

Reminiscences of a puzzle enthusiast

John Beasley, 2 May 2018, minor corrections to 13 May

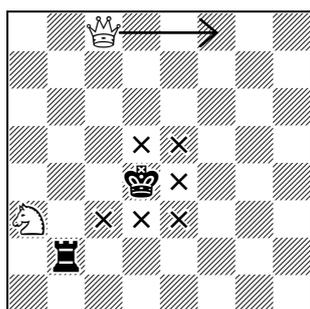
Every ten years or so (*Some Flights of Chess Fancy* in 1989, *More Flights* in 2000, *51 Flights* in 2009) I have produced a little vanity-book containing my favourite chess compositions to date. It would now be nearly time for another, except that I would have nothing new to put into it. Instead, it occurs to me that it might be of interest to look back over a lifetime of enthusiasm for puzzles, and to pick out a few highlights. If this causes readers to try creating puzzles for themselves, so much the better.

I have divided the text into six sections: chess and chess variants pages (1-5), peg solitaire (page 6), other games and puzzles (page 7), unfinished business (pages 8-10), thoughts on producing your own puzzles (page 11), and solutions and notes (pages 12-16).

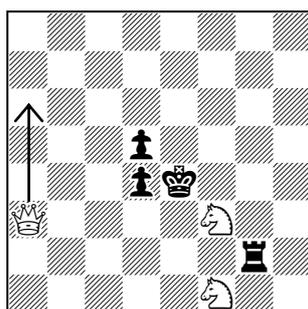
Chess and chess variants

The legendary chess composer T. R. Dawson used to say that the production of chess problems and endgame studies was a matter of scientific discovery, and this view is surely correct. The number of different chess positions, although large, is finite, the number embodying any particular property is therefore also finite, and “composing” a problem or endgame study featuring a particular property or set of properties is in principle just a matter of looking to see if one is there. As such, it is subject to the good or bad luck accompanying every attempt at scientific discovery: (a) there may be nothing to be found and (b) somebody may have got there first.

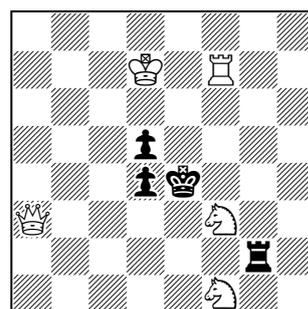
A graphic illustration of the role of luck is given by a little two-mover by Comins Mansfield which appeared in the *Morning Post* in 1923. Mansfield tells the story in his book *Adventures in Composition*



1a - The intention



1b - Some progress made



1 - The finished problem

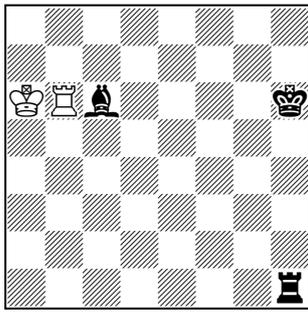
The problem was of a type known as “complete block with changed mates” (if it were Black to play, every possible move would let in a White mate, but White has no waiting move available, and the actual key destroys one or more of the set mates and provides new mates in their place), and the idea behind it is shown in **1a**. The squares marked “x” are assumed to be blocked by a Black man or guarded by a White man not yet present on the board. As set, therefore, a move by the Black rook on the rank will let in a mate by Nb5, and one on the file will let in a mate by Nc2. But White is assumed to have no waiting move, and the intended key 1 Qf8 will destroy these mates because the White knight will be tied to the defence of c4. However, from f8 the queen will threaten mate on f2 and b4, and any move by the Black rook will relinquish its guard of one of these squares. All right, 1...Rb3 and 1...Rc2 will still prevent both mates, but the placing of any man on c3 will stop this.

A little work, including a quarter-turn of the board, produced **1b**. The squares on the f-file are assumed guarded, so the mates before and after the key all work, and the second White knight not only blocks what is now f3 but also puts the necessary guard on e5. Indeed, it does more. The Black pawn on d4, as well as preventing immediate mate by Qe3, has a move 1...d3 which relieves the White queen from the duty of guarding this square, and since the knight on f3 guards d4 this allows mate by Qe7 before the key and Qe6 after it.

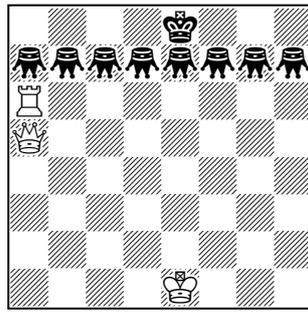
All this is very promising, but we still have to guard the f-file and to put the White king where it will be safe from checks but not be able to make a waiting move. Here is where the luck comes in: all we need is to put a White rook on f7 and tuck the king behind it on d7. 1 Ke7 now stops mate by Qe7, allowing 1...d3, any other king move allows Black to check, and an attempted waiting move by the rook on the file also allows check.

This has given **1**, which is a little gem. Mansfield’s own comment: “It happens just about once in a lifetime!”

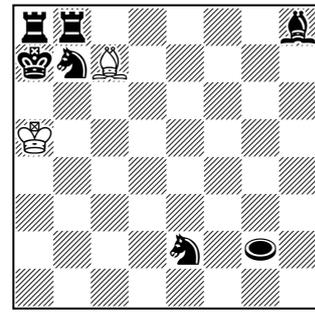
I have been lucky much more often than this. Overleaf are six examples from *51 Flights*, and I could have chosen others. Cover the solutions lower down the page if you haven’t seen them before and want to have a go.



2 - Maximummer
Selfmate in six

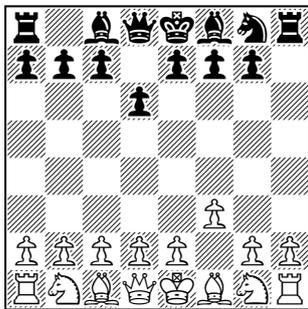


3 - Grasshoppers a7-h7
Mate in four

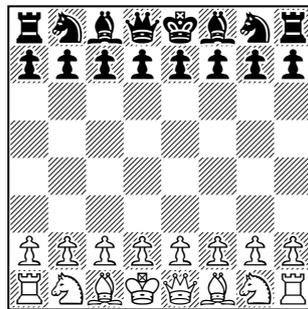


4 - Imitator g2
Mate in two

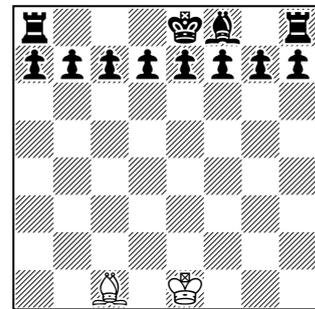
In a maximummer: Black must always play his longest legal move measured from square centre to square centre (0-0 counts as 4, 0-0-0 as 5), but checks are normal. In 2, Black to move would have to play ...Ra1, which would be mate even though ...Bh1 would be longer than ...RxK. A grasshopper moves along Q-lines, but must jump over one man and land on the square beyond. Black to move in 3 could play ...Ga7xa5, and if Ra8+ then ...Ga5-d8. An imitator copies each move, and a move cannot be made unless the imitator can copy it. In 4, Kb6 (Ih3) is legal (Black cannot play KxK) and check (White can). The answer: ...Bf6 (If1)!



5 - Position after Black's 8th move
What was the game?



6 - Optional Replacement Chess
How soon can we reach this position?



7 - Maximummer
White to play and win

It is easy to reach 5 after Black's or even White's 7th move, but to get there after Black's 8th is not so easy. In Optional Replacement Chess, a player can put a captured man straight back on the board on any vacant square (a pawn not on the first or last rank, a bishop only on a square of the same colour). With this rule, how soon can we interchange the White K and Q? In 7, Black is assumed to have been maximumming throughout the game.

Solutions. 2: 1 Rb8 Ra1+ 2 Kb6 Bh1 3 Kb5 Ba8 4 Rb7 Rh1 5 Rb6+ Bc6+ 6 Ka6, giving Black the move.

3: 1 Rh6 Kf8 2 Qh5 K-- 3 Rxh7 Gxh7 (if 2...Kg8) 4 Qe8, or 1...Kd8 2 Qa2 K-- (2...Gh5 3 Rxh5) 3 Rxh7.

4: 1 Bb6 (If1). This is not check because the Black knight blocks the imitator, but it restricts Black to moves by this knight because anything else will bring the imitator out into the open. Three of the knight's four moves demand unique king moves in reply: 1...Nc3 (Id2) 2 Kb4 (Ie1), 1...Nf4+ (Ig3) 2 Kb5 (Ih3), and 1...Ng3 (Ih2) 2 Ka4 (Ih1). There remains 1...Nd4+ (Ie3), after which no king move works but we have the star of the show: 2 Bxd4 (Ig1), a mating retreat along the line of check quite unlike anything that can happen in ordinary chess.

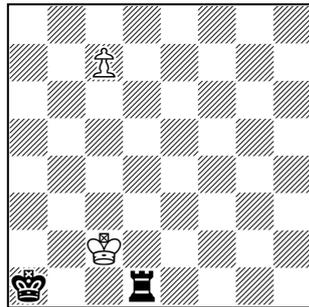
5: 1 f3 h5 2 Kf2 Nh6 3 Kg3 h4+ 4 Kxh4 Ng4+ 5 Kxg4 d6+ 6-8 Ke1 Ng8, the b8 knight now being at g8.

