



THE PUZZLING SIDE OF CHESS

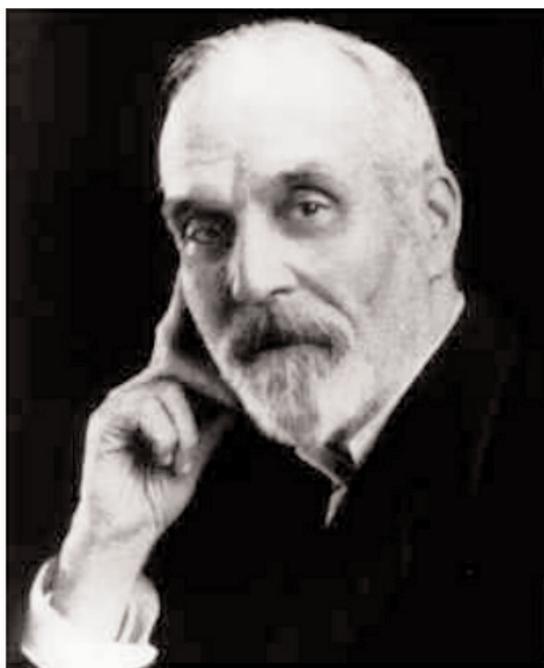
Jeff Coakley

THE DUDE ABIDES

number 81

January 23, 2015

February is *artist appreciation month* at the Cafe gallery. Currently on display is a selection of fine work by one of the great puzzle masters of all time, Henry Dudeney.



HENRY DUDENEY

*“...Our lives are largely spent in solving puzzles;
for what is a puzzle but a perplexing question?
And from our childhood upwards we are perpetually
asking questions or trying to answer them.”*

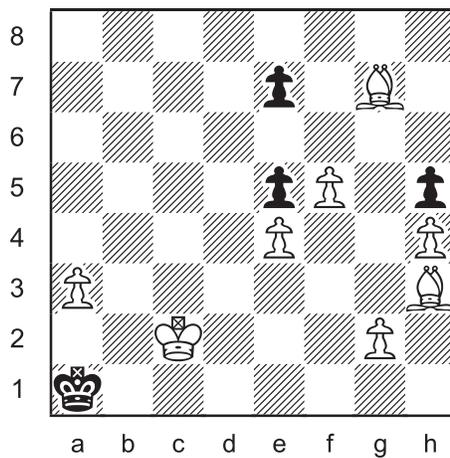
Henry Ernest Dudeney (1857-1930) worked most of his life as a civil servant in Sussex, England. But he made his mark on the world as a mathematician and composer of puzzles.

His early creations were published in various newspapers under the pseudonym “Sphinx”. He also collaborated for several years with Sam Loyd. Many of their puzzles and articles appeared in the British magazine *Tit-Bits*.

Today, Dudeney is probably best remembered for his book *Amusements in Mathematics* (1917). It contains over 400 math and logic puzzles. Nearly a hundred are chess-related.

The first item in our exhibit is a simplified version of a Dudeney *conditional mate*. White is only allowed to move their bishops. Black defends as best they can.

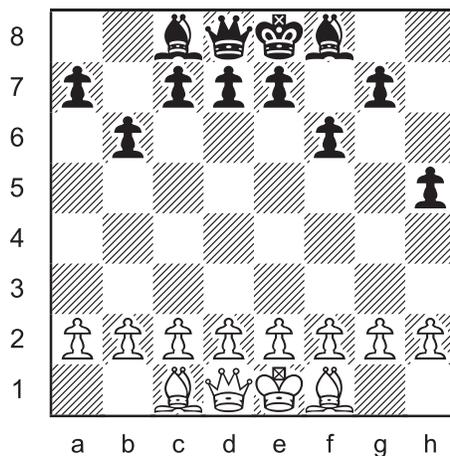
1



White to move and force mate by only moving bishops

The task in the next problem is to determine which move was just played to reach the given position. 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.

