



THE PUZZLING SIDE OF CHESS

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CHESS MAZES: TORONTO STYLE

number 69

September 27, 2014

People have been making *mazes* since before history began. The monumental labyrinths of ancient Egypt and Crete date back over 4000 years.

Mazes come in all shapes and sizes. Some are just lines on a sheet of paper. Others are big enough to walk through. The *hedge maze* shown below is located in St. Louis, the chess capital of the United States.



Missouri Botanical Garden

Mazes are constructed from all sorts of material. They can even be made with chess pieces!

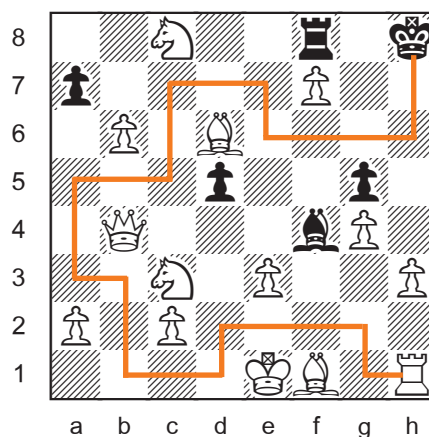
Here are the instructions for the puzzles in this column.

Chess Mazes

1. The object is to capture the black king in the stipulated number of moves (the shortest path through the maze).
2. Only one designated white piece (“the maze piece”) is allowed to move. Black does not get a turn.
3. The maze piece may not move to a square attacked by a black piece. It may cross over an attacked square.
4. The maze piece may not capture a black piece.

Here is a simple example. Arrows are drawn on the diagram to show the solution.

Chess Maze 00



Rook Maze in 14

Only the white rook moves. Capture the black king in fourteen moves, without taking any pieces or moving where the rook can be taken.

The solution can also be written in notation.

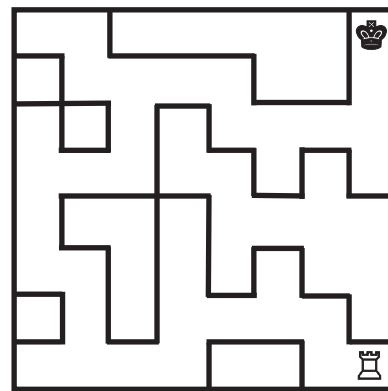
Rh1-g1-g2-d2-d1-b1-b3-a3-a5-c5-c7-e7-e6-h6xh8

The thing that distinguishes my mazes from others you may have seen is that captures are not allowed. Aleksey Bartashnikov in his program *Chess Mazes* (1998) and Bruce Alberston in his popular book *Chess Mazes* (2004) both allow captures.

In this example, if captures were permitted, then a shorter solution would be Rh1-g1-g2-d2xd5-f5-f6-h6xh8.

By definition, mazes are puzzles with *fixed walls*. The solver is not allowed to climb over or break through a wall. Can you imagine taking a ladder or a chainsaw to a hedge maze in order to find a shorter path? From my perspective, that is the equivalent of capturing pieces in a chess maze.

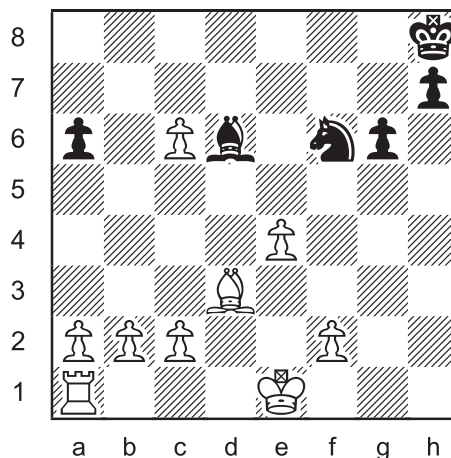
On a chessboard, the pieces and the attacked squares form the walls and halls of the maze. The rule forbidding captures maintains that fixed structure and makes the problems much more “maze-like”. Here is a schematic view of the sample puzzle which accentuates these features.



