# Ex-World (Correspondence) Champ beats
# Current World (Computer) Champ

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To understand the following game, I would like to share my thoughts regarding Belle as I contemplated it over the last 3 or so months. I first became aware of the new Belle just shortly before the World tournament. At that time, though I had heard of the fantastic processing power it was going to have, it still remained to be seen if by searching brute-force 1½ ply deeper than any previous program it would be able to play about 300 points better than previous programs, as predicted by Thompson's own regression formulas and others too [Gillogly, 1978]. My first impressions were that it played awful positional chess, but over a period of 6 weeks or so, it seemed to have its act more together and, while its performance in the World tournament was not dazzling, it was still convincing. Upon returning home, Ken Thompson began to play Belle against all the strong players he could find, with the idea of finding out just how good it was, and, of course, getting ideas for improving it. It played 10 serious games against a variety of players rated from 1936 (high A) to 2413 (Senior Master). The average strength of this group was 2139 and Belle's score was 8½ - 1½. This gives it a performance rating of 2384; very high rated master. Incredible!!! To really make a believer out of me, one of the above wins was the very fine short game below against Mike Valvo, a senior master.

## M. Valvo — Belle

1 c4 c5 2 Nf3 Nf6 3 b3 g6 4 Bb2 Bg7 5 g3
O-O 6 Bg2 Nc6 7 O-O b6 8 e3 Bb7 9
Qe2 e6 10 d3 d5 11 Nbd2 d4 12 e4 e5 13
Nh4 Bh6! 14 f4?? exf4 15 gxf4 Nh5! 16
Qg4 Bxf4!! 17 Rxf4? Ne5

White Resigns

The maneuver starting with 13 Nh4 did not appeal to me, but I must confess that I did not see what was going to happen until it did. White resigned because he is going to be the exchange and 1 pawn down right away and more will come shortly after. An unusual and devastating combination by Belle that it clearly saw no later than the 13th move. In the second game of this set, Valvo sacrificed a pawn in the early middle game to get a very promising positional advantage. He played the game in the "normal" way, making small positional threats, that Belle sometimes answered and sometimes not. However, whenever there was a serious threat Belle answered it. In the end it had fended off all threats and was a pawn ahead in the end-game when Ken Thompson graciously offered a draw.

On top of this, Belle ran through a set of positions from *Win at Chess* [Reinfeld, 1945] that had been used to test a number of previous chess programs. Out of the set of 300 positions it got only 19½ wrong and found 9 times that the book solution was not best, or did not work. Based on this information, I felt it may be getting to the time when I would have my last chance to beat the World's best mechanical chess entity, so I thought I better try to do it now. However, it would be foolish to play a normal game against Belle. It was clearly better than I tactically, (probably close to World Championship level if not

beyond), so I had to take advantage of its lack of knowledge in some way, while intending to avoid tactical complications if at all possible. My idea was to get it into an opening system in which I had private (unpublished) analysis, and hope to get an advantage that could hopefully be converted into a win at some future time. It did not quite work out that way; but what did happen was interesting. By the way, as far as I know, I am the only person/thing that Belle has lost to in its most recent incarnation (I also won a 30/30 game from it recently when I caught it in a private line). Even counting those results in, it still has a performance rating of 2322.

## Belle — H. Berliner
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**1 e4 Nf6**

I have over the years specialized in this defense; for instance, I won 4 out of 4 with it in the World Correspondence Championship finals. Thus, I know what I am doing, but we will have to see how well Belle understands what is going on.

**2 e5 Nd5 3 d4 d6 4 Nf3 g6 5 c4 Nb6 6 exd6 cxd6 7 Be2 Bg7 8 O-O O-O 9 Be3 Nc6 10 Nc3 d5!**

Up to here Belle was in its book.

**11 c5 Nc4 12 Bxc4 dxc4 13 Qe2**

This move is more flexible than the book 13 Qa4, but should lead to the same end result.

**13 ... Bg4! 14 Radl! Nxd4 15 Bxd4 Bxd4**
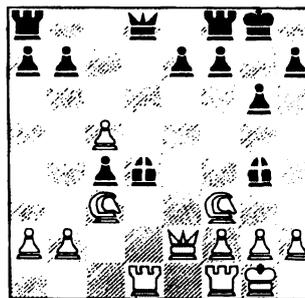


**Position after 15 ... Bxd4**

**16 Rxd4?**

This is a mistake, but not an ordinary mistake. White thinks it is winning 2 knights for rook and pawn. However, in the endgame the edge in such situations goes to the side that has the better placed pieces. Here Black will get a rook on the seventh rank, and will have many threats against the Q-side besides keeping the king on the back rank. Thus this line favors Black. Correct was 16 Nb5 e5 17 Nbxd4 exd4 18 Qxc4 Bxf3 19 gxf3 Qf6! maintaining the material balance. White's Q-side pawn strength is offset by his K-side pawn weakness.

**16 ... Qxd4 17 Nxd4 Bxe2 18 Ndxe2 Rfd8!**

Making the penetration possible. White now plays extremely well to keep its head above water. For instance, on the obvious 19 Rd1 R×d1† 20 N×d1 Rc8 picks up a pawn already.

**19 b3! c×b3 20 a×b3 Rd2 21 f4!**

Another very fine move, making it possible for the knight to stay at d4 for some time. Black was threatening 21 ... Rb2, and if 22 Nd4 then 22 ... e5. Now, 21 ... Rad8 is met by 22 Ra1 a6 23 c6! and another facet of White's 21st move becomes apparent: 23 ... b×c6 24 R×a6 and there is no back rank mate.