6: In four moves only, 1 e4 Nf6 2 Qf3 Nxe4 (Pe2) 3 Qf6 Nxf6 (Qg8!) 4 Kd1 Nxe8 (Qe1).

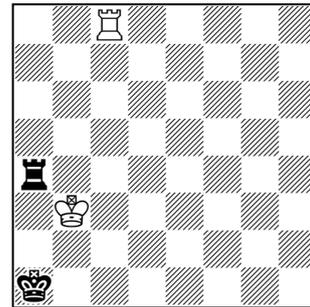
7: Black has just moved his a-rook, else he would have had a longer alternative, and he can never have moved his king or his h-rook, because he would always have had a longer alternative (a knight move, or a pawn-two, or a pawn capture in reply to a knight check). So he cannot play 0-0-0, but he *can* play 0-0. A winning mechanism now emerges: 1-2 Bxg7 Ra8 3-4 Bxa7 Ra8 5 Bd4 Ra1+ 6 Bxa1 Bh6 7-8 Bxc7 Bh6 9 Bf4 0-0 10 Bd6 Bc1 11-16 Kxb7 Bc1 17-18 Kxd7 Bc1 19 Kxe7 Bh6 20 Kf6 Bc1 21 Bxf8 Bh6 22 Bxh6 Kh8 23 Ke7 f5 24 Kf8 f4 25 Bg7. The interest lying in the provable availability of ...0-0, alternatives in the play do not matter.

Where did the luck come in? In the case of 2, 5, and 6, I just set up the idea, and was presented almost at once with an accurate sequence in which the moves by each side interleaved perfectly. For 3, I set up the Black array, and was delighted to find that it yielded not only a sound problem with two main lines but one which offered an apparent concentration on a7 whereas the breakthrough would come at the other end. In 7, the luck lay in finding a setting in which every man still on the board was on its home square, always an attractive feature. But the greatest slice of fortune came with 4. I was merely trying to set up the retreating mate 1...Nd4 2 BxN; that each of Black's other moves demanded a different White king move in reply really was once-in-a-lifetime good luck.

The extreme case of compositional luck is the serendipitous bust. Typically, somebody produces an endgame study, and somebody else (or even the same person) finds a bust which is more interesting than the original idea. So the board is turned round, the original intention becomes the elegant refutation of a plausible wrong move, and the bust becomes the new solution.

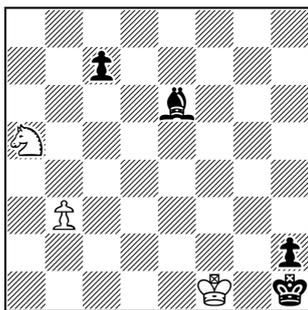


8 - Black to play

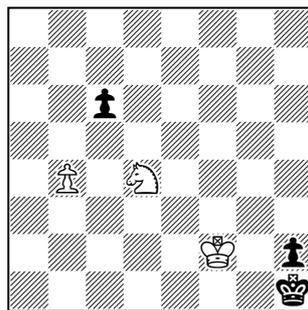


8a - 2 c8R, after 3 Kb3

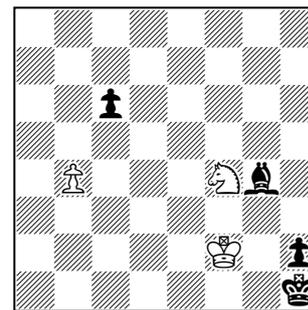
The best known example is given by the Barbier-Saavedra study. John Roycroft tells the full story in his book *Test Tube Chess* (reprinted by Dover as *The Chess Endgame Study* and reissued in 2016), but the heart of the matter is shown in 8. Barbier, a newspaper columnist, had presented this position with the comment that although Black could not prevent White's promotion, he could hold the draw by playing 1...Rd4 since 2 c8Q Rc4+ 3 Qxc4 would be stalemate. Not so, said Saavedra, one of his readers. Saavedra is reported as having won at least one newspaper solving competition, and he seems to have done what strong solvers do automatically, running through every defensive move in turn, however apparently absurd, just to make sure that indeed none of them works. And of course one of them does work; the underpromotion 2 c8R!! threatens mate by 3 Ra8+ etc, hence 2...Ra4, and now 3 Kb3 attacks the rook and discovers a mate threat on c1 (see 8a). This is now known as "the Saavedra theme", and Saavedra has become famous on account of a single move.



9 - White to play



9a - White's objective (Black B anywhere)

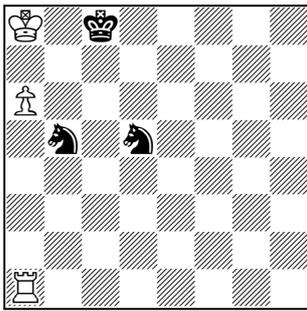


9b - 1...Bd5, after 6...Bg4

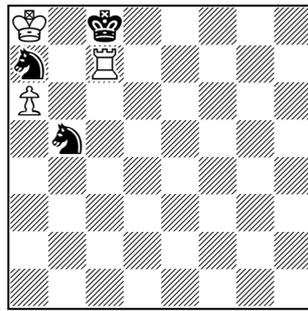
I have twice had luck of this sort, though neither has been as spectacular as 8. 9 shows the essentials of a position which Wallace Ellison sent to me around 1995 (I am quoting from memory). The intention was 1 b4, with the immediate sequel 1...Bd5 2 Kf2 c6. Now White wants to get to d4 (see 9a), since the Black bishop must then go to g4 or d3 to stop Ne2/Nf5 followed by Ng3 mate, and the c-pawn will fall. So 3 Nb7 B-- 4 Nc5 Bd5 (to stop Nd4, Black must guard e6/b3 as well as e4) 5 Nd3 B-- 6 Nf4 Bg4 (giving 9b with the same motif – Black must defend e6 as well as h5/e2) 7 Kf1 (this tempo move has become possible because the knight guards the squares from which the bishop might check) Bf3 (nothing else is better) 8 Ne6 Bg2+ (again nothing else is better) 9 Kf2 B-- 10 Nd4 (objective achieved) Bg4/Bd3 11 Nxc6, and with the tempo move b5 now available White soon wins.

This was very neat, but the point occurred to me: what happens if Black plays the utterly ridiculous move 1...c5? It draws, doesn't it? 2 b5 loses the pawn to 2...Bc4+ since 3 Nxc4 will be stalemate, so White must take, 2 bxc5, and now we play 2...Bd5? No, 3 Kf2, and Black must release the pressure. Correct is 2...Bc4+, playable because the capture will again give stalemate, and only after 3 Kf2 do we at last play 3...Bd5. Now White is at a standstill. 4 Kf1 will be met by 4...Bc4+ repeating the position we have just had, and 4 c6 allows 4...Bxc6 since the capture will once more give stalemate.

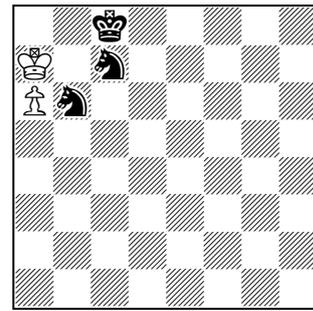
This seemed too good to waste, so we spun the board through 180 degrees, added an introductory move to bring the bishop to what was now d3, presented the fortuitous discovery 1...c5, now 2 f4, as the main line, used Wallace's excellent analysis to refute the natural move 1...Bd5 (now 2 Be4), and published the result as a joint study. It can be found in *51 Flights* (available on the Orthodox Chess page of www.jsbeasley.co.uk).



10 - Optional Replacement Chess
White to play and draw



10a - after 2 Rxc7+ (Na7)



10b - after 3 Kxa7 (Nb6)

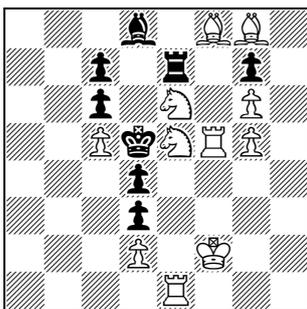
My other slice of serendipitous luck occurred with Optional Replacement Chess. I was trying to use the Optional Replacement rule to sharpen up a problem featuring a mate with a lone knight in the corner, and suddenly realised that the rule could be used by the defender to avoid the mate. So I turned the board around, and reset the problem as a “White to play and draw” study.

This produced **10**. In ordinary chess, this is a win for Black: **1 Rc1+** (else 1...Ndc7 mates at once) **Ndc7+** **2 Rxc7+ Nxc7+** **3 Ka7 Nd5 4 Ka8 Kc7 5 Ka7** (5 a7 Nb6 mate) **Ne7 6 Ka8 Nc8 7 a7** (no choice now) **Nb6 mate**. Now let’s see what happens in ORC.