There are nine puzzles in this column. As usual, they get more difficult as we make our way to the end.

Some solvers may find it easier to print the diagrams and use a pencil to trace their path through the maze.

Chess Maze 01

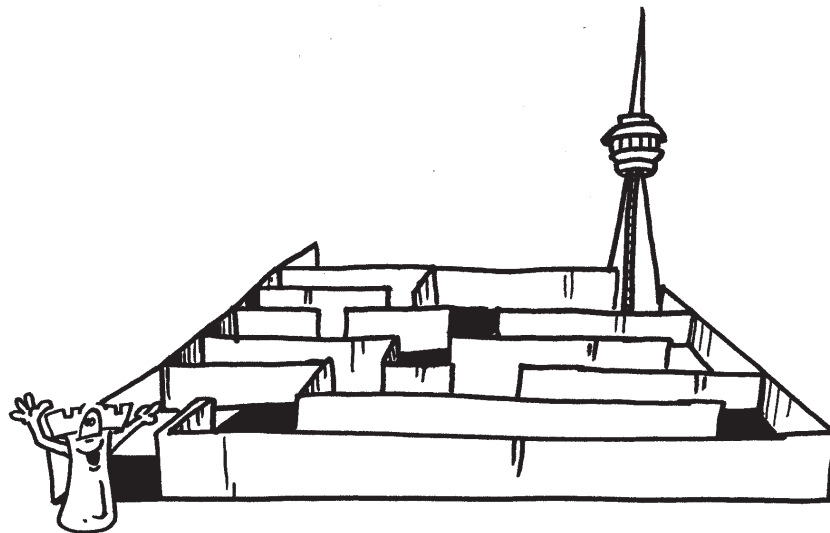


Rook Maze in 17

Only the white rook moves. Capture the black king in seventeen moves, without taking any pieces or moving where the rook can be taken.

I first began composing chess mazes in Toronto around 1990. Two of my private students were in kindergarten and I needed an exercise that would improve their ability to see which squares were attacked. As every chess instructor knows, young beginners have a tendency to give pieces away for free.

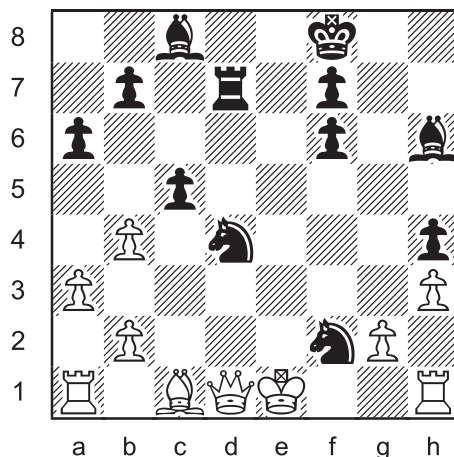
The mazes were fun and seemed to have the desired effect, so I started to use them in my classes too. I was surprised by how much enthusiasm they generated, even among the stronger players. Within a couple years I had made more than a hundred mazes.



Since I became editor of *Scholar's Mate* magazine in 1994, at least two mazes have been included in each issue. Some were also published by Al Woolum in *The Chess Tactics Workbook* (2000), an excellent introductory and intermediate level book.

The next puzzle is a queen maze.

Chess Maze 02



Queen Maze in 14

Only the white queen moves. Capture the black king in fourteen moves, without taking any pieces or moving where the queen can be taken.

The world's largest botanical maze is on the Hawaiian island of Oahu. It covers three acres (12,700 m²) with paths totalling 2.4 miles (4 km)! Can you guess what the theme is?



