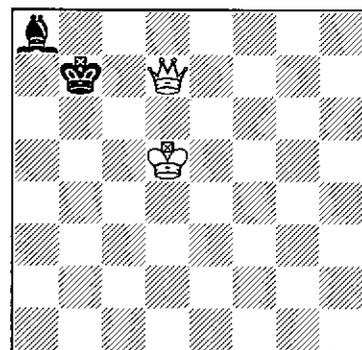
K+Q to play against king and another piece can capture the piece unless it is defended and the king and queen cannot attack it together, but there are draws by stalemate. In **1**, Black simply meets Qxc7+ by ...Ka8. In **2** also, White can only draw; he can neither capture bN nor give mate, and Black will capture wQ at his next turn. In **3**, however, Black loses. The bK is restricted to the squares b8 and a7, and as soon as bN moves it will give check; this ends Black's turn, and White will mate on b7.



4 - Black loses



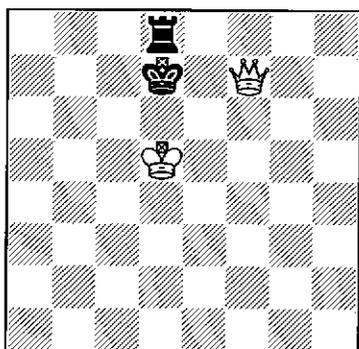
5 - Black loses



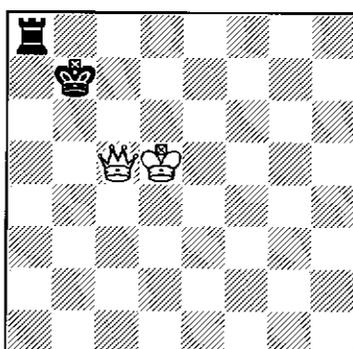
6 - Black loses

White always wins with K+Q v K+B. If Black tries for stalemate as in **1**, White

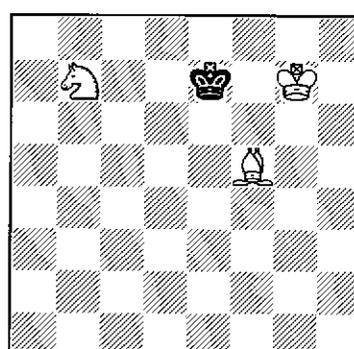
plays to 4 instead of capturing, and Black has no good reply (bB cannot capture wQ, and a bB move to d6, hoping to shield an escape for bK via d7 or d8, gives check and so terminates Black's turn); in 5, Black has tried to set up the same position as in 2, but again White can play so as to leave him with no good reply (Castelli appears to have overlooked this possibility); and 6, mate under Italian rules because any bK move would give premature check, is quickly lost under Scottish rules as well.



7 - Black loses

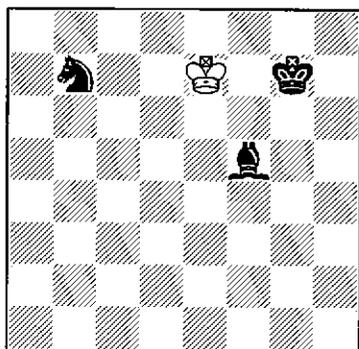


8 - White can only draw

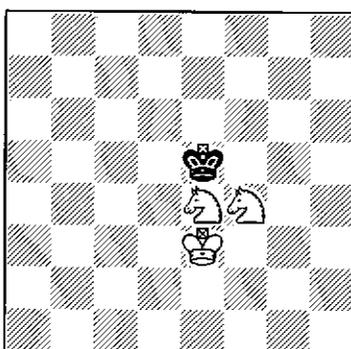


9 - White can only draw

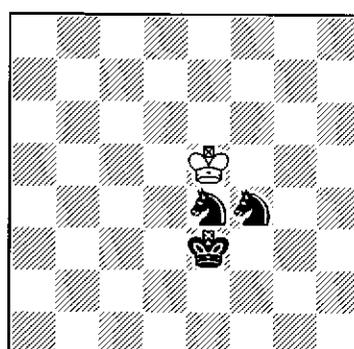
The Black K+R in 7/8 are placed as his K+N in 2/3, but the results are reversed. 7 is mate under Italian rules, and Black loses even under Scottish rules because his first move gives check and ends his turn. 8, on the other hand, is only drawn.



10 - White loses



11 - White can only draw



12 - White loses

But the most interesting endings involve K+B+N and K+2N against K. These are won for Black but not for White! The reason is that White's turn always consists of an *odd* number of moves, Black's of an *even* number. In 9, Black's even-length turn brings him back to e7, and if White checks him he can always play to reach an equivalent square (b4, d2, g5). In 10, however, White's odd-length oscillation leaves him at e8, and giving mate is then easy. Castelli attributes these to Deumo Polacco.

