The TCEC17 Computer Chess Superfinal: a perspective

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1   The TCEC17 Premier Division

In past years, I have paid only cursory attention to DivP, experiencing it as the necessary but pallid taster before the anticipated main course! However, this year's DivP was extremely entertaining and captivated my attention from beginning to end. The format was slightly odd as – in order to save costs on the hiring of the GPU server – all CPU machines games were played first. The downside was that the exact ranking order was shrouded in mystery until the very end due to the differing numbers of games played by CPU and GPU engines. On the other hand, organising the games in this fashion did reveal some interesting trends and contrasts.

It's obvious that whatever CPU engines do, STOCKFISH does it much better! Six of STOCKFISH's seven wins were scored against other CPU engines and it dominated the early part of DivP. For the rest of the event, STOCKFISH was solid and in the only game it seemed in danger – White against STOOFVLEES – STOCKFISH came through for the win!

For the GPU engines, ALLIESTEIN got off to a great start and seemed on course to repeat its Season 16 feat of pipping LEELA to the Superfinal by scoring heavily against the weaker engines. The wheels fell off ALLIESTEIN's challenge with two heavy losses against KOMODO and ETHEREAL. LEELA moved past ALLIESTEIN by putting together a string of wins although none of them felt too convincing. ETHEREAL was tricked, or tricked itself, in an opposite-coloured bishop ending while STOOFVLEES and SCORPIONN seemed to self-destruct. There was a very impressive King's Indian win against KOMODO but LEELA also suffered two losses against ETHEREAL (a crunching win for ETHEREAL from a favourable – but certainly not winning – White opening) and KOMODO (LEELA getting tricked from a good position while on increments). All-in-all, I wasn't sure what to expect from LEELA in the Superfinal!

Of the other engines, ETHEREAL's name has been mentioned often and that's no coincidence. With six wins and six losses, ETHEREAL was the 'hooligan' of DivP! Some of its losses were beautiful NN vs AB games (both STOOFVLEES and ALLIESTEIN defeated it in great style) but its wins were just as good. Impressively, it had the power to push the strongest NNs off the precipice when things got fraught! STOOFVLEES was also very interesting (a strong Grandmaster asked me whether it could be downloaded as it seemed to be finding different moves to all the other engines!) but rather up and down – you wouldn't bet your house on the soundness of a STOOFVLEES sacrifice! Finally, ScorpioNN is worth an honourable mention for enterprising play. It lost a lot of games but contributed a lot of thrills!"

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2   The TCEC17 Superfinal

I have been watching the TCEC Superfinal since Season 11 (STOCKFISH against HOUDINI) which makes me a young colt compared to most of the TCEC chat participants! In my experience at least, I have never witnessed such an interesting set of Superfinal games as these. Every single game had moments of deep chess interest, quite apart from the drama of the games themselves.

In general, although the engines are extremely close in playing strength, LEELA simply has more positions in which it can hurt STOCKFISH with the white pieces. Any structure resembling a King's Indian, Benoni or French is likely to be an excruciating experience for STOCKFISH. By contrast, apart from Open Sicilians where STOCKFISH is a complete assassin, LEELA defended a wide range of positions quite excellently even – quite shockingly – deservedly winning the mini-matches in the fairly random Trexler and Dragon! LEELA's defensive method seemed to be a mixture of extreme activity combined with a subtle appreciation of fortresses; by contrast, STOCKFISH's attritional defence – normally so difficult to break – was found wanting in many games. I also felt that LEELA had improved greatly when short of time: despite a couple of accidents, LEELA generally played securely on increments and brought home a number of wins despite time shortage.

A word about Jeroen Noomen's opening selections for the Superfinal which always attract a lot of comments – excellent! Both engines had ample opportunity to display their biggest strengths and this was reflected in the number of decisive games and the excitement level of many of the drawn games. I think the character of each engine emerged very clearly as a result of these opening choices and this certainly played a role in attracting – and keeping – viewers during the entire Superfinal. A viewer asked me "is it wrong that I'm finding this match more exciting than the last human world championship (until the rapid-play games)?" I replied that it was all about great chess, and with such different styles clashing it's easy to have a strong opinion about who you want to win! All the key ingredients are there for good watching - fun! (and disappointment, elation and tension). A big thanks to all the TCEC volunteers who make this wonderful event possible and long may it continue! Now…for the games!