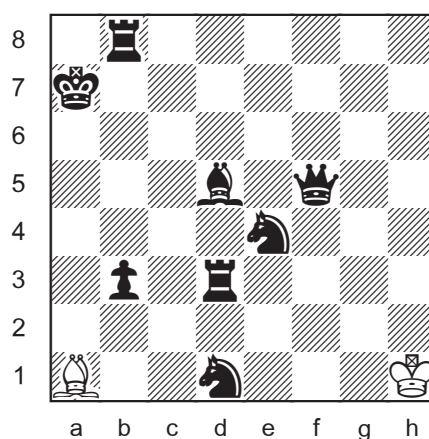
Dole Pineapple Plantation

In problem terminology, a chess maze is a *conditional series-mover*. White plays a specified number of moves in a row to check the black king, with the additional conditions that only one designated white piece may move and it may not capture or move to a square attacked by Black.

Stating the objective as “capture the black king” is more maze-like than simply “check the black king”. The checking piece takes one final step to complete the maze path. Both stipulations are essentially the same.

Bishops are probably the easiest piece to manoeuvre through a maze. Their playing field only consists of thirty-two squares.

Chess Maze 03



Bishop Maze in 12

Only the white bishop moves. Capture the black king in twelve moves, without taking any pieces or moving where the bishop can be taken.

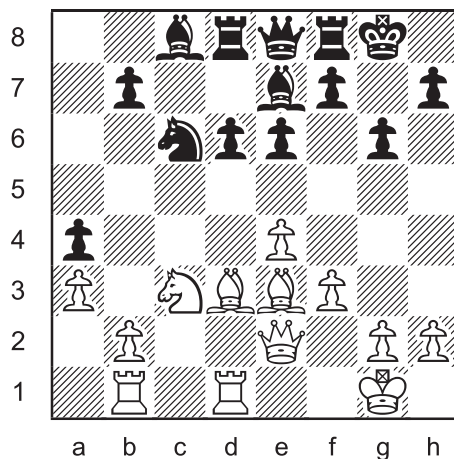
In 2010, the record for largest *ice maze* was set in Buffalo, New York, breaking the mark previously held by Toronto. The maze was nearly 13,000 square feet (1200 m²).



Are you a Bills fan?

Because of his leaping motion, the knight is not naturally suited for maze work. But don't say that to his face.

Chess Maze 04



Knight Maze in 13

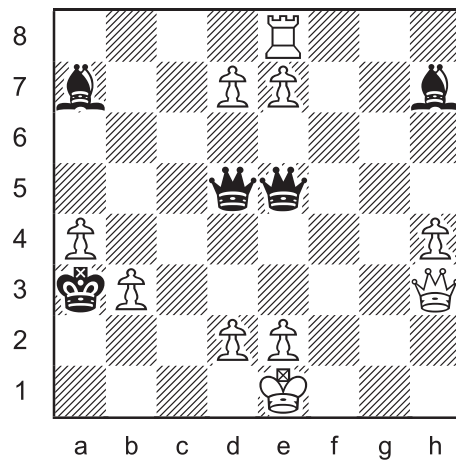
Only the white knight moves. Capture the black king in thirteen moves, without taking any pieces or moving where the knight can be taken.



Longleat Maze, England

Chess mazes come in various styles. Positions can be game-like or totally obscure. The next two puzzles provide some interesting geometry.

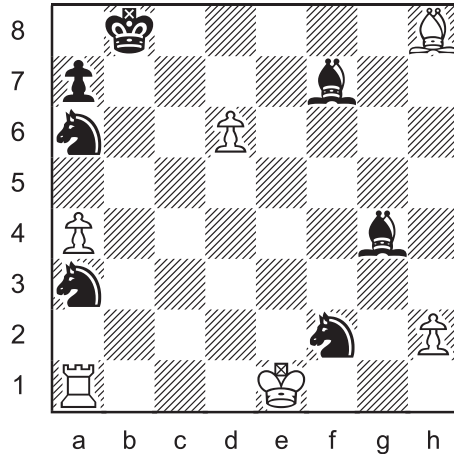
Chess Maze 05



Queen Maze in 7

Only the white queen moves. Capture the black king in seven moves, without taking any pieces or moving where the queen can be taken.

