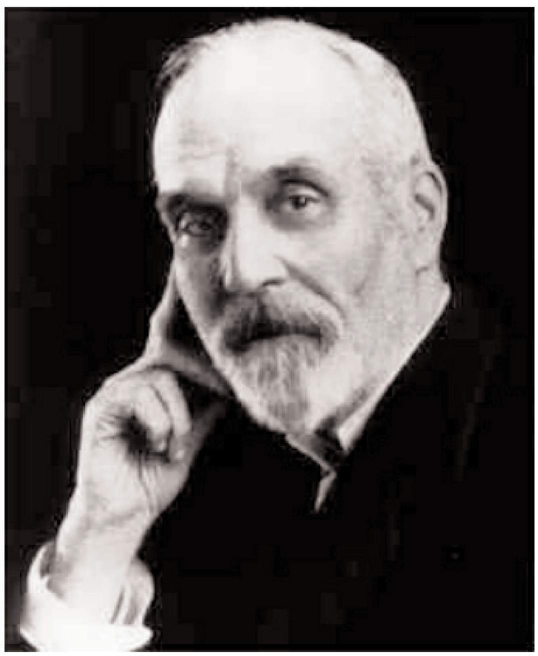
THE PUZZLING SIDE OF CHESS

Jeff Coakley

THE FIVE COIN DUDENEY

number 82 February 13, 2015

Get out your lucky pennies. It's Friday the 13th! And time for round two of *artist appreciation month*, featuring four more puzzles by the great Henry Dudeney. Plus a couple Cafe originals.



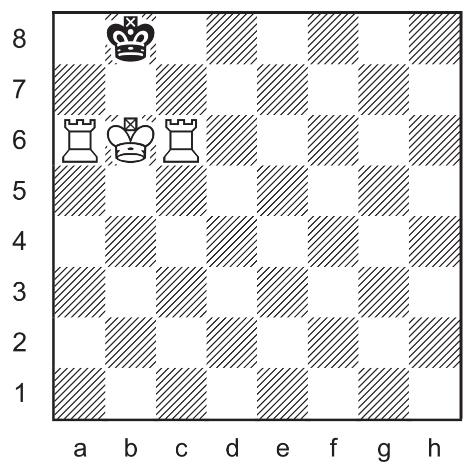
HENRY DUDENEY

"It is extraordinary what fascination a good puzzle has for a great many people. We know the thing to be of trivial importance, yet we are impelled to master it, and when we have succeeded there is a pleasure and a sense of satisfaction that are a quite sufficient reward for our trouble, even when there is no prize to be won. What is this mysterious charm that many find irresistible? Why do we like to be puzzled? The curious thing is that directly the enigma is solved the interest generally vanishes. We have done it, and that is enough. But why did we ever attempt to do it?"

That quote is from Dudeney's first book, *The Canterbury Puzzles* (1907). His answer to the final question is given at the end of this column, just before the solutions.

Our first problem is a conditional mate in three from *Amusements in Mathematics* (1917). White must give mate on their third turn. Mate in two is not allowed. Additionally, each white move has to be made with a different piece. Dudeney calls it an "ancient Chinese puzzle".

1

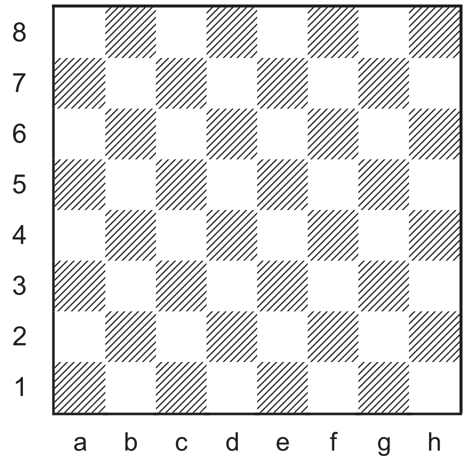


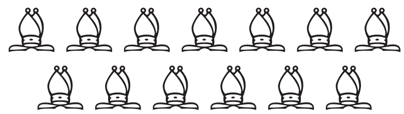
White to mate in exactly 3 moves.
Each white piece may only move once.

The next item in the exhibition has three parts. The first is a monochrome version of a Dudeney sketch titled *The Bishop Convocation*. The other two are fresh off the easel.