Similarly, White cannot win in 11 even if he has the move, but in 12 wK is restricted to the corridor e5/f5/g4/h4 and his turn leaves him at f5 or h4. Suppose f5; Black sets up a similar position twice more, driving him to g5 and then to h5, and then mates. This time Castelli credits Agostino Braca.

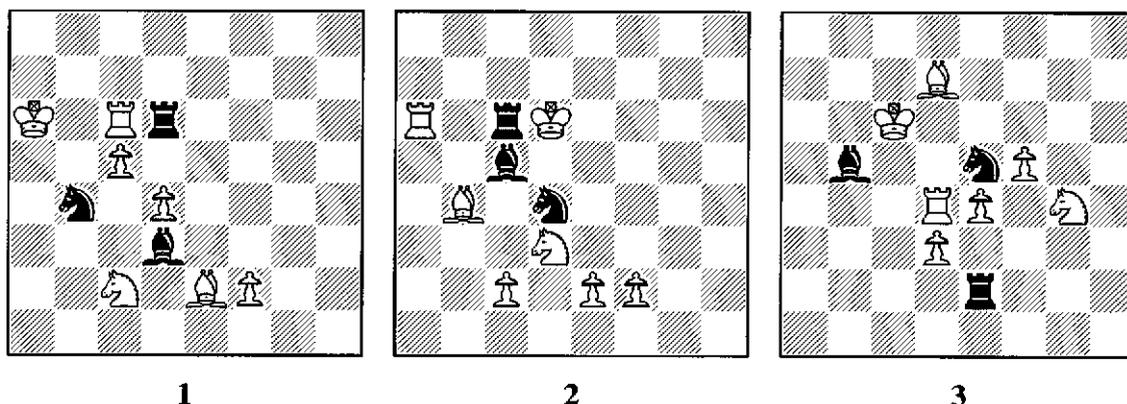
Which brings us to our front-cover diagram. The positions of the two sides are identical, but White to play can only draw whereas Black to play can win.

Desargues and Pappus on the chessboard

T. R. Dawson's *Fairy Chess Review* used to include mathematical items among the chess material, and George Jelliss's *Chessics* maintained the tradition. The problems that follow are hardly new (David Singmaster's invaluable *Sources in recreational mathematics* gives references back to 1821) and I shall not be surprised if readers draw my attention to essentially identical descriptions somewhere in the literature, but I have not seen this particular treatment in print.

When I was young, we still learned projective geometry, and two of my favourite theorems were those of Desargues and Pappus. It once occurred to me to see if they could be represented on a chessboard. They can, and the results are rather attractive.

Theorem 1 (Desargues) says that if O is any point, OAP , OBQ , and OCR are any three lines through this point, and X , Y , and Z are the meeting points of BC and QR , CA and RP , and AB and PQ respectively, then the points XYZ lie on a straight line. Can we set this up on a chessboard?

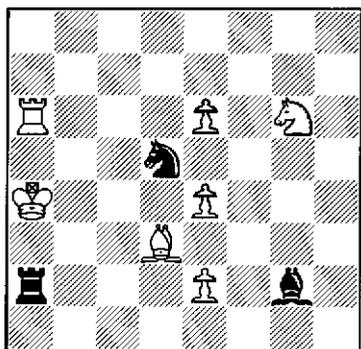


Yes, we can, and **1** shows one possible arrangement. The white king represents O , the rooks AP , the bishops BQ , the knights CR , and the pawns XYZ . The use of rooks, bishops, and knights to denote horizontal, diagonal, and oblique lines is fortuitous, and in future we shall use them purely as markers without regard to the type of line they occupy. We note, incidentally, that we have a total of ten lines, each containing three men and each man lying on precisely three of them, so we have a solution to the ancient puzzle "plant ten trees in ten rows of three".

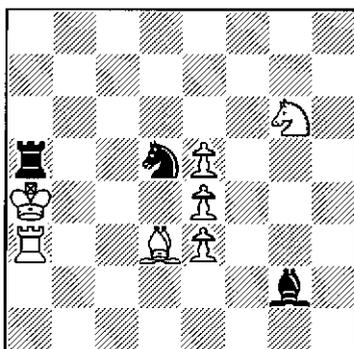
A property of this formation, perhaps not immediately obvious, is that its ten points are equivalent: any of them may be chosen as O . **2** shows one alternative labelling, and the others can be done similarly.