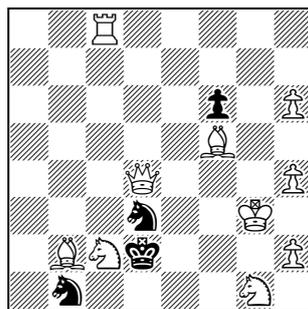
1 Rc1+ again, obviously, and if 1...Nbc7+ then 2 Ka7 and Black must let the White king out. Hence **1...Ndc7+** as before, and we have the first capture-and-replacement: **2 Rxc7+ (Na7!)** giving **10a**. Black has nothing better than **2...Nxc7+** taking the White rook off, and we have the second capture-and-replacement: **3 Kxa7 (Nb6!)** giving **10b**. White now threatens **4 Kxb6**, capturing the Black knight for the third time and this time actually taking it off the board, and if Black moves it or defends it he gives stalemate.

Every composer has a pet composition which he feels has not received adequate recognition by others, and this is mine. Had anyone asked me to set the ORC task “White to capture and put back the same man twice as the only way to win or draw”, I would have thought it completely impossible, and would not have wasted time on it. Yet here we have it, simply and naturally, with only six men: a piece of extreme good luck rivalling **4**.

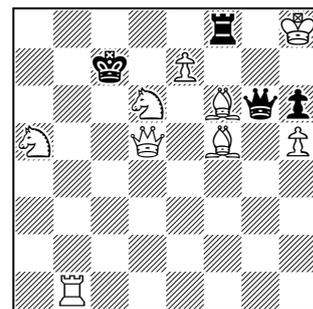
All the examples so far have featured unalloyed good luck, and I could have chosen others. There is another kind of luck, less spectacular but by no means less real, which consists not in finding an elegant setting but in achieving the task at all. Here are three examples. The selfmate in six was composed for a World Chess Solving Championship, and six competitors out of 57 were successful. If you want to see how you might have fared, cover up the solution and give yourself an hour. The use of board and men is permitted.



11 - Mate in two



12 - Selfmate in six



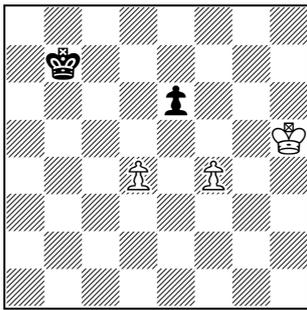
13 - White to play and win (perhaps)

The task I set myself in **11** was to make the key of a two-mover help Black in as many different ways as possible. White has two potential lines of check, from the rook on f5 and the bishop on g8, but the key **1 Rf7** abandons one line of check, blocks the other, makes no threat, gives the Black king a flight square, and exposes White’s own king to check. The pin mates **1...Rxf7+ 2 Nf4** and **1...Rxe6 2 Rd7** are a pleasant embellishment.

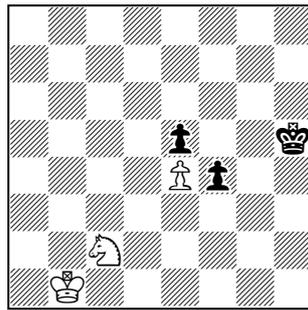
12 yields to **1 h3**, with **1...Nc3 2 Rxc3 Kd1 3 Kg4 Kd2 4 Kh5 Kd1 5 Bg4+ Kd2 6 Qf4+ Nxf4**, or **1...Na3 2 Bxa3** and the same, or **1...Kd1 2 Qxd3+ Nd2 3 Be4 f5 4 Bh1 f4+ 5 Kh2 f3 6 Qf1+ Nxf1** echoing the same mate three squares lower. This was well received (a selfmate echo with the mates three squares apart had been done before, but not very often), but I have always regretted the need for different knights for the two mates. Anyone who can reset this echo using the same knight for each mate may publish the result with my good will.

In **13**, we have **1 exf8R Qg7+** and stalemate, **1 exf8N Qh7+**, and **1 exf8B/Q Qg8+**. However, **1 exf8P!** would win if it were legal (which once it was). **1...Qg7+ 2 Bxg7**, **1...Qh7+ 2 Bxh7**, and **1...Qg8+ 2 Qxg8** all release the stalemate, while **1...Qxf6+** destroys it at once and White will win as soon as the checks have run out.

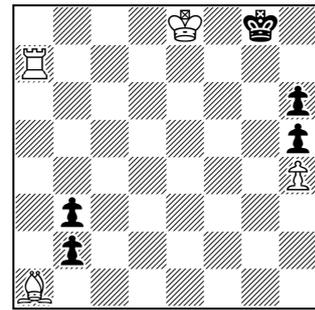
It's time for some compositions by others. Here are three of the studies which Timothy Whitworth and I put into the second edition of *Endgame Magic* (Dover, 2017).



14 - White to play and win



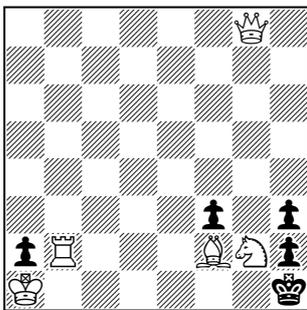
15 - White to play and win



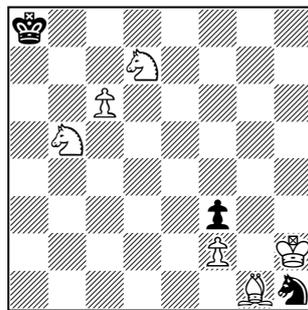
16 - White to play and win

In Artur Mandler's **14**, the White king must ignore the central battlefield entirely and march straight up the board into the corner, while people have been known to take one look at David Blundell's **15** and to say that the first move must be Na1 or the position would not have been set. For explanations, and for the solution of John Nunn's **16**, see page 12.

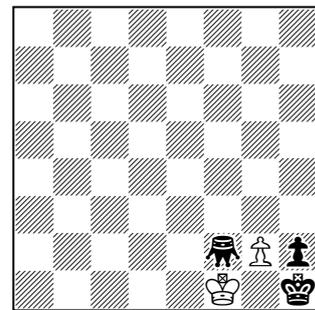
And three of my favourite problems by others, with answers again on page 12. **17** may be found difficult, but will reward the successful solver. **18** and **19** in contrast, are easy, but charm is more important than difficulty.



17 - Mate in three

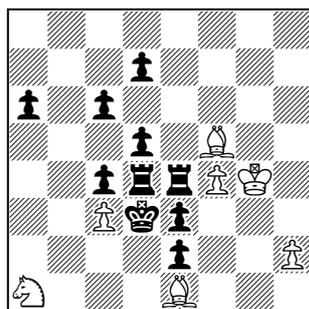


18 - Mate in three

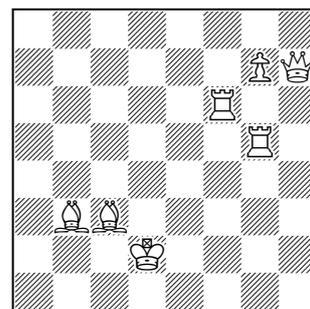


19 - Grasshopper f2; mate in six

And a final question relating to chess: if I were writing *51 Flights* today, would I do anything differently?



20 - Mate in eight



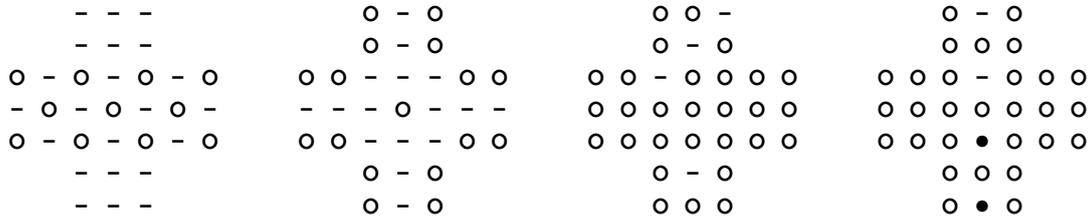
21 - Kriegspiel; see text

I might include the eight-mover **20**, despite its frankly horrid construction (answer on page 12), and I would restore the original text of the Kriegspiel problem **21**. In Kriegspiel, a player can see only his own men, and there is an umpire who tells him if he is attempting an illegal move or if he has just made a capture or given check. We are told that Black is down to a bare king (which White knows, since the umpire has announced fifteen captures), but that White does not know where this king is; mate in one. Well, on the face of it the Black king can be anywhere in the rectangle a8-e7, in which case White does not know precisely where it is but g8Q is mate in all cases, or it can be on a3, when there is no mate. But if it is on a3, it will just have moved out of check from a bishop, which the umpire will have announced, so White *does* know where it is. So this case does not arise, and **1 g8Q** is a complete solution.

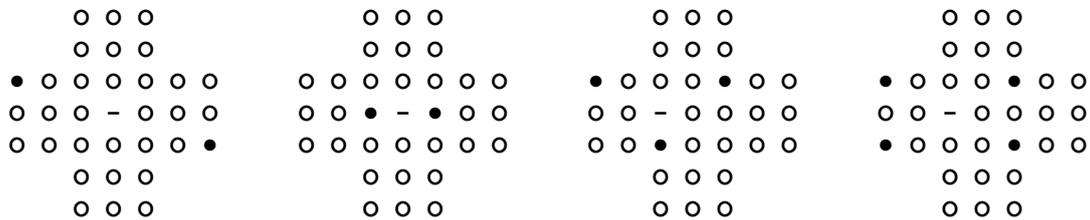
But what has been written, has been written.