In the context of this puzzle, the words 'attack' and 'defend' are synonymous. 'Defend' is used in part C because that type of task is called a *defensive loop*.

2





2A

Dark B Independence

What is the most dark-square bishops that can be placed on the board so that none attack each other? How many different solutions are there?

2B

Dark B Double Attack

What is the most dark-square bishops that can be placed on the board so that each is attacked exactly twice?

2C

Dark B Double Defensive Loop

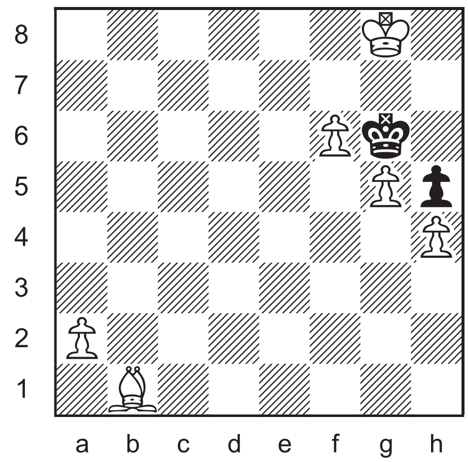
What is the most dark-square bishops that can be placed on the board so that every bishop is defended exactly twice and the “defensive chain” forms a single continuous loop?

The first piece guards the second piece; the second guards the third; the third guards the fourth; ...; and the last piece guards the first.

In *Amusements in Mathematics*, Dudeney introduced the following problem this way.

“Strolling into one of the rooms of a London club, I noticed a position left by two players who had gone. This position is shown in the diagram. It is evident that White has checkmated Black. But how did he do it? That is the puzzle.”

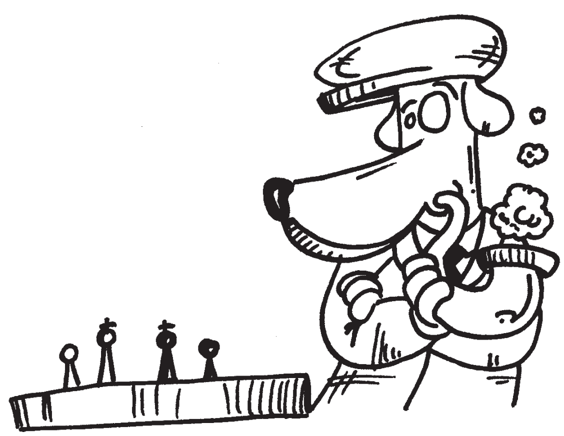
3



What were the last three moves?

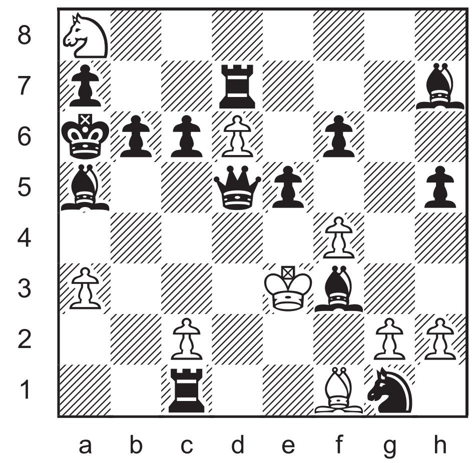
Be as precise as possible. A complete description of a move includes the square a piece moved from, whether a capture was made, and if so, what type of piece was taken.

White and black moves are counted individually. “Last three” means two moves by one side and one move by the other.



I suspect that most experienced chess detectives found the previous puzzle rather elementary. That won’t happen with the next problem. It’s a recent case solved by super sleuth Harmonius Hound, guaranteed to test your powers of deduction. Every move is uniquely predetermined.

4



What were the last nine moves?

Our final puzzle is my favourite Dudeney. Strangely enough, it is not chess-related. Though it might be viewed as a form of *defensive loop*. I hope you enjoy it.

5

Five Coin Dudeney

Place five coins so that
each coin touches every other coin.

Any type of ordinary flat round coin may be used. All five coins should be identical. This photo shows the five beaver-tail Canadian nickels that I solved with. Dudeney did the puzzle with five British pennies, five pence if you prefer.