Game 1. The Superfinal started with two games with a 1-ply opening book. Game 1 was an uneventful draw on the face of it but featured a stunning moment in the opening that also awed the Chess24 commentary team of Jan Gustafsson, Laurent Fressinet, Peter Heine Nielsen and Anish Giri.

13...h5, Fig. 1a. I can understand such a move when it is played on the board, but I doubt I would (dare) think of it myself! Black is a pawn up but has king safety issues (the kingside is out of bounds) while the rook on h8 is oppressed by the pressure of the white rook on the h7-pawn. 13...h5 returns the pawn and neutralises any White hope for a long-term initiative.

14.Rxh5. 14.Bxh5 puts the light-squared bishop into a pin on the h-file. **14...Rxh5 15.Bxh5 Qe7**. With the h-file pressure gone, Black could even choose to place the king on g7 via f8. The exchange of rooks reduces White's active potential while the Bh5 will need to be redeployed as well.

16.Nb3 c6 17.c4 dxc4 18.Rxc4 Bd7 19.Na5 0–0–0 20.Qb1 Be8 21.Bf3 Qc7 22.Qb4 Qb6 and Black was comfortable.

Games 3 and 4. The first of an astonishing seven pairs in which White was victorious in both games. This first set was a microcosm of the whole match: STOCKFISH mates and LEELA grinds. In those seven

decisive pairs (games 3-4, 27-28, 33-34, 43-44, 83-84, 87-88 and 93-94) STOCKFISH took an average of 62 moves to win while LEELA took 134 moves!

Game 3, St-LC0, **20...Rbc8**, Fig. 1b. In the chess24 broadcast, Peter Heine Nielsen expressed his amazement at STOCKFISH's evaluation of +1.89 (signifying an almost decisive advantage). Not that we doubt STOCKFISH's evaluation, but for players brought up on the Karpov-Kasparov clashes in such Scheveningen structures, it's astonishing to think that such a position might simply be bad for Black! You'll note also the white pawn on h6! STOCKFISH made use of this ALPHAZERO/NN strategy on many occasions during the match.

21.Bh3 Qb7 22.Na2 a5 23.Nc3 Rb8 24.b4 axb4 25.axb4 Rfc8 26.f5 Ne5 27.fxg6 fxg6 28.Bf4 Rf8 29.Qd4 Qc7 30.Nd5. After some queenside manoeuvring that I don't understand too well, STOCKFISH opens the f-file and exploits the mate threats on g7 created by the pawn on h6. Easy! **30...exd5 31.Bxd7 Qxd7 32.Qxd5+ Nf7 33.Qd4 Bf6 34.Qxf6 Ne5 35.Qg7+ Qxg7 36.hxg7 Rfe8 37.Bxe5 dxe5 38.Rf8+ Rxf8 39.Rxf8+ Rxf8 40.gxf8Q+ Kxf8 41.Kf1** and the king and pawn ending was easily winning (only White can safely create a passed pawn with c2–c4).

Fig. 1. (a) game 1 (St-LC0) pos. 14w; (b) game 3 pos. 21w; game 6 (c) pos. 22w and (d) 32w; (e) game 7 pos. 10b.

Game 6, LC0-St. We moved for the first time to the Mar del Plata variation of the King's Indian – one of the most complex opening variations in modern chess theory. I was extremely impressed with both sides. LEELA reproduced one of the most critical lines and then STOCKFISH found an exceptional method of defence that the engines running on my hardware certainly couldn't reproduce.

21...g4 as in Fig. 1c. The novelty from STOCKFISH and very logical: hit the pawn on e4 before White defends it with Rc4! **22.fxg4**. It is possible to leave the pawn on g4 but that always makes me nervous! ...g4–g3 exposing White's kingside dark squares is a typical pawn sacrifice in such situations.