Peg solitaire

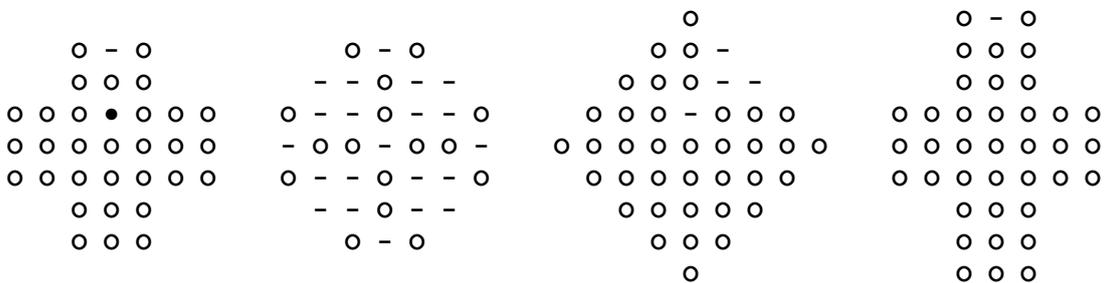
I did very little work on peg solitaire between the publication of *The Ins and Outs of Peg Solitaire* in 1985 and a few years ago. Here are some favourite problems both old and new.



In the first two problems, the central hole d4 is to be vacated, and the task is to play to the position given. (Peg solitaire uses an algebraic notation similar to that used for chess, but in solitaire we put row 1 at the top.) In the others, the holes denoted by dashes are to be vacated, and these are to be left occupied at the end, the black men being the survivors in the last problem. This is in *The Ins and Outs* with the man from d5 finishing at d1 and that from d7 at d3, but it can also be done (and is more difficult) the other way round.



In these four problems, the hole denoted by a dash is to be vacated and the black men are to be interchanged or cycled round, the rest of the board being cleared. In the third problem, the cycle may be in either direction.



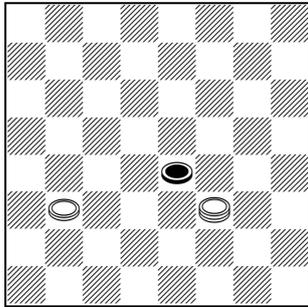
And four problems by others. The first is “Whither will he wander?”, which is in *The Ins and Outs* without acknowledgement in the belief that I had discovered it during our researches at Cambridge in 1961-62. Dic Sonneveld has since told me that it was one of the problems in an anonymous book *Der praktische Solitärspieler* which was published in 1808. The task is to vacate d1 and to play leaving the black peg as the final survivor, but the hole in which it is to finish is not specified. The 37-hole problem is “Le triolet”, which, although not difficult, is perhaps the most attractive of the problems in the articles in *Mercure Galant* 1697 which appear to be the earliest surviving references to the game (start by vacating d4). The 41-hole diamond board problem is a brilliant systematization by Paul Redon of the solvable single vacancy single-survivor problems on this board. Having vacated d2 or g5 – the central hole is now e5 – it is easy to reach the position shown, and the task is to play to the reflected position with men on d2/c3/d3/e4, whence a finish at f2 or c5 is again easy. The 39-hole problem (vacate and finish at d1) was found by George Bell in the course of a systematic examination by computer of boards comprising a central 3x3 square and arms of various lengths, and may be found the most difficult of the set. The solution is unique to within symmetry and ordering of jumps, and it is the only single-vacancy single-survivor problem I know, on a board of reasonable size and natural shape, whose solution is unique in this way.

Solutions to all these are on page 13. *The Ins and Outs* is out of print and is likely to remain so, but it should be in the Legal Deposit libraries and in other libraries which took the OUP series *Recreations in Mathematics*, and copies surface from time to time on the second-hand market.

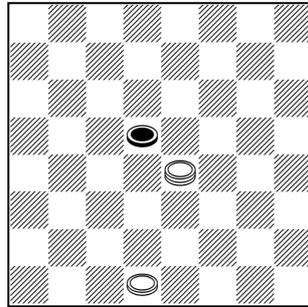
Unfinished business

Rugby games

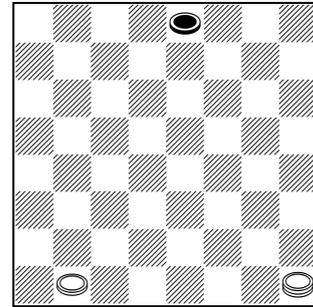
The essential features of rugby football are that (a) the object is to carry a ball to the opponent's goal line and (b) the ball may be passed only to a man further from this line than the man passing. Some years ago, it occurred to me to try to realise this game on a chessboard.



1 - White to play



2 - White has an easy win



3 - White has a more difficult win

1 illustrates my first attempt. Each side has one or more men (here, two against one), and one of the White men carries a ball. The White man with the ball may move one step diagonally in any direction, or may pass the ball to a man on a lower rank (the pass counts as a move). The White man or men without the ball cannot move. Black's man or men can move one square diagonally in any direction, and may capture the man with the ball but not a man without it (capture is by displacement, as in chess). White wins by taking the ball to Black's back rank, Black wins by stopping him (there are no draws).

In 1, White appears to have an easy win. He starts by playing **1 g4**, and Black's natural reply is **1...f5**. White now plays **2 pass** followed by **3-4 b5**, and Black must play **4...c6** to stop 5 c6 and 6-7 a8. White continues **5 pass** followed by **6-7 g6**, and Black must play **7...f7**; but now White passes again, **8 pass**, and Black cannot prevent **9-11 a8**.

But Black can do better: **1...d5!** He concentrates on the man without the ball, contenting himself with keeping an eye from a distance on the man with it. If White now passes, **2 pass**, Black plays **2...c4** and meets **3 a4** with **3...b5**, and White can never get far enough forward to pass back. Nor does it help White to delay his initial pass: **2-3 g6 f7 4 pass e6 5-7 a6 b7** and again White cannot get far enough forward to pass back, or **4 h7 g8 5 pass f7 6-8 a6 c6**. Position 1 is in fact a win for Black.

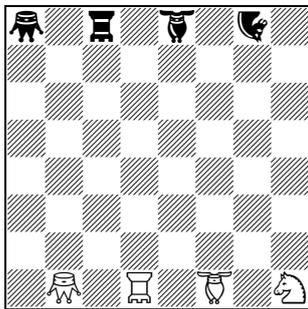
The most natural games to play with two against one start with all the men on their back ranks. In most cases this is a simple win for White. 2 shows the case with the man without the ball at d1. White has played **1-3 e4**, which he can always do, and Black has had to reply **3...d5** to prevent 4 d5 (after which White would score at either a8 or g8). White now plays **4 pass** and **5 e2**, after which things are easy (5...d- 6-8 h5 etc, or 5...f- 6-8 b5). Play with the man without the ball at f1 is just as easy, and play with this man at h1 is only slightly more difficult.

The most difficult case is shown in 3. Now an immediate advance to e4 fails, because Black can answer White's pass by 4...c4 and the new ball carrier will never cross the line a4-d1 (5 c2 d3 6-7 a4 b5, or 6 d1 e2). But White can still win, though it takes 27 moves against best defence. **1-3 e2 d5 4 pass c4 5 c2 d3** (5...b3 6 d3 c4 7 pass d5 8-9 g4 and as after move 13 below) **6 b3 c4 7 a4** (7 pass d3 8 f3 e4 gives 1) **d5!** (7...b5 8 pass c4 9-11 h5 f- 12 pass, or 11...d- 12 g6 and scores at g8) **8 b5 c6 9 c4!** (a completely counter-intuitive move backwards towards its own man) **d5 10 d3!!** (and another) **e4 11 pass d5** (11...f- 12 d1 e- 13-15 a4 b5 16 pass, or 15...d5 16-17 a6 b7 18 pass) **12-13 g4 d5** (13...f5 14 pass e4 14-15 b5 c6 16 pass) **14 f5 e6 15 e4!** (a third counter-intuitive move, but if 15 g6 f7 16 pass then 16...e6 and Black wins, or 16 h7 g8 17 pass f7) **d5 16 pass c4** (16...e6 17-18 b5 c6 19 pass) **17 e2 d5 18-20 h5 e6** (20...g6 21 pass) **21-22 h7 g8 23 pass** and **24-27 a8**.

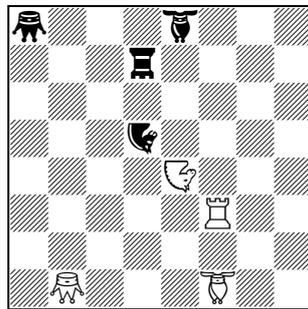
I wrote this up, with some additional material, as "Rugby Chess" in a paper for a meeting held by Anthony Dickens to celebrate the 90th anniversary of the birth of T. R. Dawson, and repeated most of it in *Some Flights of Chess Fancy*. *Some Flights* is long out of print and rarely appears even on the second-hand market, but each of the Legal Deposit libraries exercised its right to a copy, so it is accessible to anyone who really wants to see it.