He posed the task with the word ‘equidistant’. See text on next page. Perhaps that makes the four coin version more interesting.

“Here is a really hard puzzle, and yet its conditions are so absurdly simple. Every reader knows how to place four pennies so that they are equidistant from each other. All you have to do is to arrange three of them flat on the table so that they touch one another in the form of a triangle, and lay the fourth penny on top in the centre. Then, as every penny touches every other penny, they are all at equal distances from one another. Now try to do the same thing with five pennies—place them so that every penny shall touch every other penny—and you will find it a different matter altogether.”

Continuing from the quote at the beginning of the column, which ended with a question:

> *“The answer is simply that it gave us pleasure to seek the solution - that the pleasure was all in the seeking and finding for their own sakes. A good puzzle, like virtue, is its own reward.”*
>
> Henry Dudeney

SOLUTIONS

Sidenote to last column. Puzzle 7B was first published by Dudeney in 1911 in *Strand* magazine.

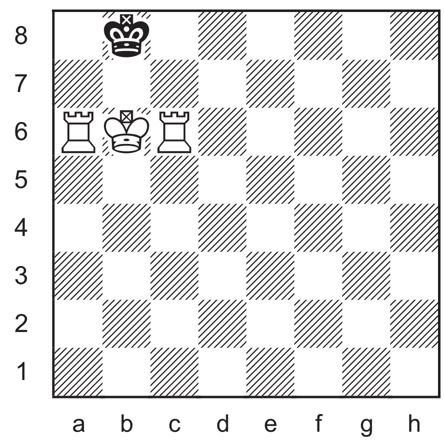
PDF hyperlinks. You can advance to the solution of any puzzle by clicking on the underlined title above the diagram. To return to the puzzle, click on the title above the solution diagram.

1

Henry Dudeney 1917

Strand

“ancient Chinese puzzle”



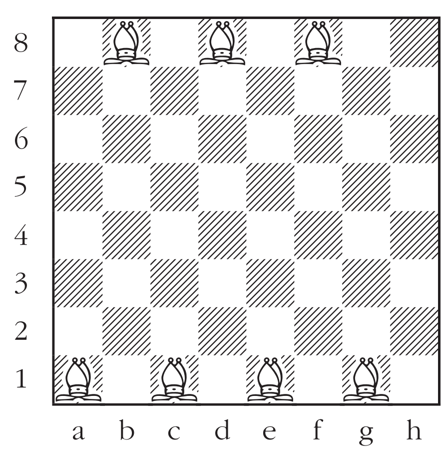
1.Rd6 Kc8 2.Ka7 Kc7 3.Rac6#

Trickier than it looks.

White could mate in 2 by 1.Ra8+ Kxa8 2.Rc8# or 1.Rd6 Kc8 2.Ra8#.

2A

Dark B Independence



The most dark-square bishops that can be placed on the board so that none are attacked is **seven**.

continued next page

There are sixteen different solutions. In all cases, every bishop is along the edge of the board.

Dudeney gave this problem in *Amusements in Mathematics* but did not limit the task to dark-square Bs. If the bishops can be placed on either colour, then the most bishops on the board so that none are attacked is fourteen (2 x 7). There are 256 different solutions (16 x 16).

He also gives the following general formula for the most independent bishops (b) on a square board of any size, with n squares along each side.

$$b = 2n - 2$$

The bishops can be arranged in 2^n different ways.

In his words, "It is an interesting puzzle to discover in just how many different ways the fourteen bishops may be so placed without mutual attack."

2B

Dark B Double Attacks

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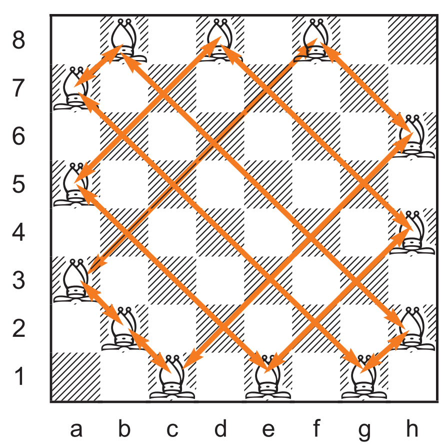