1 is not the only possible arrangement of the ten points, though it is the only one that will fit on a board as small as 6×5 . **3** shows a pleasantly symmetrical setting; **4** uses only the light squares; **5** to **8** show further possibilities. In each case, as in **1**, the pattern may be relabelled so as to choose any of the ten points as O .

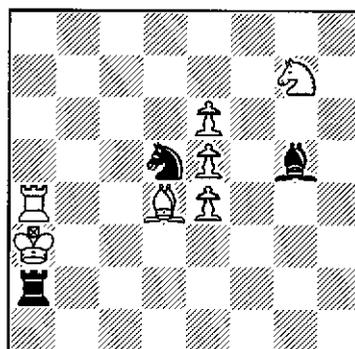
Theorem 2 (Pappus) relates to nine points only. It says that if ABC and PQR are any two lines, and X , Y , and Z are the meeting points of BC and QR , CA and RP , and AB and PQ as before, then the points XYZ again lie on a straight line. This is very



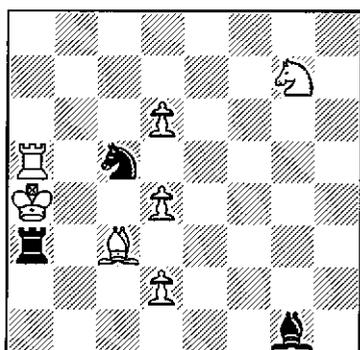
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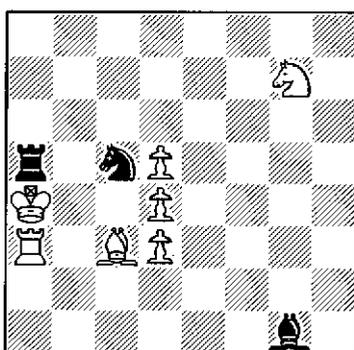
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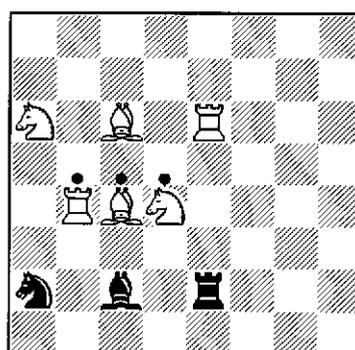
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7

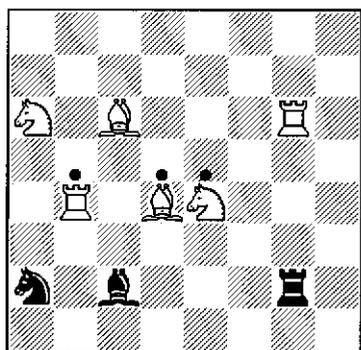


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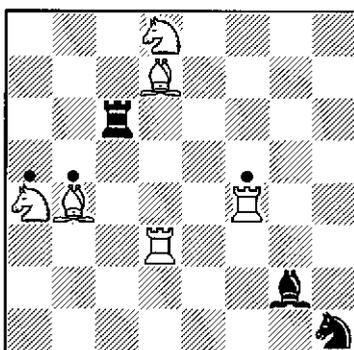


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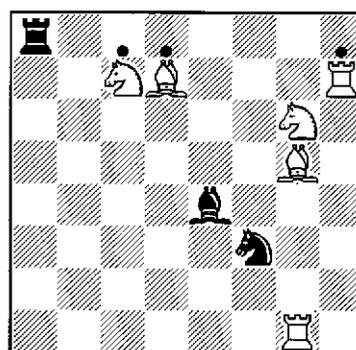
easy to set up, as shown by 9, where the White knight, bishop, and rook represent *ABC*, the Black ones *PQR*, and the dotted ones *XYZ*. However, this fortuitously has the bishops *BYQ* in line as well (it solves the ancient problem “plant nine trees in ten rows of three”) and I personally prefer the less symmetrical setting shown in 10. Here we have precisely nine lines of three; each line contains one knight, one bishop, and one rook; and either all three are of the same colour or there is one of each.