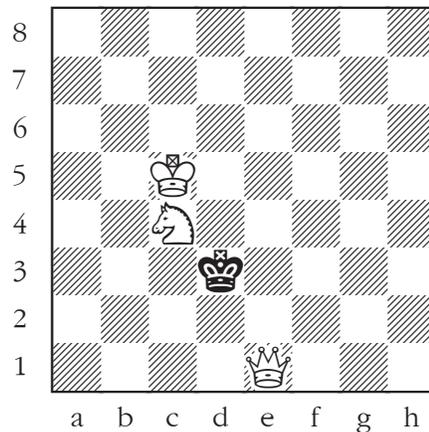
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What was the last move?

Dudeney also composed standard chess problems, but only a few have been preserved in his books or in modern databases. Because they are so scarce, we cross over briefly to “the normal side” to present two examples.

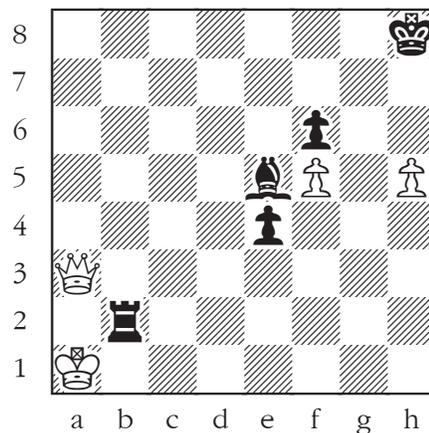
3



White to mate in 3

Dudeney was an avid chess player throughout his life. The following study shows the practical side of his game.

4



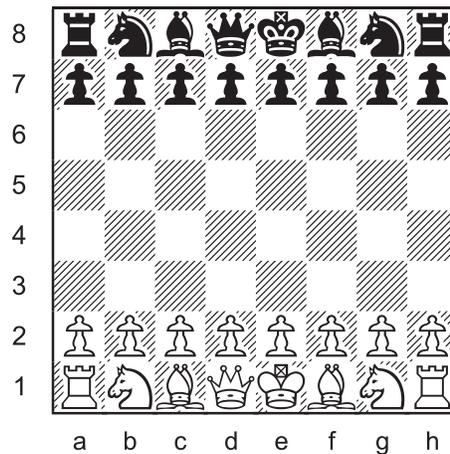
White to move and win

Now back to the impractical! The next puzzle asks you to construct a game that ends in stalemate with all thirty-two pieces still on the board. As usual in such tasks, the ultimate goal is to use as few moves as possible.

The problem is given here because Dudeney included it in *Amusements in Mathematics*. But he was not the first person to find the shortest solution. And neither was Sam Loyd who often receives credit.

5

Synthetic Game 12



Construct a game without any captures
that ends with White in stalemate.
How many moves are needed?

Dudeney had no formal education in mathematics, but many of his discoveries in this field are still studied at universities. He even has a special class of numbers named for him!

A *Dudeney number* is a positive integer whose cube root is the sum of its individual digits. For example, 512 is a Dudeney number because the sum of 5, 1, and 2 is 8, and 8 cubed equals 512.

There are exactly six Dudeney numbers in the universe.

$$1 = 1^3 = 1$$

$$512 = (5 + 2 + 1)^3 = 8^3$$

$$4913 = (4 + 9 + 1 + 3)^3 = 17^3$$

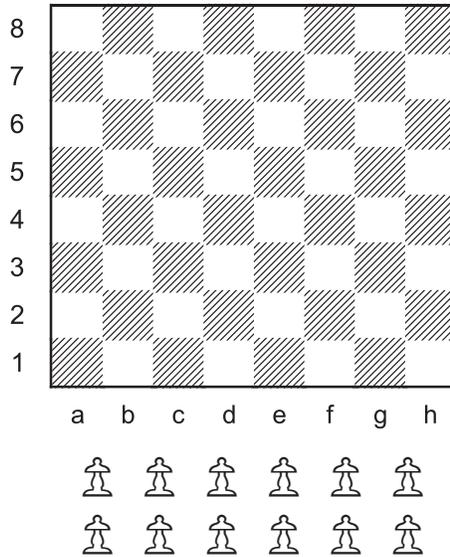
$$5832 = (5 + 8 + 3 + 2)^3 = 18^3$$

$$17576 = (1 + 7 + 5 + 7 + 6)^3 = 26^3$$

$$19683 = (1 + 9 + 6 + 8 + 3)^3 = 27^3$$

Dudeney was fascinated by chessboard geometry. His puzzles in this area are often embellished (or disguised) with stories. The next problem is a bare-bones version of one titled “The Abbot’s Window” in which a bedridden cleric frets over the pattern of light shining through the window panes.