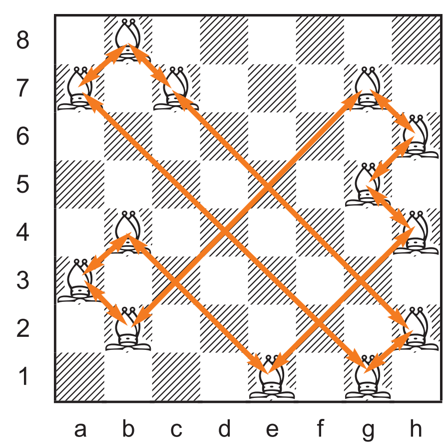

The most dark-square bishops that can be placed on the board so that each is attacked exactly twice is **thirteen**.

There are many solutions. Two arrangements are shown here. Three "island" groups on left (5 + 4 + 4). Two islands on right (5 + 8).

Is a single thirteen bishop island possible? That is the question that part C asks.

2C

Dark B Double Defensive Loop

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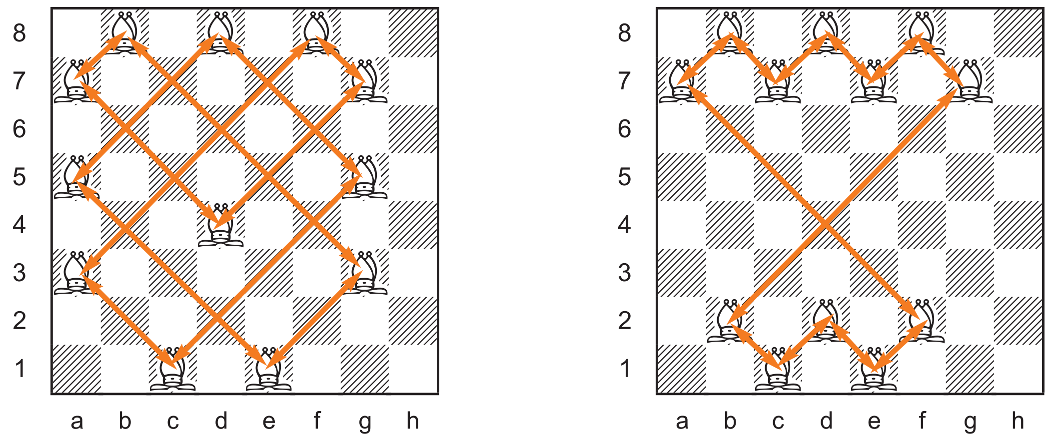


The most dark-square bishops that can be placed on the board to form a single continuous double defensive loop is **twelve**.

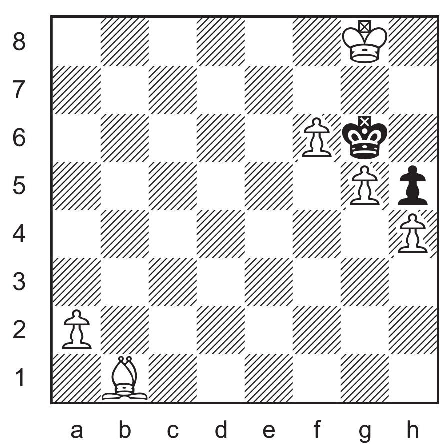
There are many solutions. Two are shown here. The reason 13 bishops were possible in part B is that both double corners (a7 b8 g1 h2) could be occupied. For more defensive loops, see *Minor Niner* (column 70).