Chess Maze 06



Rook Maze in 14

Only the white rook moves. Capture the black king in fourteen moves, without taking any pieces or moving where the rook can be taken.

So what are you doing for Halloween? Some folks in Idaho are celebrating with a *haunted straw maze*! Scary monsters and darkened hallways. A sure formula for fright and delight. Here's what it looks like in the daylight.



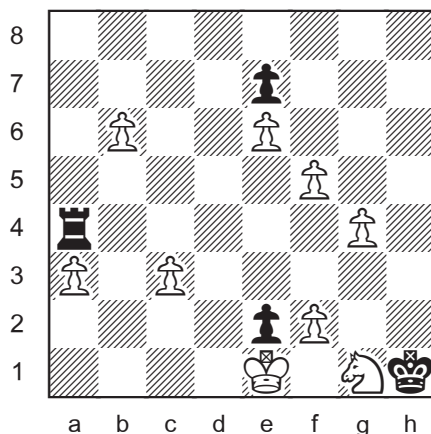
Rexburg, Idaho

Speaking of Halloween, that's the deadline for the *2014 Chess Cafe Puzzlers Cup*. Four weeks and counting.

One effective method of solving mazes is to work backwards from the black king. Once students discover this trick, they are often heard to say, "These are too easy!"

To combat that dreaded sentence, I found ways to complicate the mazes and hinder their retro technique. Endless loops and reverse blind alleys.

Chess Maze 07

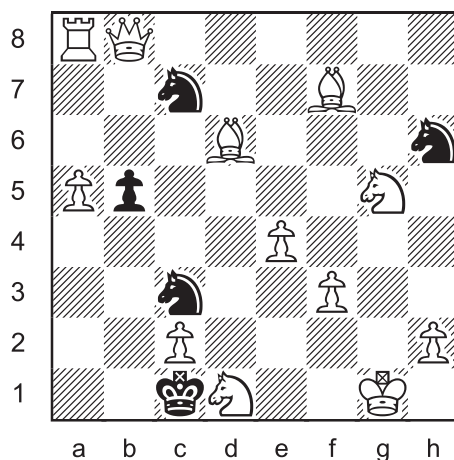


Knight Maze in 13

Only the white knight moves. Capture the black king in thirteen moves, without taking any pieces or moving where the knight can be taken.

The current record length for a chess maze is thirty moves, with a rook. The knight is second at twenty-nine.

Chess Maze 08



Rook Maze in 30

Only the white rook moves. Capture the black king in thirty moves, without taking any pieces or moving where the rook can be taken.

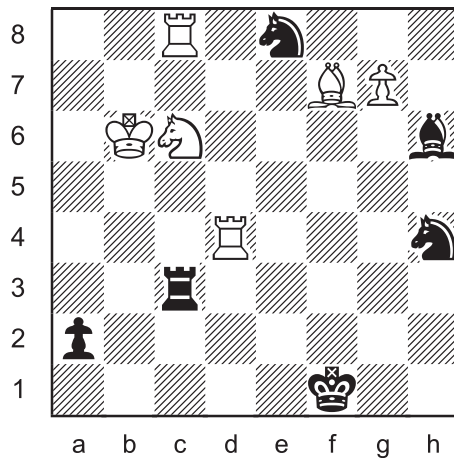
A hedge maze was built in 1967 on the Toronto Islands in Lake Ontario. After years of neglect, it was finally removed in 2011. But funding was recently donated and a new maze is being designed to take its place, using 1200 cedar trees. Scheduled to open in the spring of 2015.



The Birth of a Maze

In a pawn maze, the task is to determine which kind of promoted piece can get through the maze the fastest. Is it a knight, or a bishop, or a rook? Otherwise the rules are the same.