6



Place twelve pawns on the board so that there are an even number of vacant squares on all ranks, files, and diagonals.

Did you know that there are twenty-six diagonals on a chessboard?



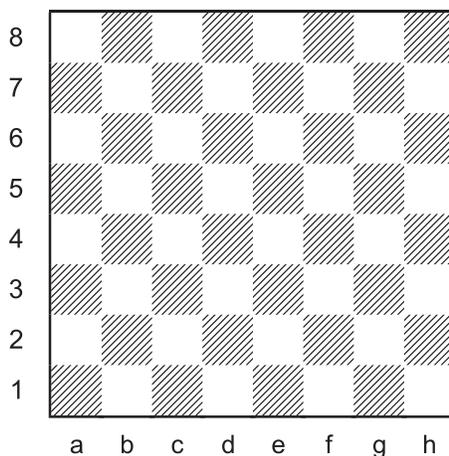
The following three-part puzzle involves sixteen pawns.

Part A is the generic simple version.

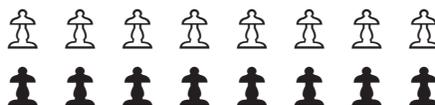
Part B has an added twist by Dudeney. No three pawns may be placed in a “straight line”. That includes not only ranks, files, and diagonals, but also “obliques”. An *oblique* is a slanted straight line that passes through the centre of three squares, like a knight move from b1 to c3 to d5 (or an unorthodox zebra from a1 to c4 to e7).

Part C is my invention with eight pawns of each colour.

7



- A. Place sixteen pawns on the board so that no three pawns are on the same rank, file, or diagonal.
- B. Place sixteen pawns on the board so that no three pawns are on the same rank, file, diagonal, or oblique.



- C. Place eight white pawns and eight black pawns on the board so that no two pawns of the same colour are on the same rank, file, or diagonal.

Not surprisingly, most of the puzzles in *Amusements in Mathematics* involve math. Many are the brain teaser type in which a short story is told that reveals certain facts. At the conclusion of the tale, a question is asked to challenge our powers of calculation.

I couldn't find a Dudeney puzzle of this kind with a chess theme, so here's something new in a similar vein. Are you in the mood for a little algebra?

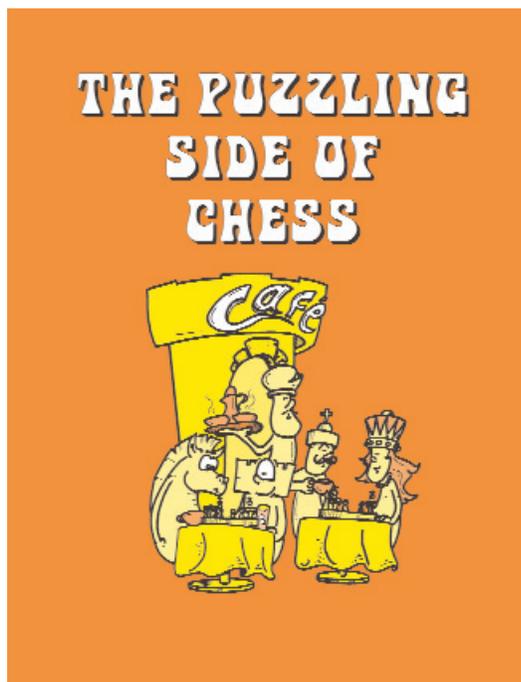
The Cafe Chess Report



Last year's *Cafe Chess Championship* was an exciting affair. The two finalists were ace detective Harmonius Hound and his longtime companion Dr. Watson. In the end, as most experts predicted, the title was awarded to the renowned sleuth.

Harmonius won the match convincingly by a margin of six points. Poor Watson, although he played valiantly, had three times as many defeats as victories, and managed to draw just two fewer games than he lost. Perhaps it is also worth mentioning that Harmonius had a much superior position in the last round when he graciously conceded a draw to clinch the championship.

What was the final score of the match?