3

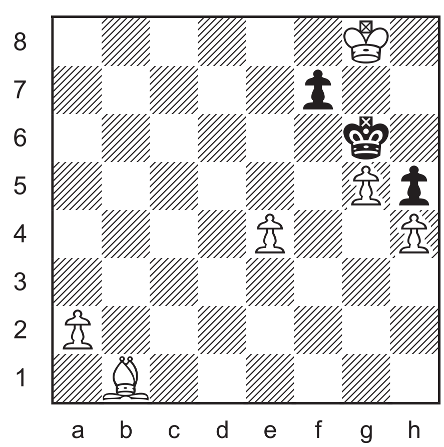
Retro 26

Henry Dudeney 1908

Strand



Last three moves:
1.e4-e5+ f7-f5 2.exf6 e.p.#



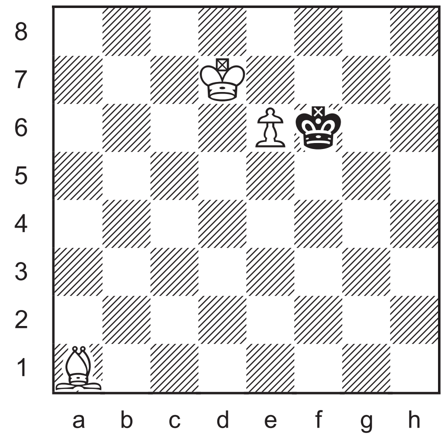
Position three moves ago

Not very challenging by modern standards, but as far as I know, this problem is the first instance of retrograde analysis with an *en passant* capture by a pawn that gave discovered check on the previous turn. It predates the following well known position.

Retro 04

Niels Høeg 1916

Skakbladet



Last three moves: 1.d4-d5+ e7-e5 2.dxe6 e.p.+

For more about this and other retro problems, see *Chess Mysteries in a Retro World* (column 30).

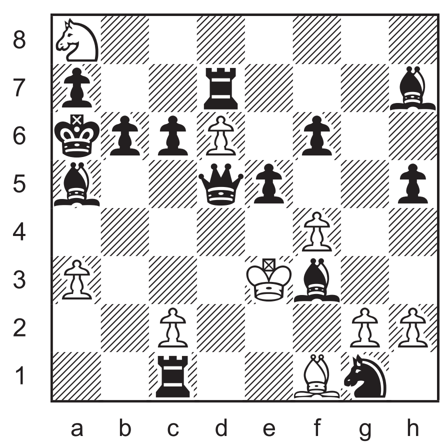
4

Retro 27

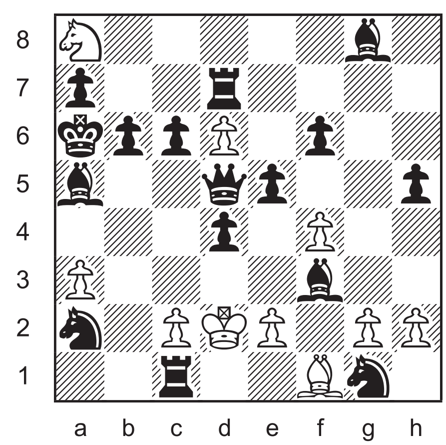
J. Coakley 2015

ChessCafe.com

"An Odd Case of Obtrusive Behaviour"



Last nine moves:
1.Kd2-d3 Na2-b4+
2.Kd3-d2 Nb4-d3+
3.Kd2xd3 Bg8-h7+
4.e2-e4 d4xe3 e.p.+
5.Kd3xe3+



Position nine moves ago

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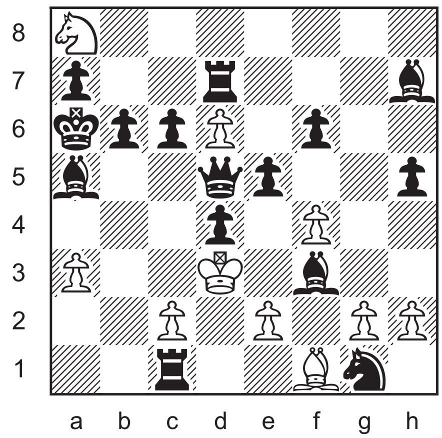
Analysis

a) Black is in check from the bishop on f1. This could only happen with a discovered check by the white king from d3 or e2.

b) The white king would be in double check on either square he might have moved from. The only legal double check is with the king on d3. An *en passant* capture is involved. The position before 4.e2-e4 d4xe3 e.p.+ 5.Kd3xe3+ looked like this.



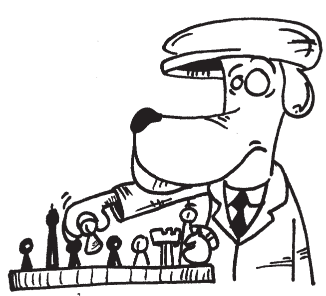
c) White is in check from the bishop on h7. This could have occurred in three different ways: 3...Bg8-h7+, 3...Bg8xh7+, or 3...g6xh5+.