The two-against-one rugby game having been solved, it was natural to try three men against two, but this collapses; all Black has to do is to post one man on c8 and mark time with the other on g8/f7, and White can never approach. But the game might be viable on a wider and perhaps deeper board.

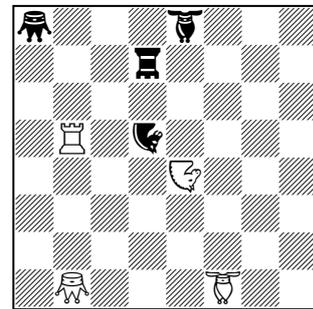
As an alternative to using a wider or deeper board, I tried the idea of having equal numbers of men on each side but with the restriction that the men were paired off, each Black man corresponding to one White man and one only, and only the Black man corresponding to the current ball-carrier being able to move. The game is conveniently played using ordinary chessmen, QRBN, but in the diagrams they are shown upside-down to indicate that they do not have their normal chess moves. The current ball-carrier is shown the right way up.



4 - White to play



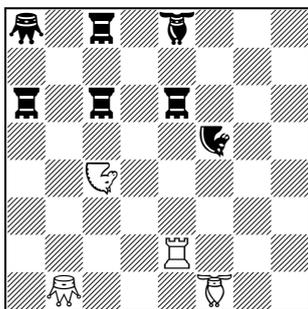
4a - 3...Nd5, 5...Rc-, 6...Rd7



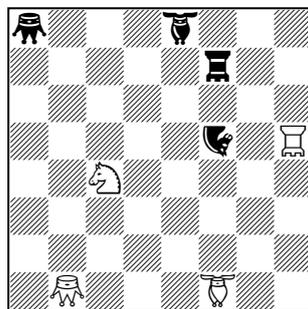
4b - 5...Re6, 6...Rf-, 8...Rd7

A natural starting position has the paired men facing each other, and as a first trial we might give the ball to the man on the extreme right (see 4). Let White play **1-3 Ne4**, and let Black reply **3...Nd5** (bad but instructive). White now plays **4 pass to R Rb7/Rd7 5 Re2**, and Black's R has four options: to play to a6, c6, e6, or back to c8. If **5...Ra6** then **6-11 Rg8**; if **5...Rc6/Rc8** then White again plays **6 Rf3** going for g8, Black must play **6...Rd7** to stop him, and with Black having blocked both d7 and d5 White can pass to his B and walk in at c8 (see 4a).

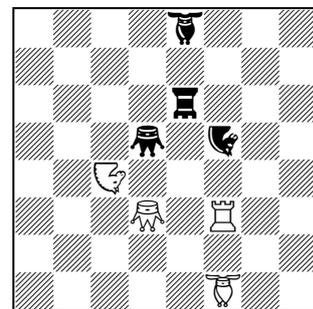
Better, therefore, is **5...Re6**. Now **6 Rf3** can be met by **6...Rf5**, but **6 Rd3** forces Black to make another choice. If **6...Rd7** then **7 pass to B Bf7 8-10 Bc2 Bxe4** (we have to allow Black to capture any White man, else the game becomes too easy for White) **11 Bb3 Bxd3**, and with the d-file completely blocked White can pass to his Q and walk in at e8 or g8 (or, if he prefers, play **12 Ba4 Bc4 13 pass to Q** and score one move sooner). If instead **6...Rf5/Rf7** then **7-8 Rb5** forces **8...Rd7** anyway, but now the previous line fails because on b5 White's R is blocking the path for his B (see 4b). Never mind: **9 pass to Q Qb7 10-11 Qd3** forces **11...Qxb5** removing the blocking man, and after **12-14 Qg4 Qxe4** White will again be able to pass to his B and walk in.



4c - 5 Nc4 Nf5, options at Black 7



4d - 7...Rc-, 10...Rf7, 11 pass



4e - 7...Re6, 8 pass to Q, 12...Re6

As a possible alternative, Black might try **3...Nf5**. Play might continue **4 Ne5 Ng6** (we leave the refutation of **5...Ne6** to the reader) **5 Nc4**, and if **5...Nf5** then **6 pass to R Rb7/Rd7 7 Re2** and again Black has four options (see 4c). **7...Ra6** once again lets White straight in at g8. If **7...Rc6/Rc8** then **8-10 Rh5** forces **10...Rf7**, and **11 pass to N** gives 4d. If **11...Ne4** then **12 Nb5 Nd5 13 pass to Q Qb7 13-15 Qe4 Qe6** (else **16 Qf5** and scores at g8), and with **f7/e6/d5** all blocked White can play **16 pass to B** and walk in; if **11...Ne6** then **12 pass to Q Qb7 13-14 Qd3 Qd5 15 pass to B** and the same.

There remains **7...Re6**. White can play **8 Rf3** and continue as before (**8...Rd7/Rd5** again allows **9-10 Rh5**, **8...Rf7** allows **9 pass to B** at once), but he has another option: **8 pass to Q Qb7 9-10 Qd3 Qd5 11 pass to R Rd7 12 Rf3 Re6** giving 4e. An immediate pass to B fails, but the waiting move **13 Rg2** forces Black to block d7 or f7, and **14 pass to B** then wins.

Although this analysis did not cover every possibility, I wrote most of it up in an article "Moving on from Fox and Geese" in issue 8 of *Abstract Games*, stressing that the play, as in the game on the previous page, arose from a natural starting position and not from a position specially composed. I have since returned to 4 and have satisfied myself that White can force a win against any defence, but the additional analysis offers nothing of particular interest and I have never published it. Nor have I examined any of the 95 other four-against-four back-rank starting positions, let alone looked at larger boards, so there is still work to be done here.

Scissors, paper, stone chess

This can be dealt with much more quickly. Capturing in ordinary chess is independent of rank; a pawn may capture a queen. In the Jungle Game (which also goes by various other names) capturing is influenced by rank: in general, a man can capture only an enemy man of lower rank.

While writing about this game in issue 40 of *Variant Chess*, it occurred to me to try out “Scissors, paper, stone chess”, in which capturing is allowed only as in the children’s playground game (scissors cut paper, paper wraps stone, stone blunts scissors). A first essay (board 5x5, each player has a king and three men of each other kind, all men move as kings, a king can capture or be captured by any man, other men capture only in the cases specified) indicated that the game was playable, and not without interest; a deeper investigation might of course lead to an exactly opposite conclusion. It will however be noticed that at least the final stage of the endgame makes sense, king and man against king being a win on all boards up to 14x14 (work by Marc Bourzutschky reported in *Variant Chess* 47).

Variant Chess (ISSN 0958-8248) is available on www.jsbeasley.co.uk, on George Jelliss’s excellent “Mayhematics” site www.mayhematics.com, and in most of the Legal Deposit libraries.

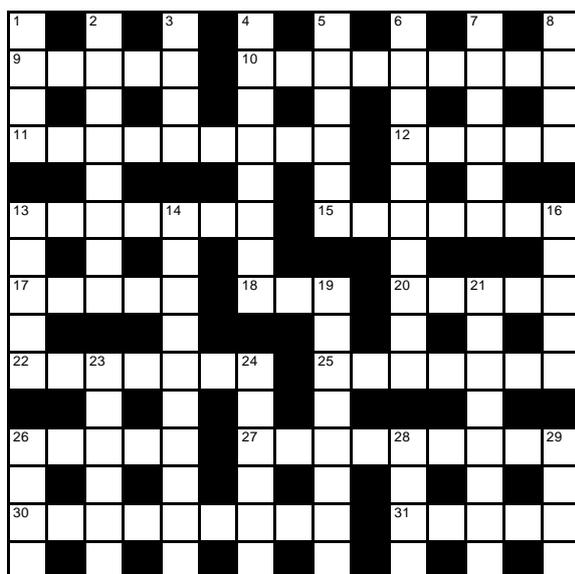
Peg solitaire

This also can be dealt with very quickly. *The Ins and Outs* is deficient in its treatment of historical matters, and its coverage of boards other than the standard 33-hole board is limited. Sooner or later, somebody is going to want to write a book in which these points are addressed. I shall not be writing this book myself, but as a first step I have donated all my peg solitaire papers to the Bodleian Library. Including the file which I donated in 1985, they comprise five well-filled A4 box and lever arch files, and I hope that any future writer who starts by spending a couple of days in Oxford will find his or her time rewarded.

Cryptic crosswords

A few years ago, I decided to try my hand at compiling cryptic crosswords. It was not a success. When you are trying to produce an ordinary puzzle, you have an idea, you set it as neatly and piquantly as you can, job done. With a cryptic crossword, you then have to fill in and clue the rest of the grid. This I found sheer drudgery, and the results were sadly pedestrian. I hoped that practice would bring fluency, but it didn’t. Perhaps it requires a different type of mind from mine, perhaps I merely started too late, but eventually I decided it would be more profitable to spend my time doing other things.

The exercise has however left me with some clues which I feel deserve an airing, and anyone who can make use of them is very welcome to do so. They all fit the diagram below, though not simultaneously.