10



11



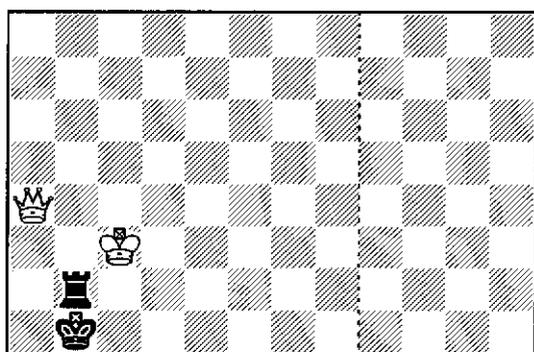
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Even 10 is a little dull, however, and it occurred to me to wonder: it is possible to put three knights, three bishops, and three rooks on the board so that they form nine lines, each containing one knight, one bishop, and one rook, and *no two of these lines are parallel*? It is indeed, as shown by 11 and 12, and it makes a good puzzle. I think these are the only ways to do it, and each uses the full 8 x 8 board.

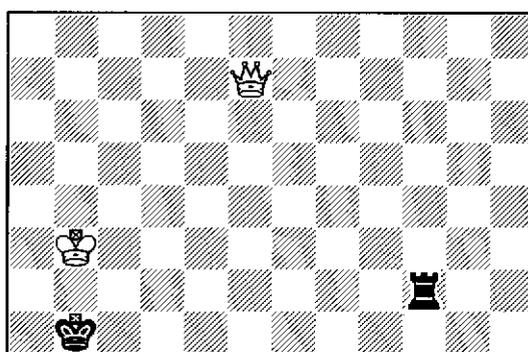
Queen against rook on a rectangle

Paul Byway's invention of Modern Courier Chess, using a 12 x 8 board, has raised a number of theoretical questions. One of the most fundamental is that of Q v R.

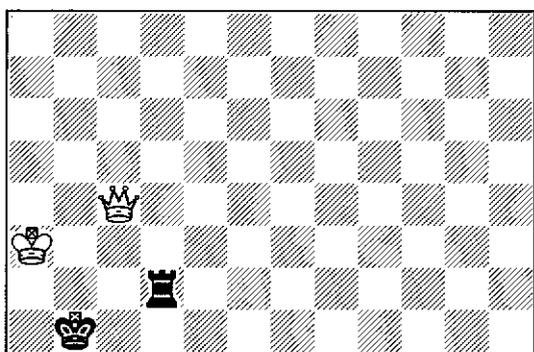
The 8 x 8 win depends on Philidor's position **1**, where bR soon falls to a fork. On the 12 x 8 board, bR has four extra squares, but i2 and k2 are easy (White drives bK to b1, then forks on f5 or g6). If **1...Rj2**, bK can avoid forks by keeping to a2 and b1, but Paul shows a win by **2 Qb5+ Ka2 3 Qa6+ Kb1 4 Qf1+ Ka2 5 Qf7+ (covering j3) Kb1 (best) 6 Kb3** threatening mate (see **1a**). Best defence is **6...Rb2+ 7 Ka3 Rd2** (for **7...Rh2 8 Qb3+** see below), but **8 Qc4** forces bR to move (see **1b**): **8...Rd8 9 Qe4+ Kc1 10 Qf4+ Kd1 (10...Rd2 11 Kb3) 11 Qi1+** and a fork, or **8...Rh2** (say) **9 Qb3+ Kc1 10 Qc3+ Kd1 (10...Kb1 11 Kb3 and mates) 11 Qa1+** and a skewer.



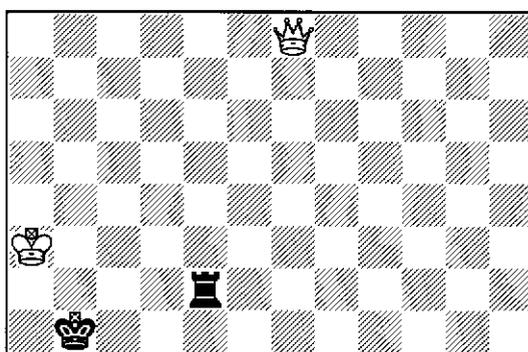
1 - Black to play



1a - 1...Rj2, after 5 Qf7+ Kb1 6 Kb3



1b - 1...Rj2, after 7...Rd2 8 Qc4



1c - 1...Ri2, after 7 Qg8 and 9...Re2

But after **1...Ri2**, Black threatens ...Ri3+ and not ...Rj3+, so wQ must play to g8 instead of f7 and now Black has ...Re2 (see **1c**). On the 8 x 8 board, such a position is won by playing to reach Philidor's position, but here that is where we started. Perhaps it can be won by other means, but we have not found them and I suspect it is drawn. If any reader or his computer can resolve the matter, we shall be most interested.

If you enjoy this annual supplement to our normal fare, I recommend that you try the quarterly magazine Variant Chess. Contact Peter Fayers, 2 Beechwood Avenue, Coulsdon, Surrey CR5 2PA, 1999 subscription (UK) £8 - JDB.