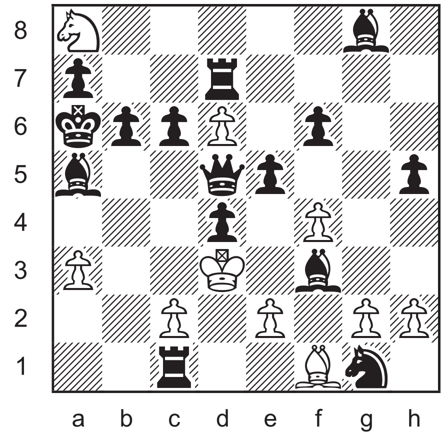
d) At this point in the investigation, it is essential to note that Black has three bishops. The implications of the “obtrusive” light-square B are the key to solving this difficult case. Among other things, it proves that the last move in the diagram was not a capture on h7 or h5.

e) The extra black bishop had to be promoted on the light square b1. It could not have escaped from d1 (or f1 or h1). An examination of the pawn formation reveals that five captures by black pawns were necessary for the promotion.

f) Because of the bishop on f1 and pawns on e2 g2 h2, we know that the white king rook was captured on g1 or h1.

g) That makes a total of six captures by black pieces. White is missing six pieces (at this point in the game). Which means that Black did not make any other captures. So the last move had to be the non-capture 3...Bg8-h7+.





h) Now consider the situation before the bishop check. The bishop at f1 and pawns at c2 e2 g2 h2 are still on their original squares. So White's last move was with one of the other five pieces (Na8, a3, Kd3, d6, f4).

i) The last move was not 3.Nc7-a8 because the knight would be checking the black king from c7. *It cannot be White's move if Black is in check*.

j) The last move was not 3.b7xa8=N because it would require two additional captures, either by White or Black.

  j1) The white b-pawn did not capture twice to get by the black b-pawn (bxa6, axb7) because Black is only missing one piece.

  j2) Black did not play ...bxc6 to let the white b-pawn pass, followed by ...cxb6 because all captures of white pieces happened elsewhere. (See step g.)

k) The last move was not 3.a2-a3 because the promoted black bishop on b1 had to pass through a2 when it left the 1st rank.

l) The last move was not 3.b2xa3 because the pawn that promoted on b1 had to go through b2. Otherwise two additional captures would be necessary (...bxa2 and ...axb1=B).

m) The last move was not 3.c5xd6 because that would require two captures, first on the c-file (for example, dxc3) and then on d6. But Black is only missing one piece. The original white c-pawn is still on c2.

n) The last move was not 3.e3xf4 or 3.g3xf4 because that would require two captures, first on e3 or g3 and then on f4. Black is only missing one piece.

o) So the last move was by the king. To d3 from c3, c4, d2, e3, or e4.

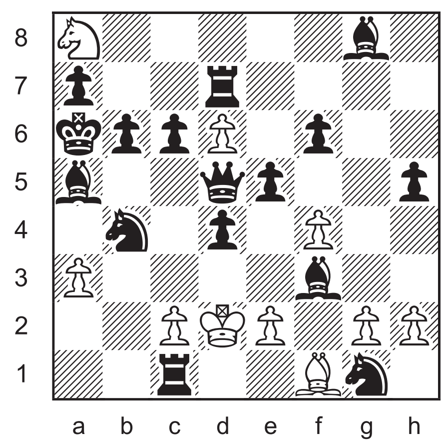
p) On c3 or e4, he would be in an impossible double check.

q) On c3 or e3, he would be in an impossible check by the black d-pawn. The pawn could not advance from d5 or capture from e5. It also could not capture from c5 because there are no missing white pieces available for that capture. (See steps e-g.)

r) On c4, the king would be in an impossible check from the black queen. She did not capture on d5 because there are no missing white pieces available for capture. And if she moved to d5 from e4, the white king on c4 would already be in check from the bishop at g8.

s) As Sherlock Holmes often said, “When you have eliminated the impossible, whatever remains, however improbable, must be the truth.” In this case, we must conclude that the white king just moved from d2.

t) On d2, the white king is in a seemingly impossible check from the black bishop on a5. Unless, of course, it was a discovered check, and the king later captured the black piece that moved to give the check. Black is only missing one piece, a knight. The discovered check had to be 2...Nb4-d3+. It was not a capture since no missing white pieces are available. White replied 3.Kd2xd3.