22...Nxe4 23.Rc4. White plays to 'absorb' Black's play by capturing on g4 (removing any Black hopes of a general kingside pawn storm) and then trying to hold back Black's central pawns and shore up its own weakened pawn on d5. **23...Nf6**. STOCKFISH spies a concrete and precise solution to its greatest problems. I was looking mainly at two other moves (23...Nc5 and 23...Ng5). Amazingly, 23...Nf6 wasn't selected in any of my engine matches despite manifold opportunities!

24.Bf3 e4 25.Bxe4 Bxg4 26.Bf3 Bxf3 27.Qxf3. Intuitively, I would guess at a substantial White advantage here. **27...Ne5 28.Nxe5 dxe5 29.d6 Rc8 30.Rc6**. 30.Rc7 is the move White desperately wants to play but 30...Bxd6 31.Rxc8 Qxc8 32.Nxd6 Qc5+ cleans up for Black.

30...Rxc6 31.Qxc6 Nd7, a strong defensive move, Fig. 1d. The knight covers the weakness on b6, the d7-knight is firmly protected by the rook on f7, the knight on c3 cannot easily find its path to the key e4-outpost and the black queen is now free to roam and cause trouble on the kingside.

32.b4. 32.Nc3 Nc5. **32...axb4 33.Bxb4** protecting d6, preventing ...Nc5 and preparing Nc3–e4.

33...Qg5 34.Kh1 Qg4 35.Qc4. 35.Nc3 f3 hits the bishop on b4! **35...Qg6 36.Qd5**. 36.Nc3 Bxd6 and now the pawn on d6 hangs! **36...Kh8 37.Nc3**. Finally, White has covered the threat of ...f4–f3 and defended d6 so the knight can retreat to c3. However, can it get to e4? **37...Rg7**. Not now!

38.Ba3 Rg8 39.Re1 Qh5 40.Bb2. 40.Ne4 f3. Since the rook has moved away from f1! 41.g3 f2 42.Nxf2 Rxg3. **40...Qg6** hitting d6 again. **41.Ba3 Rg7 42.Rd1 Nf6**. Now the rook has moved from e1, Black takes the opportunity to activate the e-pawn: White's plan to blockade e4 with a knight has been successfully countered!

43.Qf3 e4 44.Nxe4 Qxe4 45.Bb2 Qg6 46.d7 Nxd7 47.Bxg7+ Qxg7 48.Qxf4 Qf6 and the resulting position is even: STOCKFISH holds it without any difficulty (as you'd expect!).

Game 7. The next set of games put STOCKFISH back out in front as it navigated the crazy complications of the Dracula-Frankenstein opening better than LEELA and then held the return. **1.e4 e5 2.Nc3 Nf6 3.Bc4 Nxe4 4.Qh5 Nd6 5.Bb3 Nc6 6.Nb5 g6 7.Qf3 f5 8.Qd5 Qf6 9.Nxc7+ Kd8 10.Nxa8**, Fig. 1e.

Games 11 and 12. We seemed to be settling into the familiar pattern of STOCKFISH winning unbalanced tactical positions with White and then easily holding the return. This seemed to foreshadow a rough ride for LEELA. However, the game pair 11 and 12 made me revise that opinion.

18.Qg3, Fig. 2a. I feared for LEELA's life here as I have lost many such positions against STOCKFISH. White has a lead in development, the black king is in the centre and the kingside is difficult to develop. However, LEELA extracted every ounce of activity from its pieces with a dynamic defensive plan and drew comfortably in the end. **18...Qf5 19.h3 Be7 20.Qxg7 Kd7 21.Qg3 Rhg8 22.Qb3 Qe4 23.g3 Rac8 24.a5 Bh4 25.Qa4+ Ke6**, Fig. 2b. Look at those pieces! **26.Qxd4 Qxd4 27.Rxd4 Be7 28.Be3 Rc2 29.Rf4 Bg5 30.Rg4 Bxe3 31.Rxg8 Rxf2 32.axb6 axb6 33.Re8+ Kd7 34.Raa8 Rf3+ 35.Kg2 Rf2+ 36.Kh1 Rf1+ 37.Kg2 Rf2+ 38.Kg1 Rf4+ 39.Kh1 Rf1+ 40.Kh2 Rf2+ ½–½.**