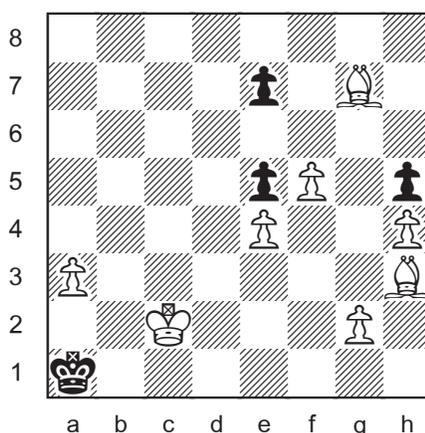
SOLUTIONS

“Dudeney” rhymes with “Buddha knee”.

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
British Chess Magazine
version by J. Coakley 2015
ChessCafe.com



1.Bh6

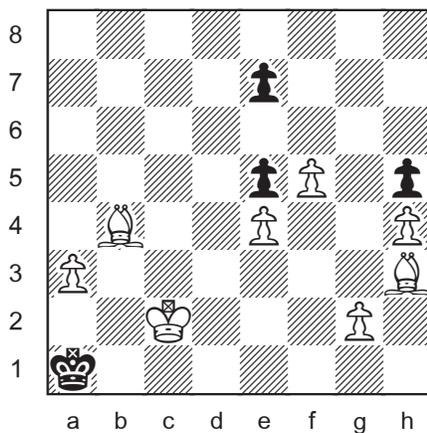
Not 1.Bxe5+? Ka2 2.Bb2 e5! White cannot win then because the only possible subsequent move by the light-square bishop is Bg4, which can be met by ...hxg4.

1...Ka2

White intends to free the light-square bishop by forcing the black pawn at e7 to advance and capture on f5. Black delays mate by only moving the pawn when they have to.

2.Bc1 Ka1 3.Bd2! Ka2 4.Bb4!

This unusual bishop manoeuvre, which loses a necessary tempo, is the main idea of the problem.



4...Ka1 5.Bc3+ Ka2 6.Bb2

Now the e-pawn must advance.

6...e6 7.Bc1 Ka1 8.Bd2!

White repeats the same manoeuvre.

8...Ka2 9.Bb4 Ka1 10.Bc3+ Ka2 11.Bb2

Once again, the black pawn is forced to move.

11...exf5 12.Bc1

12.Bxf5? is stalemate.

12...Ka1 13.Bd2

One more time!

13...Ka2

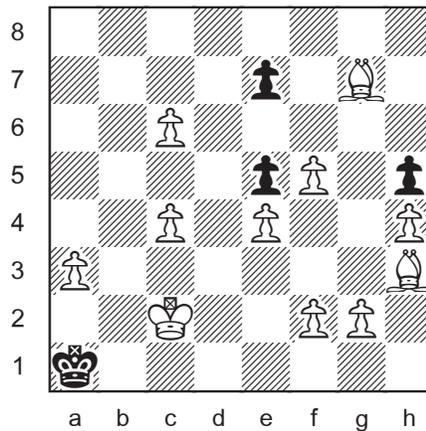
If 13...fxe4, then 14.Be6 e3 15.Bb2#

14.Bb4 Ka1 15.Bc3+ Ka2 16.Bb2 fxe4 (or ...f4) 17.Be6#

Dudeney's original problem had three additional white pawns, on c4, c6, f2, making the mate much more difficult. I'm not sure that the problem benefits from the extra complications. See next page.



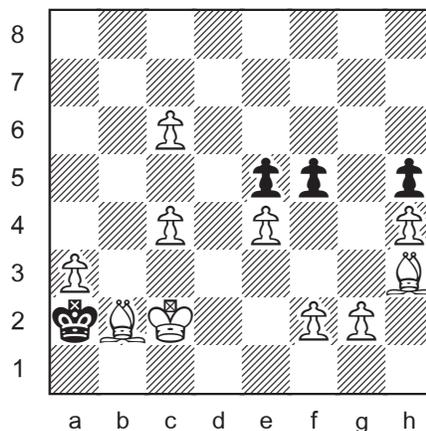
Henry Dudeney 1917
British Chess Magazine



White to mate
 by only moving bishops

The first eleven moves are the same.

**1.Bh6 Ka2 2.Bc1 Ka1 3.Bd2 Ka2 4.Bb4 Ka1 5.Bc3+ Ka2 6.Bb2 e6
 7.Bc1 Ka1 8.Bd2 Ka2 9.Bb4 Ka1 10.Bc3+ Ka2 11.Bb2 exf5**



12.Bxe5!