**21 ... Rb2 22 Nd4 Rd8 23 Na4!**

Again very good. If 23 Rd1 f6 threaten 24 ... e5 and White's position collapses.

**23 ... Rd2 24 Nb5 a6**

24 ... Rc2 (threatens doubling rooks on the seventh) is met by 25 Na3! Ra2 26 Nc4 and White holds together better than in the game.

**25 Nbc3 Rc2 26 Rd1! Rdd2! 27 R×d2 R×d2 28 g3**

White can hardly move. The text protects the f-pawn against such threats as Rd4 followed by Rb4. The immediate 28 Ne4 loses a pawn to 28 ... Rd4. Now Black further constricts the knights.

**28 ... f5! 29 h3 Kf7 30 Kf1 e5!**

Going for the throat. It appeared to me that this way of getting the king into active play was the thematic way to proceed. However, I realized that I was temporarily sacrificing a pawn and further venturing out into the open where two knights take on my king and rook with a variety of forks in prospect. I had done my calculations and everything seemed to be in order. But against a program that was by now probably looking at least 9 ply deep, one misstep could prove fatal.

**31 f×e5 Ke6 32 Nb6 Rc2**

Of course not 32 ... K×e5 33 Nc4†.

**33 Ne2 K×e5 34 Ke1 Ke4**

The king is becoming super-active, or is it super-exposed?

**35 Nc4 g5!**

An important point in Black's plan: the knights are denied access to f4, and the exchange sacrifice is readied.

**36 Kd1**
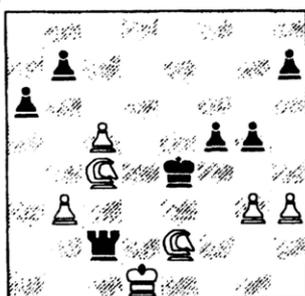


Position after 36 Kd1

**R×c4 37 b×c4 Kd3!**

The position I had foreseen. Black has only a pawn for a knight (and in an endgame yet), but has a vastly superior position. He has an outside passed pawn on the Q-side, a potential passed pawn on the K-side and a dominant king position. Black has excellent winning chances.

**38 Ng1?**

During the game I was not sure what the best defense is here. Black can go to either side to try to win, and White must try to activate his knight. During the game I had thought 38 h4 h6 39 h×g5 h×g5 40 Ng1 best, but Belle may be thinking it is winning and is reluctant to exchange pawns in that case. Several weeks after the game I discovered that this line does in fact draw. There are two lines: If now 40 ... Ke3 41 Nh3 f4! 42 N×g5!! (the only move to draw) f×g3 43 Kc2 g2 44 Nh3 Kd4 45 Kb3 draws. Or 40 ... g4 41 Ne2 K×c4 42 Kd2 a5! 43 Kc2! and White can draw by keeping his king on the Q-side and letting his knight hold the K-side, in dire circumstances from h5.

**38 ... g4?**

This is my only mistake (near the time control of 40 moves in 2 hours) in an otherwise very fine effort. Correct is 38 ... Ke3, and on either 39 Ke1 or 39 Ne2, then 39 ... a5 and White is in Zugswang and has no good waiting move. Depending on which side he moves to, Black can win on the other side.

**39 h4?**

White can draw with 39 h×g4 f×g4 40 Ne2, when Black's king dare no longer venture to the K-side as White can opportunely create a passed pawn by Nd4 c6. So Black must play 40 ... K×c4 41 Nf4 when White obtains enough freedom to draw. Both sides have to play very carefully, White's king going to the Q-side, and Black's staying in the center.

**39 ... Ke3! 40 Ne2**

On 40 Ke1, comes 40 ... a5 winning.

**40 ... Kf2 41 Kd2 a5!**
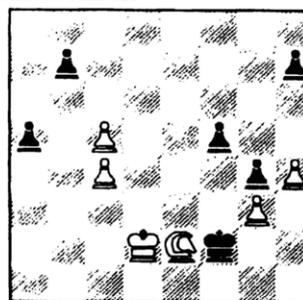


Position after 41 ... a5

**42 Kd3**

The only chance here was 42 Nd4 K×g3 43 c6 (after 43 N×f5† Kf2 44 h5 g3 45 Nh4 g2 46 N×g2 K×g2 Black will win because the White king must approach b7 via a5 [else the Black a-pawn will advance] and this allows Black to merely bring his king to d4 which is winning), 43 ... b×c6 44 N×c6 f4!! (44 ... Kf2 loses to 45 Ne5!) 45 Nd4 (45 Ne5 f3 46 Ke1 a4 wins), 45 ... f3 46 c5 f2 47 Nf5† Kf3!! 48 Ne3 g3 49 c6 g2 50 c7 (50 N×g2 f1(Q) wins), 50 ... g1(Q) 51 c8(Q) Qe1† and Black wins the endgame. Very tough stuff, that I didn't see the end of at the table, and Belle certainly did not fathom.

**42 ... a4! 43 Nd4 a3 44 Kc2 a2 45 Kb2 f4! 46 Nf5 f×g3**

White Resigns

**References:**

Gillogly, James J., "Performance Analysis of the Technology Chess Program", Department of Computer Science, Carnegie-Mellon University, March, 1978.

Reinfeld, F., *Win at Chess*, Dover Publications, 1945.