

## **Sherlock Holmes and the Simultaneous Monochromatic Chess Exhibition**

“Hurry up Watson!”, shouted Sherlock from the passenger seat of Watson’s Toyota Yaris. “We’re going to be late for the simultaneous monochromatic chess exhibition.”

Watson could not understand why the famous retrograde chess detective was in such a rush, for if they got there before the games started there would be no possibility of analyzing the games in a retrograde manner.

Tonight was to be quite the exhibition. The famous monochromatic chess player Larry Kasparov (no relation to the famous non-monochromatic player) was playing three games of monochromatic chess at once against other world-class players. As they entered the chess hall, to their amazement, Larry had captured the opposing queens in each of the three games and still had all of his original pieces!

Sherlock walked up to the first chess player and exclaimed, “How on Earth did Larry capture your queen without losing a single piece in the process!?”

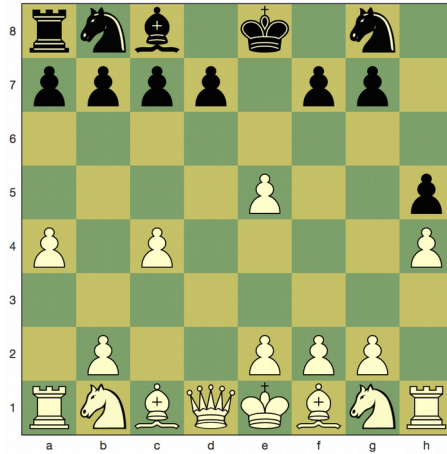
The player shot back, “Look, everybody knows that Larry is the best.” Then he looked at his feet and continued, rather embarrassed, “It is quite a mess though, considering that no piece in this game has even moved more than twice.”

“That’s it!” Sherlock blurted out.

The player looked at him quizzically. “What’s it...”

“I know where the black queen was captured!”

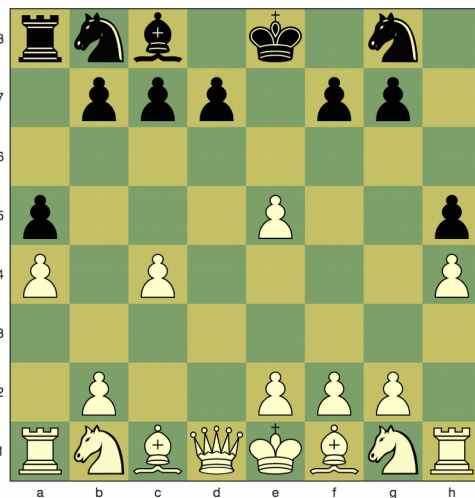
The board is as shown below. Given that no piece moved more than twice, and the game was monochromatic, how did Sherlock figure where the black queen was taken? (Monochromatic chess is a variation of chess in which pieces can never move from a square of one colour to a square of a different colour.)



The player at the second board looked over in amazement as Sherlock explained his retrograde proof. “What a coincidence!” said player #2, “My board is almost exactly the same as yours and no piece was moved more than twice in this game either! The only difference in the position is that I have a pawn on a5, which was the last piece I moved (see diagram below). However, my queen was captured on a different square. Can you figure this one out, Sherlock?”

“Of course, in most games the information is not sufficient to perform retrograde analysis. But I can assure you that if it is possible then I can absolutely figure it out.” replied Sherlock in his usual manner.

Sherlock had a way of astonishing you with his arrogance, then astonishing you further by backing up his arrogance with sheer brilliance. This is exactly what happened in this case as he solved the puzzle within seconds and explained the solution to the dumbfounded players. How did Sherlock figure this one out?



Just as he finished, the third player chimed in. "If you think that is a coincidence, get a load of this. Not only has no piece in my game made more than two moves either, but the position of my board is exactly the same as in the second game! The only difference is that moving the pawn from a7 to a5 was not my most recent move. And believe it or not, my queen was captured on a different square than either of the other two games! If you can figure this one out too, that would be truly incredible."

After about 10 seconds, Sherlock replied, "I am embarrassed that it took me so long."

He then proceeded to explain how he knew with absolute certainty where the queen was captured in this third game as well.