The bishop retreat 12.Bc1? fails to 12...f4! followed by 13...f3. Then, if the light-square bishop ever moves, Black captures on g2 and promotes. This line explains the purpose of the pawn on f2. Without that pawn, White could still win after 12.Bc1 f4 13.Be6 f3 with 14.Be3, controlling f2 and g1.

After 12.Bxe5, Black has three choices. All lead to a similar conclusion.

12...f4 13.Bxf4 Kxa3 14.Bd2 Ka4 15.Bc8 Ka3 16.Ba6 Ka4
 17.Bb5+ Ka3 18.Bc3 Ka2 19.Bb4 Ka1 20.Ba4 Ka2 21.Bb3+ Ka1
 22.Bc3#

12...fxe4 13.Bd4 Kxa3 (13...e3 14.Bxe3 Kxa3 15.Bd2)
 14.Bc8 Kb4 15.Ba6 Ka5 16.Bb5 Kb4 17.Bb6 e3
 (17...Ka3 18.Bc5+ Ka2 19.Ba4 e3 20.Bb3+ Ka1 21.Bd4#)
 18.Bxe3 Ka5 19.Bd4 Kb4 20.Bb6 Ka3 21.Bc5+ Ka2
 22.Ba4 Ka1 23.Bb4 Ka2 24.Bb3+ Ka1 25.Bc3#

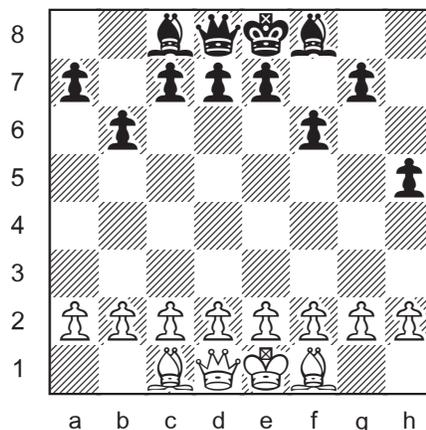
12...Kxa3 13.Bd6+ Ka4 14.Bxf5 Ka5 15.Bc5 Ka6 16.Bc8+ Ka5
 17.Bd4! (See note below.) 17...Kb4 18.Ba6 Ka5 19.Bb5 Kb4
 20.Bb6 Ka3 21.Bc5+ Ka2 22.Ba4 Ka1 23.Bb4 Ka2 24.Bb3+ Ka1
 25.Bc3#

The solution given by the *British Chess Magazine* (1918) was a single line with 12...Kxa3. They deviated with 17.Bb7 Ka4 18.Bb6 Kb4 19.Ba6 Ka4 20.Bb5+ Kb4 21.Ba7 Ka5 22.Bd4 Kb4 23.Bb6 Ka3 24.Ba5 Ka2 25.Bb4 Ka1 26.Ba4 Ka2 27.Bb3+ Ka1 28.Bc3#, taking three moves longer than needed.

2

Retro 25

Henry Dudeney 1922
Schachvärlden 1924



The last move was Black capturing a knight on h5 with a pawn from g6.

1...g6xh5(N)

The last move had to be by Black since none of the white pieces have any “reverse mobility”.

continued next page

The last move had to be a capture. Otherwise White had no possible move on the previous turn, and the position would be illegal.

The captured piece had to be a knight since the white rooks could never have escaped from behind the unmoved pawns.

The only three possible captures to consider are 1...Bxc8, 1...Kxf8, and 1...gxh5.

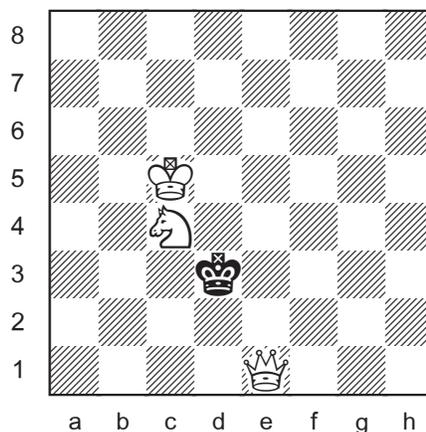
1...Bxc8 is impossible since the only square that a white knight could move from on the previous turn to reach c8 is d6, where it would be checking the black king. *It cannot be White's turn if Black is in check.*

1...Kxe8 is impossible for the same reason. A white knight could only move to e8 from d6, where it would be checking the black king on f7.