Game 12 was intriguing and revealing for a number of reasons. Firstly, the general rule 'LEELA vs French = 1-0' was confirmed. LEELA still clearly enjoyed a massive positional superiority in such structures which augured ill for STOCKFISH games with Black. Secondly, LEELA's time handling was a source of worry now and for the rest of the match. As a human player, you manoeuvre and repeat moves from a position of strength to gain time and weaken the opponent's resistance. The only result of LEELA's shuffling seemed to be to lead LEELA into time trouble! Thirdly, you wondered a little about STOCKFISH's defensive technique.
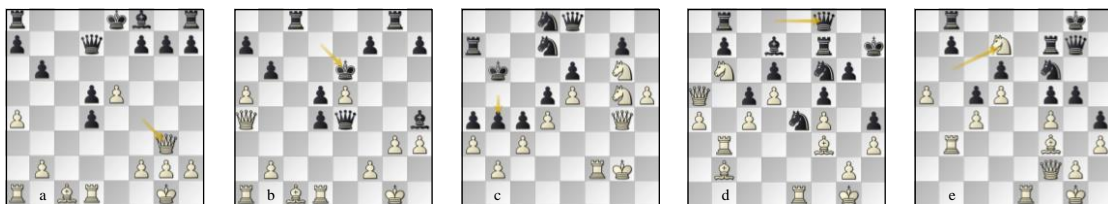

Fig. 2. Game 11 positions (a) 18b and (b) 26w; (c) game 12 pos. 88w; game 14 positions (d) 28w and (e) 32b.

87...b4, Fig. 2c. STOCKFISH has been completely outmanoeuvred but is hanging on grimly. The casual observer would expect STOCKFISH to hold its position and let LEELA work out a way to break through. However, STOCKFISH saw something it didn't like (its assessment was already 5.25) and played the desperate 87...b4. In principle, it's a decent option to weaken the white d4-pawn after cxb4 with hopes

of counterplay with …c4-c3. However, with LEELA short of time and a considerable period of status quo shuffling behind it, this felt like making LEELA's progress for it! I haven't analysed this position in detail yet. All I can say is that from time to time I have taken the LEELA side of such an endgame and played some rapid games against an engine like KOMODO. When you play it out yourself, you appreciate the LEELA shuffling much better. A fair amount of it does have some point! My feeling is that LEELA would have found a way through without this move. A plan like Qf4/f3 and Nf7 looks like an easy and promising start!

Finally, LEELA's technique in winning the resulting ending was somewhat nerve-wracking – watching it unfold at increment-only pace, it felt like LEELA almost messed it up a few times… but it must be said LEELA is much stronger at that speed than me!

Game 14. LEELA stretched its lead further in a Benoni as STOCKFISH proved that cruelty to its dark-squared bishop in Benoni and King's Indian structures is ingrained (an exchange of the dark-squared bishop with …Bxc3 in game 66 was particularly shocking). LEELA's technique in such cases is to sacrifice pawns to open lines for its unopposed dark-squared bishop and pin STOCKFISH down with its long-term advantage on a colour complex. One moment did arouse some disappointment in the chess24 commentators, see Fig. 2d. White has a beautiful position and with such a mighty dark-squared bishop you would expect White to somehow break open the kingside and deliver mate – "ALPHAZERO-style" as Anish Giri said! Instead, LEELA played very efficiently, starting with a move that no normal human player would ever consider - 28.Bxf6, giving up the pride of White's position!

28.Bxf6 Nxf6 29.Qd2 Qg7 30.a5 Kg8 31.Qf2 g5 32.Nxd7, Fig. 2e. Again, a very 'efficient' exchange, exposing more weak squares in the Black position. The danger in such exchanges is that the squares you gain are less valuable than the Black gains as his passive pieces are exchanged. LEELA seems to time it just right however! **32...Nxd7 33.Bh5 Rff8 34.Re6 Nf6 35.Qe2 Qh6 36.Bf3 g4 37.hxg4 fxg4 38.Bxg4 Qxf4 39.Bh3 Qc1+ 40.Qe1 Qxe1+ 41.Rxe1 Kg7 42.Rb6 Rfd8 43.Reb1** and LEELA won the b-pawn and the game.