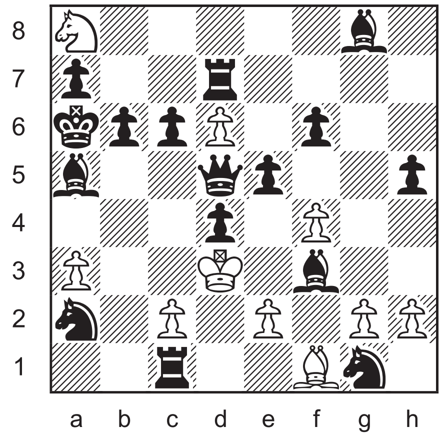


u) With the black knight on b4 and the white king on d2, we must once again determine White’s last move. By the same logic as before (steps h-o), we know that it was a king move. And also that he did not move from c3 or e3 (steps p-q).

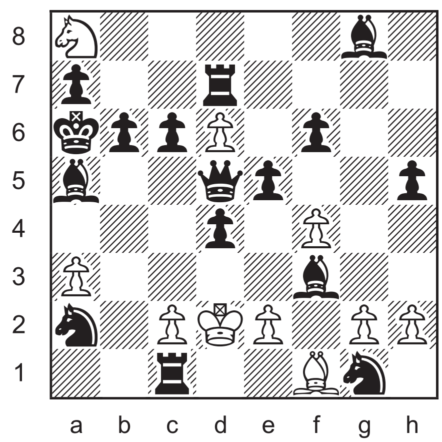
v) The last move was not 2.Kd1-d2 or 2.Ke1-d2 because the king would be in an impossible check on d1 or e1 from the rook at c1. The rook did not capture on c1 and it could only move there from along the 1st rank where it would already be giving check.

w) So the last move had to be 2.Kd3-d2.

x) On d3, the white king is in check from the knight at b4. The only square the knight could move from is a2. So the previous move was 1...Na2-b4+.

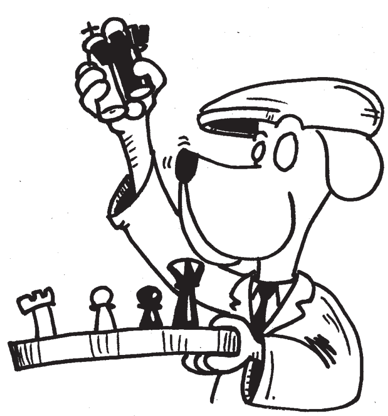


y) The reasoning here with the king on d3 is identical to steps h-s. The last move had to be 1.Kd2-d3. A strange yo-yo effect between d2 and d3!?



z) The preceding black move was either **...Nb4-a2+** which would lead to a “retro-perp” by repeating Kd3 Nb4+, Kd2 Na2+ indefinitely, or **...Nc3-a2+** which “unlocks” the position. With the black knight on c3, the white king can shuffle a few more times between d2 and d3 while Black untangles other parts of the board. All in reverse order!?

Congratulations if you cracked this case. Your status as a *master chess sleuth* is confirmed.



5

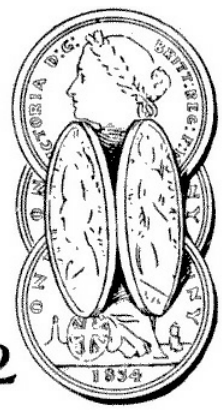
Henry Dudeney 1909

Strand

"The Five Pennies"

Drawings and explanation by Henry Dudeney: "First lay three of the pennies in the way shown in figure 1. Now hold the remaining two pennies in the position shown in figure 2, so that they touch one another at the top, and at the base are in contact with the three horizontally placed coins. Then the five pennies will be equidistant, for every penny will touch every other penny."

1



2

The puzzle is a lot easier with four hands! And getting the five coins to stand together like this without holding them is almost impossible. Almost.

By the way, if anybody is wondering, I used nickels because Canada did away with pennies two years ago. Or maybe I just like the beavers.

Until next time!