Therefore the last move had to be 1...gxh5. White's preceding move was 1.Nh5, which may or may not have been a capture.

3

Henry Dudeney 1924
The Chess Amateur



1.Kb5

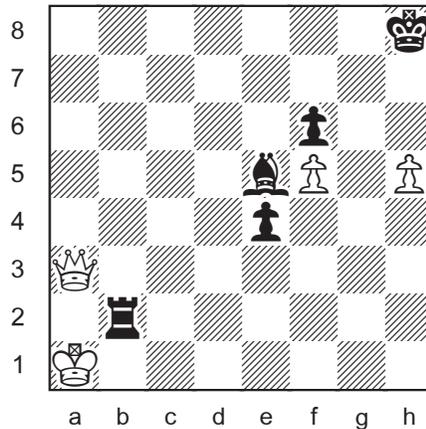
1...Kd4 2.Qe3+ Kd5 3.Qe5#

1...Kc2 2.Qd2+ Kb3 (or 2...Kb1) 3.Qb2#

Key move by the king, plus symmetrical mates.

4

Henry Dudeney 1895
Leeds Mercury



1.Qf8+

White draws with 1.Qxb2 Bxb2+ 2.Kxb2 Kh7 3.Kc3 Kh6 4.Kd4 Kxh5 5.Kxe4 Kg5 6.Ke3! Kxf5 7.Kf3. Other first moves lose to a discovered check by the rook.

1...Kh7 2.Qf7+ Kh8 (2...Kh6 3.Qg6#) 3.Qe8+ Kh7 4.Qxe5!

Trading down to an easily won pawn ending.

4...fxe5 5.Kxb2 Kh6 (5...e3 6.Kc2 e4 7.Kd1 Kh6 8.f6)

6.f6!

Demonstrating the ability of two disconnected pawns to defend each other against a king.

6...Kh7 7.Kc2 Kg8 (7...e3 8.Kd3)

8.h6! 1-0

(8...Kf7 9.h7 or 8...Kh7 9.f7 or 8...e3 9.Kd3)

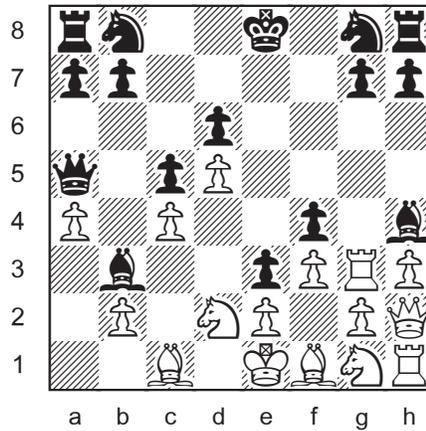


5

Synthetic Game 12

C.H. Wheeler 1887

Sunny South



It only takes twelve moves!

1.a4 c5

2.d4 d6

3.Qd2 e5

4.Qf4 e4

5.h3 Be7

6.Qh2 Bh4

7.Ra3 Be6

8.Rg3 Bb3

9.Nd2 Qa5

10.d5 e3

11.c4 f5

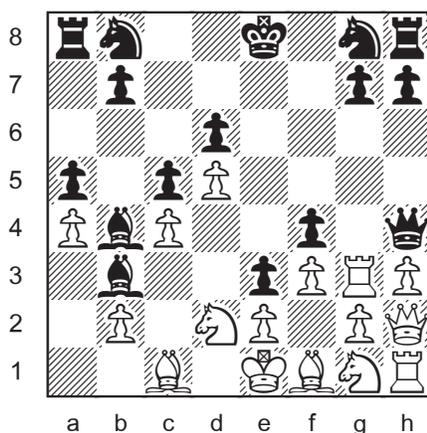
12.f3 f4 stalemate

This puzzle, first posed by Gustavus Reichhelm in 1882, has a long history. To this day, credit for the shortest solution is usually given to Sam Loyd, who wrote some funny annotations to the moves in *Lasker's Chess Magazine* (1906).