- 6d** So polished, so polished? Not so polished! (10)
- 21d** Creative person resigned after half time (8)
- 10a** The results of genetic modification gone wrong... (4,5)
- 11a** ...and what they make (by changing the bulb?) (5,4)
- 27a** Thick fog developing after start of contest was cruel to the birds... (9)
- 30a** ...but at least they didn’t get this! (9)
- 1d/26d/29d/8d** Navigational instruction to half-witted band on manoeuvres (4,4,4,1,3)

And assuming that 1d/8d are HERD of COWS and that 16d/19d are FLOCK of SHEEP:

- 26d/29d** Military equivalent of 1d of 8d? (4 of 4)

Answers on page 16. And a favourite clue by someone else (sadly, I didn’t make a note of the name of the compiler, and I am quoting from memory):

Did he describe his hobby as bird-watching? (7)

Even after I had got S–O–N–R, it took a while for the penny to drop.

Inventing your own puzzles

We started with a remark by T. R. Dawson, that chess problem “composition” was a matter of scientific discovery. The same is true of all mathematical and logical puzzles. Either what you are trying to find exists or it doesn't; experience may guide you as to which avenues are likely to reward exploration, but whether anything is there to be found is a matter of pure luck.

It follows that the only way to discover new puzzles is to explore avenues as they occur to you and to see where they lead, and the enthusiast who does the most work is the most likely to be rewarded. But luck can still bring something quite out of the blue. Let me cite one final example from my own experience.

In his book *Bridge in the Menagerie* (1979 Faber edition, pages 112-114), Victor Mollo gives a hand in which the Hideous Hog, needing to make a greedy three no trumps on a hopeless misfit and having a bare ace-king of diamonds in dummy blocking a solid six-card suit in hand, holds up his ace in the suit led by the defenders, bluffs them into continuing it, discards his blocking ace-king on it, and romps home. It occurred to me to see if a similar mechanism could be used to settle a question about which I had long wondered, namely whether a deal could be constructed in which each of the four players, if declarer, could make three no trumps against any defence.

A little experimenting with blocked suits gave me the following.

```

      Q 10 9
    -
      A 8 7 6 5 4 3 2
                                K J
  
```

This will yield seven tricks only if there is a side entry to the long hand, because if the ace is played on the first or second round then the third round will be won in the short hand, and if the ace is held up until the third round the defence will take the first two tricks. However, if a preliminary discard can be made from the short hand, a first-round duck will set up the rest of the suit.

So I set up a deal with four such suits, and bingo!

```

      S Q 10 9
      H -
      D A 8 7 6 5 4 3 2
      C K J
  S -
  H A 8 7 6 5 4 3 2
  D K J
  C Q 10 9
      S K J
      H Q 10 9
      D -
      C A 8 7 6 5 4 3 2
      S A 8 7 6 5 4 3 2
      H K J
      D Q 10 9
      C -
  
```

Suppose the defence starts by leading a low heart. Declarer discards a spade from dummy and ducks a spade, setting up seven spade tricks to go with the ace of diamonds and the heart already in the bag, and the defence can take at most three more tricks before letting him in to make them. Much the same happens if the defenders take either or both of their aces before playing a low heart or club, and if the defenders broach spades or diamonds before taking their four tricks, declarer will make an overtrick.

What did the discovery of this puzzle involve? I had to have the idea of constructing a deal with this property, and I had to perform the experiments that showed up the properties of this particular 8-3-2-0 suit distribution. Setting up a deal with four such suits was then automatic, and most of the actual work consisted in checking and rechecking the play to make sure that the defenders had no way out. So yes, some work was involved, and perhaps some skill in selecting this particular blocked suit as a promising candidate for examination; but essentially the existence of this deal was a matter of pure luck, and all I had to do was to find it.

It might be added that the same deal was thrown up some years later by an exhaustive computer examination of all rotationally symmetric deals. This was independent rediscovery and the rediscoverer acknowledged the prior publication as soon as he became aware of it, but it does underline how the production of puzzles is essentially a matter of discovery.

I am sometimes asked by a would-be puzzle inventor how many puzzles he or she needs to produce for the effort to have been worth while, and my answer is very simple: “One good one.” May the luck be with you.

Solutions and notes

Chess and chess variants. Solutions to **1-13** are in the text. I remain surprised that positions equivalent to **11** and **13** have not appeared before (particularly **13**, since Loyd had shown the task in a three-mover as far back as 1898 and a setting in a study to win is not difficult to construct), but nobody has yet brought a prior appearance to my notice. **2** and **4** were published as “after J. E. H. Creed”, but I have long forgotten the Creed problems or sketches from which they were developed.

The reasoning behind **14** is that Black must keep his king on the same rank as White’s, and an even number of squares away. So White plays **1 Kh6! Kb6 2 Kh7! Kb7 3 Kh8!!** luring Black to his back line, **3...Kb8**, after which he can play **4 d5 exd5 5 f5** and promote with check.

A full treatment of **15** would be lengthy, but the heart of the matter is that White needs to bring his knight to d2, and the route via a3 and c4 fails against best defence because the White king will need to use c4 itself to get to d5. So **1 Na3** fails (**1...f3 2 Nc4 Kg5! 3 Kc2 Kg4 4 Kc3 Kg3** and White can make no progress); and the knight must travel via a1 and b3 leaving the c-file free for the king. Hence the first move is indeed **1 Na1!!** with the sequel **1...f3 2 Nb3 Kg5 3 Kc2 Kg4 4 Kc3 Kg3 5 Kc4! Kg4 6 Kd5 Kf4 7 Nd2 f2 8 Nf1** (or **5...Kf4 6 Kd3 f2 7 Nd2 Kg3 8 Ke3 Kg2 9 Ke2 Kg1 10 Kf3**).

A study like John Nunn’s **16** yields only to a flash of inspiration or to systematic trial and error, and **1 Ra2!!** is perhaps the last move that a normal solver would try. Yet it works: **1...bxa2 2 Bxb2 Kh7 3 Ke7 Kg6 4 Ke6** and White will mop up, or **1...b1Q 2 Rg2+ Kh7 3 Rg7+ Kh8 4 Rg1+**. John and I have differed markedly as to the merits of this. I think it a masterpiece. John thought, quite wrongly in my view, that it needed some introductory play, and let it languish unpublished for more than twenty years. Fortunately he eventually relented.

Fur fuller analyses of all these, see the second edition of *Endgame Magic*.

In **17**, try **1 Rb3** hoping for **1...fxg2 2 Rxh3 g1Q+ 3 Qxg1**: no, **1...hxg2**. Try **1 Rb4**, hoping for **1...hxg2 2 Rh4 g1Q+ 3 Qxg1**: no, **1...fxg2**. Play **1 Rb7! fxg2 2 Qa8! g1Q+** (or any other promotion) **3 Rb1**. I found this, without authorship or solution, in one of David Pritchard’s copies of *Nost-algia* (the magazine of the Knights of the Square Table, an American postal chess club) when I was working on *The Classified Encyclopedia of Chess Variants*. Brian Stephenson, having consulted Christian Poisson’s WinChloe database, tells me that it was by Otto Wurzburg.

In contrast, **18** is very easy, because **Kxh1** will give stalemate and a knight or pawn move will let the Black king out. Hence **1 Kh3**, with **1...Nxf2+ 2 Kh4 N-- 3 Nc7** and **1...Ng3 2 Bh2 N-- 3 Nb6**. The perceptive critic Alain White wrote of this lovely little echo that so simple and yet so happy a problem is remembered by the solver long after a more complex interweaving of themes is forgotten. Its composer, D. G. McIntyre, published it in a college magazine while still a schoolboy, and anybody who can produce something like this in his teens is going to become at least good and probably very good. McIntyre did indeed become very good, and there is a selection of his problems on the Orthodox Chess / Problems page of www.jsbeasley.co.uk.

V. Onitiu’s **19** is even easier, because White must release the stalemate and any king move will abandon the pawn. Hence **1 g3 Gh4 2 g4 Gf4 3 g5 Gh6 4 g6 Gf6 5 g7 Gh8**, and now comes the cheeky finale: **6 gxh8G!**

The trouble with **20** is that Black threatens to stalemate himself at move 6, so **1-5 h8Q** fails because White cannot lift the stalemate and still mate at move 8. However, he can lift the stalemate by **1-5 h8N! 6 Bh7 7 Ng6**, after which we have **7...Rxf4+ 8 Nxf4** and **7...Re- 8 N(x)e5**. Either you spot something like this or you don’t. I showed it before publication to fairy chess expert Cedric Lytton, who solved it at a glance, yet when it subsequently appeared in *The Problemist* another solver admitted to having spent an hour before the penny dropped. I omitted this from *51 Flights* because I thought not only that somebody would already have set the theme (**1-5 h8N, 6 Bh7, 7 Ng6** releasing stalemate) but that they would have done so more elegantly, but nobody has yet brought a predecessor to my attention so perhaps I was wrong.

Peg solitaire. Vacate d4 and play to leave the trellis a3/a5/b4/c3/c5/d4 etc. d2-d4, f3-d3, e1-e3, e4-e2, c1-e1-e3, d3-f3; g3-e3, g5-g3, e5-g5, c5-e5, a5-c5, a3-a5, c3-e3; c5-c3, c2-c4, c7-c5-c3; e6-c6, e7-c7-c5.