Chess Maze 09



Pawn Maze

Only the white pawn moves. When it reaches the last rank, it may become a rook, bishop, or knight. But not a queen. After the promotion, only the promoted piece moves. Find the shortest path to capture the black king, without taking any pieces or moving to a square attacked by a black piece. It is possible to go through the maze with a rook, bishop, or knight. Figure out which piece has the shortest path, and which the longest. And which the in-between!

SOLUTIONS

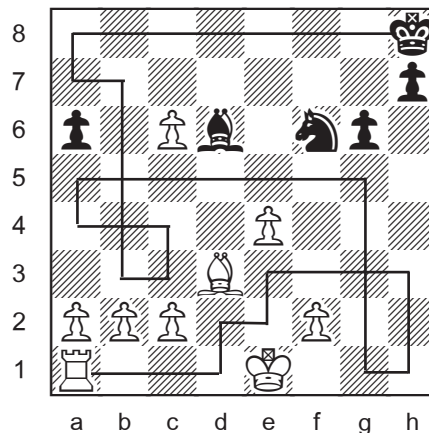
All chess mazes by J. Coakley. Numbers 1,2,3,5,7 are from *Winning Chess Puzzles For Kids* (2006). Numbers 4,8,9 from *Volume 2* (2010). Those that appeared previously in *Scholar's Mate* are credited above the solution diagrams. Maze 00 is a *ChessCafe.com* original (2014).

PDF hyperlinks. You can advance to the solution of any puzzle by clicking on the underlined title above the diagram. To return to the puzzle, click on the title above the solution diagram.

For more mazes, with slightly different rules, see the columns by Bruce Alberston. His book *Chess Mazes* is available from Chess Cafe.

Chess Maze 01

The Chess Tactics Workbook (2000)
Scholar's Mate 58 (2001)



Rook Maze in 17

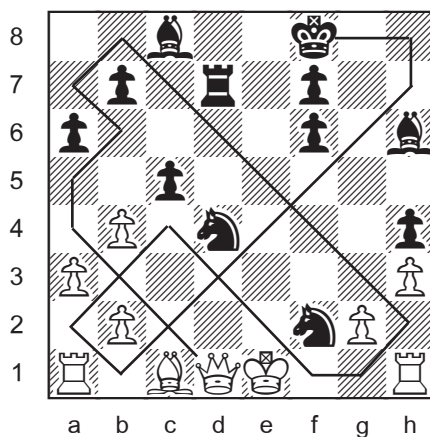
Ra1-d1-d2-e2-e3-h3-h1-g1-g5-a5-a4-c4-c3-b3-b7-a7-a8xh8

Three “rook hooks” (crossing its previous path) are the highlight of this maze.



Chess Maze 02

Scholar's Mate 28 (1995)



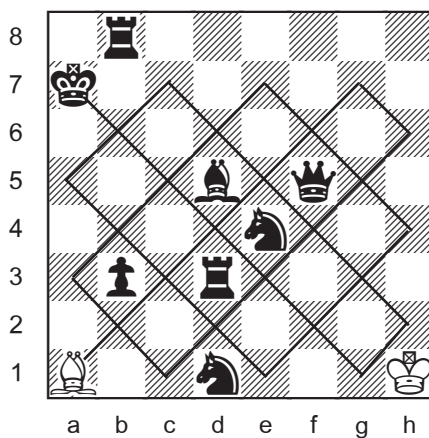
Queen Maze in 14

Qd1-a4-a5-b6-a7-b8-h2-g1-f1-c4-a2-b1-h7-h8xf8

“Around the world” with her majesty.

Chess Maze 03

Scholar's Mate 24 (1994)



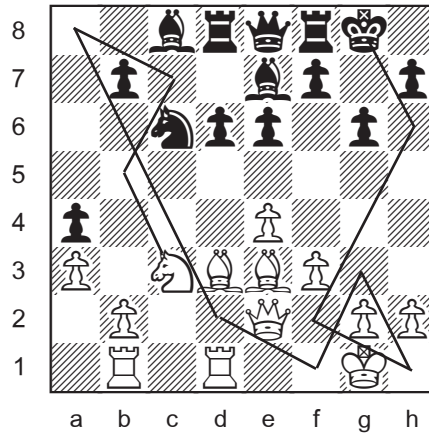
Bishop Maze in 12

Ba1-g7-h6-c1-a3-e7-h4-e1-a5-c7-h2-g1xa7

A perfect “grid” by the talented bishop.