Dudeney provided this explanation in *Amusements in Mathematics*. "Some years ago the puzzle was proposed. ... Working independently, the same position was arrived at by Messrs. S. Loyd, E.N. Frankenstein, W.H. Thompson, and myself."

As it turns out, someone else beat them all to the punch, American composer Charles Wheeler (1846-1927). His twelve move game, shown above, was published in 1887.

In Dudeney's solution, the black queen and dark-square bishop switch roles.



1.d4 e5 2.Qd3 Qh4 3.Qg3 Bb4+ 4.Nd2 a5 5.a4 d6 6.h3 Be6 7.Ra3 f5
8.Qh2 c5 9.Rg3 Bb3 10.c4 f4 11.f3 e4 12.d5 e3 stalemate

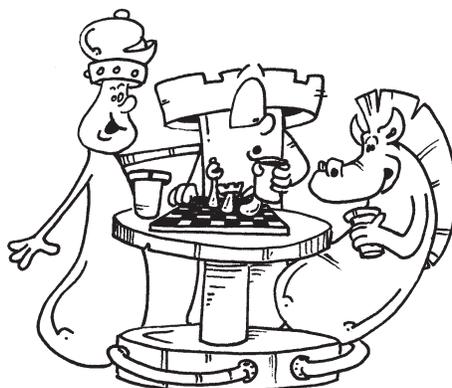
Wheeler had also noted this possibility, as well as a third solution with ...Ba5 instead of ...a5.

The annotated game by Sam Loyd, reprinted by Alain C. White in *Sam Loyd and His Chess Problems* (1913), has a different move order, but reaches the same final position as Wheeler.

1.d4 d6 2.Qd2 e5 3.a4 e4 4.Qf4 f5 5.h3 Be7 6.Qh2 Be6 7.Ra3 c5
8.Rg3 Qa5+ 9.Nd2 Bh4 10.f3 Bb3 11.d5 e3 12.c4 f4 stalemate

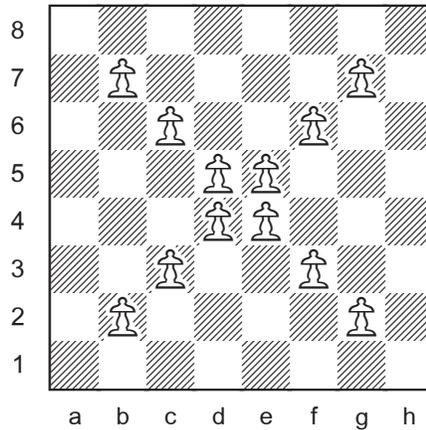
The puzzle asks for the shortest game where White is stalemated. Is it possible to stalemate Black without any captures in fewer moves? I expect not, since someone would surely have done it already if it could be done. But nobody seems to have raised this question before!?

If there is no shorter game with Black stalemated, then the word "White" could be deleted from the stipulation.



6

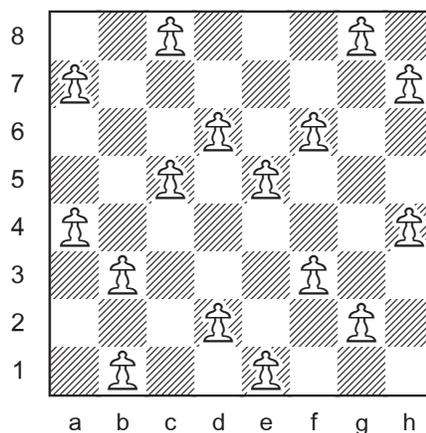
Henry Dudeney 1917
Amusements in Mathematics
"The Abbot's Window"



A lovely symmetrical arrangement achieves the desired effect. Each rank, file, and diagonal has an even number of vacant squares.

In case you were wondering if an individual corner square might be considered a diagonal, this is what the Abbot had to say, "A single pane can no more be in a line with itself than one bird can go into a corner and flock in solitude."