Vacate d4 and play to leave d4 plus four corners typified by e1/e2/f3/g3. d2-d4, f3-d3, e1-e3, d3-f3; c1-e1, c3-c1, c5-c3, a4-c4-c2; e5-c5, d7-d5, c5-e5-e3, g4-e4-e2. This is perhaps the hardest of the positions with square symmetry that can be reached from a central-vacancy start, and is the only one not given in the *Neueste Anweisung* of 1807.

Vacate c3/d2/e1/d6 and play to finish there. c1-e1, d4-d2, b4-d4-d6, d7-d5, f4-d4-d6; f5-d5, e7-e5, d5-f5; g5-e5, b5-d5-f5, e2-e4, g3-g5-e5-e3; a3-c3, f3-d3-b3, a5-a3-c3; c2-c4, c7-c5-c3. The other domino problems of this kind which can be solved are 1-0, 2-0, 2-1, 2-2, 3-0, 3-2, 4-0, 4-1, 4-2, and 5-0.

Vacate d1 and d3, put black men at d5 and d7, and play to leave the man from d5 at d3 and the man from d7 at d1. b3-d3, c1-c3, d3-b3, c5-c3, b3-d3; a5-c5, **d5-b5-b3**; c7-c5, f5-d5-b5, e4-c4, a3-a5-c5-c3; e7-e5; e2-e4, g3-e3, d3-f3, g5-g3-e3, e4-e2, e1-e3; **d7-d5-f5-f3-d3-d1, b3-d3**.

Vacate d4 and play to interchange the men at a3 and g5. b4-d4, c6-c4, a5-c5, c4-c6, c7-c5; d5-b5; d3-d5, f4-d4, d5-d3; f5-d5, e7-e5, d5-f5, d7-d5; e2-e4, g3-e3, e4-e2, e1-e3, d3-f3; b3-d3, c1-c3, d3-b3, d1-d3; **a3-c3-e3-g3, g5-e5-c5-a5-a3, g3-g5**.

Vacate d4 and play to interchange the men at c4 and e4. d2-d4, b3-d3, c1-c3, **c4-c2**; d4-d2, d1-d3, e3-c3, e1-e3, **e4-e2**; g3-e3; e6-e4, g5-e5, e4-e6; e7-e5, g4-e4-e6, c7-e7-e5; c6-c4, b4-d4; a5-c5, d5-b5, a3-a5-c5; **c2-c4-c6, e2-e4-c4, c6-e6-e4**.

Vacate c4 and play to cycle the men at a3/e3/c5. To cycle clockwise, play e4-c4, e6-e4, g5-e5, e4-e6; e7-e5, d5-f5, c6-e6, c7-e7-e5, f5-d5; g4-e4, **e3-e5**; g3-e3, d3-f3, b3-d3, c1-c3, d3-b3, e1-e3, f3-d3, **a3-c3-e3**; b5-b3, a5-a3-c3, d1-d3-b3, **c5-c3-a3, e5-c5**. To cycle anti-clockwise, c2-c4, **e3-c3**; e1-e3, e4-e2, e6-e4, g5-e5, e4-e6, g3-e3, e2-e4; e7-e5, d5-f5, c6-e6, c7-e7-e5, f5-d5; **c5-e5-e3**, a5-c5, **a3-a5, c3-a3**; c5-c3, g4-e4-c4-c2, c1-c3, d1-d3-b3-b5, **a5-c5**.

Vacate c4, and play to cycle the men at a3/e3/e5/a5. c2-c4, **a3-c3**, b5-b3, d5-b5, c7-c5, b5-d5; d4-b4, b3-b5, **a5-a3, e5-c5-a5**; d2-d4, d7-d5-d3; e7-e5, e4-e6, g5-e5, e6-e4, **e3-e5**; g3-e3, d3-f3, e1-e3, g4-e4-e2, c1-e1-e3, f3-d3, **c3-e3**. To go round the other way, reflect this solution top to bottom.

Vacate d1, put a black man at d3, and play to leave this as the last survivor. The point here is that it must finish far away at d7; no other finishing hole is possible. Play **d3-d1**, f3-d3, e1-e3, d3-f3; g3-e3, e4-e2, f5-f3, g5-g3-e3; d5-f5, e7-e5, e2-e4-e6, c7-e7-e5; b3-d3, d4-d2, c1-c3; b4-d4, c6-c4, d4-b4; a5-c5, f5-d5-b5, a3-a5-c5; **d1-d3-b3-b5-d5-d7**. To finish by going straight down the middle, play as far as d4-d2, and then continue b5-d5, c1-c3-c5, d5-b5, a5-c5, f5-d5-b5, a3-a5-c5, c6-c4, b4-d4, **d1-d3-d5-d7**.

37-hole board, vacate d4 and play to Le Triolet. d2-d4, b3-d3, d4-d2, d1-d3, b2-d2 and so on round: f4-d4, e2-e4, d4-f4, g4-e4, f2-f4 etc.

41-hole diamond board (central hole e5), vacate f2/f3/g3/e4 and play to finish at d2/c3/d3/e4. f5-f3, h4-f4, g6-g4, i5-g5, g4-g6, f7-f5, h6-f6, f5-f7, f3-f5; f8-f6, d7-f7, g7-e7, f5-f7-d7, c7-e7, d5-d7-f7, e9-e7, f7-d7, d8-d6; d3-d5-d7, b6-d6, c4-c6, a5-c5, c6-c4, b4-d4, d7-d5-d3-f3, e1-e3, f3-d3, e6-e4. As was remarked earlier, this can easily be extended to give solutions to “vacate d2 or g5 and play to finish at f2 or c5”. Most other single-vacancy single-survivor problems on this board can be proved unsolvable fairly easily; the exception is “vacate d2 and play to finish at f8”, which was proved to be unsolvable by Paul Redon in the issue of *Les Tablettes du Chercheur* for 1 May 1892. I would have acknowledged this excellent piece of analysis in *The Ins and Outs* had I been aware of it at the time. Like most of the early material not mentioned in *The Ins and Outs*, *Les Tablettes du Chercheur* (a small games-and-puzzles magazine which ran from 1891 to 1896) was brought to my attention by Dic Sonneveld. To the best of my knowledge, it is not held by any British library, but there are copies of the relevant pages in the files which I have donated to the Bodleian Library.

39-hole board, vacate d1 and play to finish there. d3-d1, d5-d3, f5-d5, e3-e5, e1-e3, e6-e4-e2; g6-e6, d6-f6, c5-e5, g4-g6-e6-e4; c1-e1-e3-e5, e8-e6-e4, f4-d4-d2; b4-d4, c7-c5, c9-c7, c2-c4-c6-c8; a6-c6, d8-d6-b6, a4-a6-c6; e9-c9-c7-c5, b5-d5-d3-d1. For a proof that this solution is unique to within symmetry and ordering of jumps, see a paper “New problems on old solitaire boards” which George Bell and I wrote for the Board Games Colloquium at Oxford in 2005 (available on the Peg Solitaire page of www.jsbeasley.co.uk).

Railway shunting. It is convenient to regard the tracks as if they were streams flowing from right to left and joining, so “up” and “above the points” are to the right.

B E . . . E M

S F . . . F

- S stops far enough short of the points to allow the main-line train to pull up to it without fouling them, M stops far enough short to allow S to come down to it.
- S detaches and goes into the siding, M pulls E...E above the points leaving B behind, and S emerges. We now have B and S below the points and E...EM / F...F above them (M need not connect to F...F).
- S detaches the lowest E, pushes it into the siding, and pulls the remaining E...E below the points, M extracts the E from the siding and pushes it up to F...F (it need not connect to them, but it must go far enough for the whole string MBE...E eventually to be fitted in without fouling the points). This gives B / SE...E below the points and ME / F...F above them.
- M pulls all but one of E...E above the points leaving the lowest E with S, S parks this E in the siding and pulls the remaining E...E below the points, M extracts the E from the siding and pushes it up to join the first E. This is repeated for each of the remaining E...E in turn, eventually giving B / S alone below the points and ME...E / F...F above them.
- S goes into the siding, M pulls B above the points, S emerges and puts B into the siding, S and M come below the points, and M extracts B from the siding and pushes it up to join E...E. We now have S alone below the points and MBE...E / F...F above them.
- S goes into the siding, M pulls BE...E below the points, S emerges and couples to the lowest F. We now have MBE...E below the points and SF...F above them.
- S puts the lowest F into the siding and pulls BE...E above the points, M extracts the F from the siding and pushes it up to join BE...E. We now have nothing below the points and MFBE...ES / F...F above them.
- M pulls FBE...E below the points, S puts the next F into the siding and pulls FBE...E above the points, M extracts the F from the siding and pushes it up to join the F at the bottom of the string. This is repeated for each of F...F in turn, eventually giving MF...FBE...ES above the points.
- The trains divide above the brake van and go their separate ways.

Each wagon visits the siding once, as does the brake van.

Problems of this general kind have been around for a long time, and the provision only of a dead-end siding restricted to holding a single vehicle was done by Dudeney (problem 374 in Martin Gardner’s 1967 edition *536 Puzzles and Curious Problems*). The elements in the present version that may be original are the setting of the task on a branch leading from the main line to a mine, and the restriction that only one vehicle may be pushed at a time. I posted the puzzle in this form on the Other Games and Puzzles page of www.jsbeasley.co.uk in November 2015, with an invitation to readers to tell me of any previous appearance. None has yet done so.