Chess Maze 04

Scholar's Mate 92 (2008)



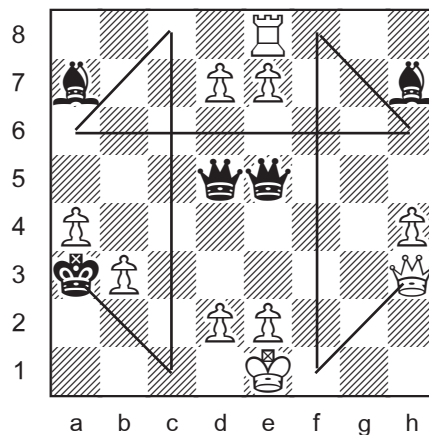
Knight Maze in 13

Nc3-b5-c7-a8-b6-c4-d2-f1-g3-h1-f2-g4-h6xg8

The agile horse demonstrates his prowess in confined quarters.

Chess Maze 05

Scholar's Mate 30 (1995)



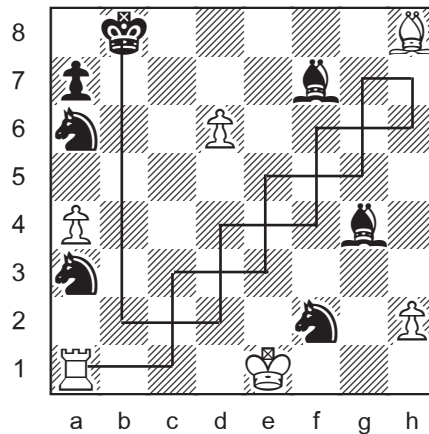
Queen Maze in 7

Qh3-f1-f8-h6-a6-c8-c1xa3

Inside-out octagon.

Chess Maze 06

Scholar's Mate 112 (2012) version



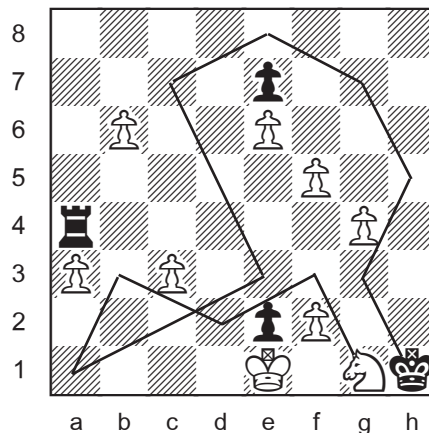
Rook Maze in 14

Ra1-c1-c3-e3-e5-g5-g7-h7-h6-f6-f4-d4-d2-b2xb8

Double helix on a chessboard.

Chess Maze 07

Scholar's Mate 38 (1997)

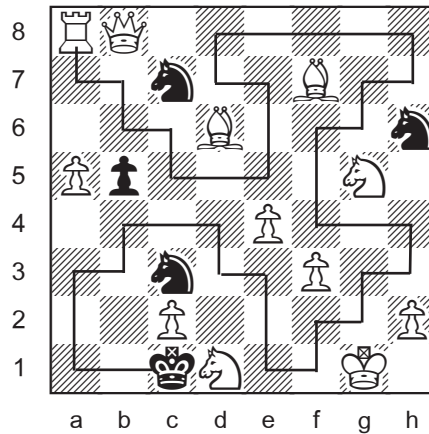


Knight Maze in 13

Ng1-f3-d2-b3-a1-c2-e3-d5-c7-e8-g7-h5-g3xh1

Did you get caught in the loop centred on e5 that includes b7 b8 c5 c6 d3 d7 d8 e5 f3 f7 f8 g5 g6 h3 h4 h7 h8? It really complicates the forward choices. But the backwards method still works pretty well.