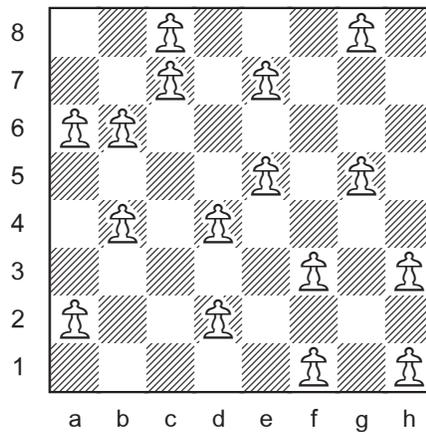
7A



One of many possible solutions. This arrangement will not work for part B because the pawns at b1, d2, f3, h4 are on the same oblique. As are the pawns at a4, d6, g8; and those at c8, e5, g2.

7B

Henry Dudeney 1917
Amusements in Mathematics



No three pawns stand on the same straight line, including obliques.

This identical position was published by Sam Loyd in 1908 under his name in *Sam Loyd's Puzzle Magazine*. Dudeney included it in *Amusements In Mathematics* in 1917 without mentioning Loyd. That book was mostly a collection of Dudeney's earlier material, and no reference was given for where he first published the puzzle.

There are many instances of the same puzzles appearing in the writings of both Dudeney and Loyd. This is not too strange as they shared ideas with each other for several years. Eventually there was a falling out between them when Dudeney accused Loyd of using his ideas without any acknowledgement. The sixteen pawn puzzle is perhaps a good example.

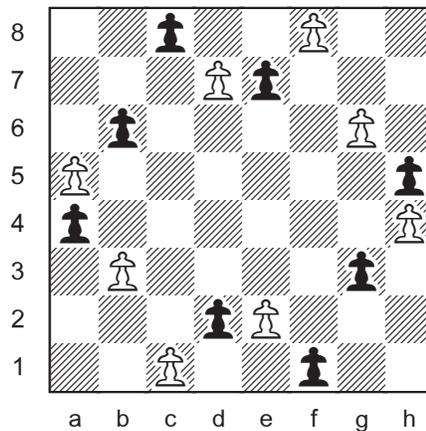
Loyd rarely gave credit to other composers. Dudeney frequently did. Since he did not credit Loyd for this puzzle, I assume he considered it his own composition. But the truth concerning the details of their collaboration remains a mystery.

Henry Dudeney and Sam Loyd never met in person. They corresponded by mail. How would you like to read those letters!?

7C

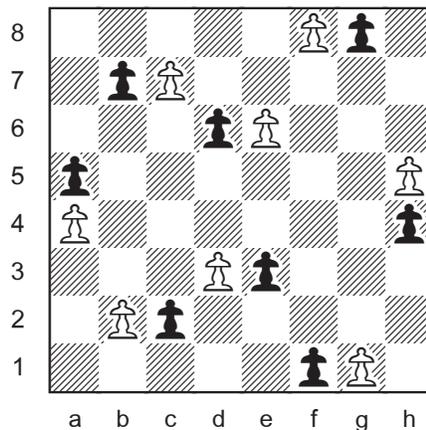
J. Coakley 2006

Winning Chess Puzzles For Kids



No rank, file, or diagonal has two pawns of the same colour.
A symmetrical position.

The diagram below shows another solution.



This problem is related to the famous *eight queen puzzle*. See *Queenfest III* (column 65) To find more solutions, place the eight white pawns in any of the eight queen patterns. Then put the black pawns in the same pattern, only reflected left to right, or top to bottom. For example, if White has pawns on a4 and b7, put black pawns on h4 and g7 (left to right) or on a5 and b2 (top to bottom).

J. Coakley 2015
ChessCafe.com

“The Cafe Chess Report”

The final score in the match was $12\frac{1}{2}$ - $6\frac{1}{2}$.

H = Harmonius wins
W = Watson wins
D = draws

The facts are these:

$$H - W = 6$$

$$H = 3W$$

$$D = H - 2$$

The calculation goes like so:

$$H - W = 6$$

Substitute $3W$ for H and reduce.

$$3W - W = 6$$

$$2W = 6$$

$$W = 3$$

H and D are easy once W is known.

$$H = 3W = 3 \times 3 = 9$$

$$D = H - 2 = 9 - 2 = 7$$

Final score:

$$\text{Harmonius } 9 + (7 \times \frac{1}{2}) = 12\frac{1}{2}$$

$$\text{Watson } 3 + (7 \times \frac{1}{2}) = 6\frac{1}{2}$$



Until next time!

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