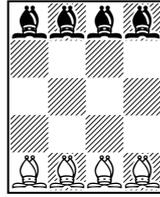
Bridge. To give yourself a chance of making Four Hearts on

	S	A	5	2		
	H	Q	10	8	6	5
	D	K	3			
	C	A	7	4		
D	Q	led				
	S	9	7	4		
	H	A	K	9	3	2
	D	A	2			
	C	K	6	3		

even if East ruffs the opening lead, cover the queen of diamonds with the king, and if East ruffs throw your ace as well. Now you can still succeed if West has exactly one spade and either one or two clubs. Win East’s return, draw trumps, cash your winners, and exit with the two and three of diamonds. West will have to win, and will have to lead another diamond. Throw a club from dummy and a spade from hand, leaving West on play. West leads a fourth diamond; ruff in dummy and throw a second spade from hand, and make the rest on a cross-ruff.

I saw this little gem many years ago in (I think) *Bridge is Only a Game* by Hubert Phillips. I am quoting from memory, but I think the essentials are correct.

The bishop problem

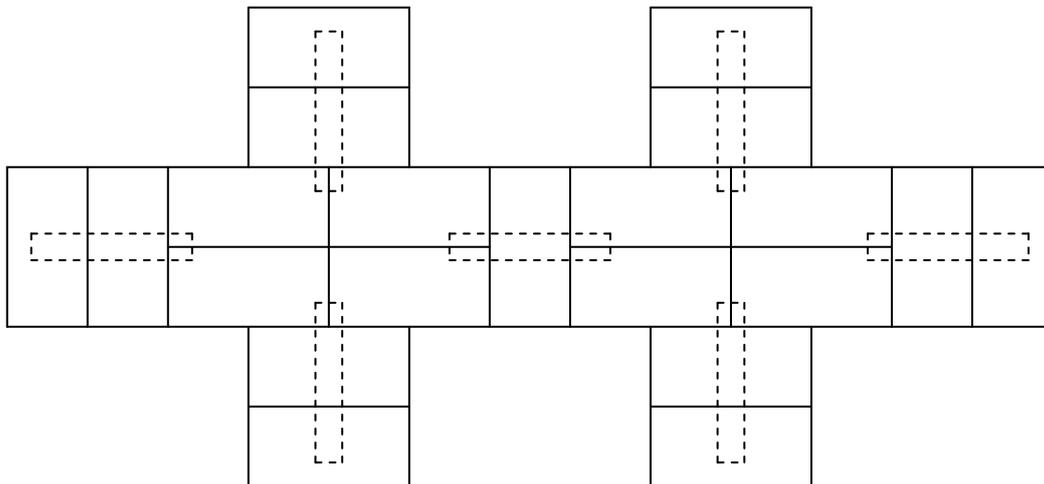


appears at first sight to consist of two independent problems, since the light-squared and dark-squared bishops never interact. If however we consider the light-squared bishops alone, we find that the problem cannot be solved unless we allow the same player to make two moves in succession. With this concession, a solution (Black's moves in bold) is c1-b2, **a5-d2**, **c5-b4**, b2-d4, **b4-a3**, **d2-c1**, d4-c3, c3-a5, **a3-c5** (the bishops at c1 and a5 have changed places, but that at c5 has gone back home and that at a1 has never moved), **c1-a3** (now we play the same moves in reverse, reflecting top to bottom, which will have the effect of interchanging a1 and c5), a1-c3, c3-d2, **c5-d4**, **a3-b2**, d2-b4, **b2-c1**, **d4-a1**, b4-c5. Dudeney, whose problem this is (it is number 327 in *Amusements in Mathematics*), prefaces the main problem with this simpler problem on a ten-point diamond lattice, using red and white counters instead of black and white bishops so that there is no unjustified assumption by the solver that the two colours have to move alternately.

However, we have to interchange the dark-squared bishops as well, and if we start with Black and play the diametrical reflections of the moves above (**b5-c4**, d1-a4, b1-c2, etc) we find that the light-square and dark-square solutions exactly complement each other; where the light-square solution demands a White move, the dark-square solution demands a Black, and vice versa. We can therefore alternate Black and White moves by playing the two solutions in parallel, always choosing the White move first and then the Black. This gives (dark-square moves in italics) c1-b2, *b5-c4*, *d1-a4*, **a5-d2**, *b1-c2*, **c5-b4**, b2-d4, *c4-a2*, *c2-d3*, **b4-a3** (everything is now down the sides), *a4-b5*, **d2-c1**, d4-c3, *a2-b3*, c3-a5, *b3-d1*, *d3-b1*, **a3-c5** (halfway there, the bishops at c1/a5 and d1/b5 having changed places and the others either having gone back home or never having moved), *b5-d3* (now we reverse), **c1-a3**, a1-c3, *d5-b3*, c3-d2, *b3-a4*, *b1-a2*, **c5-d4** (everything is down the sides again), *d3-c4*, **a3-b2**, d2-b4, *a4-c2*, *c4-b5*, **b2-c1**, *a2-d5*, **d4-a1**, b4-c5, *c2-b1*.

One of Dudeney's best, in my opinion.

Dominoes. A solution which works with typical shop dominoes, at least when reasonably new, is shown below.



Either or both of the 4x2 rectangles at the crossing points can be set north-south instead of east-west.

It might almost be a plan for a futuristic bus station.

The cow, the horse, and the sheep. Let $G > 0$ be the number of units of grass in the field, and c, h, s the number of units the cow, the horse, and the sheep eat in a day. Then, on the face of it, we have

$$\begin{aligned}2c + 2h + 2s &= G, \\3c + 3h &= G, \\4c + 4s &= G, \\6h + 6s &= G,\end{aligned}$$

and these equations are soon seen to be inconsistent. So the problem would appear to have no solution.

However, grass grows. Suppose that it grows g units in a day; then to graze the field bare in D days the animals must eat not just the G units of grass that were there at the start but also the Dg units that have been growing while they have been eating. This gives the revised equations

$$\begin{aligned}2c + 2h + 2s &= G + 2g, \\3c + 3h &= G + 3g, \\4c + 4s &= G + 4g, \\6h + 6s &= G + 6g,\end{aligned}$$

from which $c = G/3, h = G/4, s = G/6$, and $g = G/4$.

So, assuming that the grass grows at a constant rate per day, the cow alone can graze it bare in 12 days, but the horse can only keep up with the new growth and will never graze the field bare at all, while the sheep will be overwhelmed because the grass will be growing half as fast again as the sheep can eat it.

Problems like this are ancient, but are normally set with taps filling a cistern. The first to set the problem with grass in a field and apparently one stipulation too many, and to require the solver to allow for the fact that the grass must be growing, appears to have been Loyd. In his 1914 *Cyclopedia of 5,000 Puzzles*, pages 47 and 345, he has goat and goose for my horse and sheep, uses 45 / 60 / 90 days for the times taken by the animals in pairs, says that the goat and goose together eat as much as the cow, which requires the grass to be growing if the stipulations are not to be inconsistent, and asks how long all three will take together (it turns out to be 36 days).

I published the present formulation on the Other Games and Puzzles page of www.jsbeasley.co.uk in August 2014, with an invitation to readers to tell me if it had been used before. None has yet done so.

Is it fair just to say “graze” or “grass” in the statement of the problem, and to leave the solver to realise that the grass must be growing? Loyd apparently thought so, and so do I.

What counts 0, 1, 2, 3, 4, 9, 8, 7, 8, 9? A faulty seven-segment display in which the upper right-hand segment is permanently “on”.

Chris Maslanka used this in his “Pyrgic Puzzles” in *The Guardian* on 25 August 2012, with a note that I had seen one of the station clocks at Haywards Heath doing just this some twenty years before. David Singmaster has a version with the faulty segment permanently “off” (problem 163 in his book *Problems for Metalogologists*), but to have it permanently “on” allows a simpler and more natural setting.

Cryptic crossword solutions:

So polished, so polished? Not so polished!	SHOPSOILED (anagram)
Creative person resigned after half time	DESIGNER (half time, change ends)
The results of genetic modification gone wrong...	MANY HANDS
...and what they make (by changing the bulb?)	LIGHT WORK
Thick fog developing after start of contest was cruel to the birds...	COCKFIGHT (anagram of THICK FOG after C)
...but at least they didn't get this!	HENPECKED
Navigational instruction to half-witted band on manoeuvres	LEFT HAND DOWN A BIT (anagram of HALF WITTED BAND ON)
Military equivalent of HERD of COWS?	LOAD of BULL

“Left hand down a bit” was an all-purpose command issued by Sub-Lt Phillips, the splendidly incompetent navigating officer on board *HMS Troutbridge* in the BBC radio sitcom *The Navy Lark*. On one occasion, being ordered to proceed from Southampton to Portsmouth, he ended up in the Manchester Ship Canal.

Anyone who can make use of any of these is warmly invited to do so, but please don't send the result to one of Mr Murdoch's newspapers.

And the gentleman who might have described his hobby as bird-watching? SPOONER !