Chess Maze 08

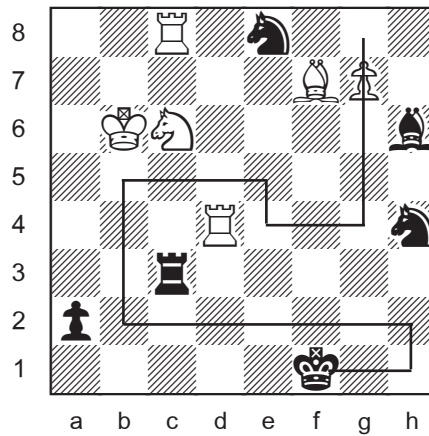


Rook Maze in 30

Ra8-a7-b7-b6-c6-c5-e5-e7-d7-d8-h8-h7-g7-g6-f6-f4
-h4-h3-g3-g2-f2-f1-e1-e3-d3-d4-b4-b3-a3-a1xc1

A long but relatively easy puzzle to solve. Very difficult to construct.

Chess Maze 09

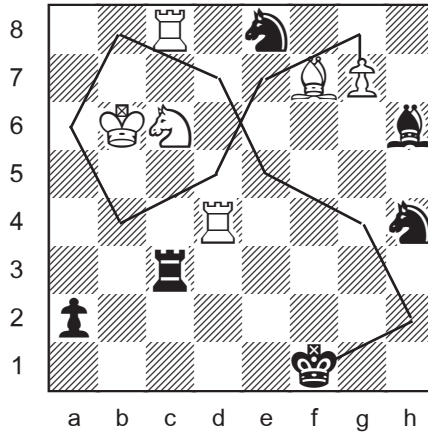


Pawn Maze (rook promotion)

The rook is the fastest. Nine moves.

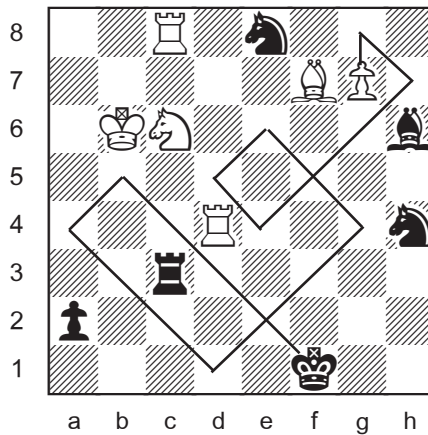
g7-g8=R-g4-e4-e5-b5-b2-h2-h1xf1

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Pawn Maze (knight promotion)

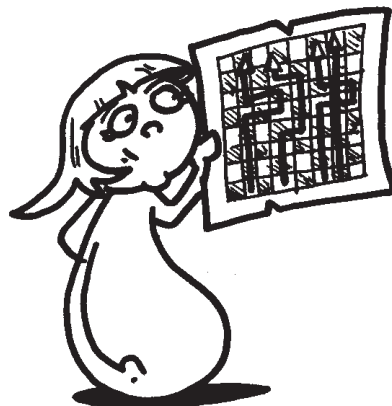
The knight is slowest. Eleven moves.
 $g7-g8=N-e7-d5-b4-a6-b8-d7-e5-g4-h2xf1$



Pawn Maze (bishop promotion)

The bishop is middle of the road. Ten moves.
 $g7-g8=B-h7-e4-d5-e6-g4-d1-a4-b5xf1$

For more pawn mazes, see *Scholar's Mate 108*, available for free in pdf format at www.chess-math.org.



continued next page

The Toronto Islands as seen from the CN Tower, the tallest freestanding structure in North America.



Somewhere out there, a maze is growing.

Amazingly, I avoided using the word ‘amaze’ in this column.

Until next time!

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