Game 16. It looked like plain sailing for LEELA, but game 16 got the nerves of the LEELA supporters jangling. Unwilling to settle for the moral superiority of the better side of the draw, LEELA sacrificed first one pawn with **82.f5**, Fig. 3a – and then a second with **130.g6**, Fig. 3b. STOCKFISH accepted the gifts – dangerous as they were – and navigated the complications to a win. Might this turn out to be a costly loss?

Fig. 3. Game 16 positions (a) 82b and (b) 130b; game 18 positions (c) 6b, (d) 14b and (e) 18b.

Game 18. This game featured a remarkable opening concept from LEELA. **1.d4 Nf6 2.c4 e5 3.dxe5 Ng4 4.e3 Nxe5 5.f4 Nec6 6.Ne2**, Fig. 3c. I've tried not to get overexcited about 6.Ne2 but it is simply a really good move! This position is pretty strange. Despite spending four moves moving its knight (...Nf6-g4-e5-c6) Black is not behind in development! In fact, after White's last move, Black will be ahead as

White will have to spend an additional tempo to develop the bishop on f1. However, Black is facing some serious structural problems. The pawns on c4, e3 and f4, combined with the half-open d-file give White a firm grip on the centre. In particular, White's grip on e4 and d5 is strong due to the unusual position of the king's knight on c6: Black's natural control of the e4-square (from a knight on f6) is missing while the knight on c6 gives White a strong knight outpost on d5. Black will need to move the knight once again to chase the knight away with ...c6 (which itself weakens the d6-pawn). Black's kingside is also bereft of pieces, and the pawn on f4 is a natural starting point for all sorts of kingside pressure.

6...d6. 6...g6 7.Bd2 is the first point of 6.Ne2, delaying the development of the knight on b1. Exchanging off the dark-squared bishops with Bc3 "flattens out" Black's position and drains it of its dynamic potential. **7.b3** dissuading Black from playing ...g6 due to Bb2, and again making use of the delayed Nc3. **7...Bg4 8.Nbc3 Be7 9.g3 Bf6 10.Bd2**, two remarkable moves. Peter Heine Nielsen tweeted that if a beginner had played these moves, he would have told them off! Despite their strangeness, they offer Black no chances for counterplay. In general terms, 9.g3 prepares Bg2, developing White's light-squared bishop and increasing White's control over the e4 and d5 central squares. 10.Bd2 defends against the tactical threat of ...Bxc3 and keeps the e3-pawn defended against future attacks by a black rook on e8. With this development, White leaves itself open to the disruptive ...Bf3, but Black lacks a concrete follow-up, and ...Bf3 ends up losing as much time as it gains.

10...Bf3 11.Rg1 h6 12.Kf2 Bh5 13.g4 Bg6 14.Rg2, Fig. 3d. Shogi-like castling! The rook is great on g2, supporting a future g4–g5 push against the black king and leaving a little space for the white king to slip into safety. The rook also covers the second rank laterally including the a2–pawn!

14...0–0 15.Rc1 Nd7 16.Ng3 Nc5 17.Kg1 a5 18.Nd5, Fig. 3e. The knight occupies its strong central outpost, and cannot easily be driven away: for example, ...Ne7 is met by Nxf6+. Unfortunately, LEELA couldn't transform this strong position into a win, but wonderful opening play nonetheless.

Games 21 and 22. These featured two fantastic fights in the Panno variation of the King's Indian Samisch. I loved game 21 as STOCKFISH's attempts to hammer its pieces into the centre collided with LEELA's own ALPHAZERO-confusion style of defence. Fig. 4a: **17. h4**. White is threatening to get a complete grip on the position. LEELA starts a great sequence of moves to shake the foundations of White's position at the expense of a couple of pawns. **17...h6 18.Nxf6+ Bxf6 19.Bxh6 d5 20.exd5.** 20.Qxd5 Rxb2. **20...Nd4**, Fig. 4b.

Fig. 4. Game 21 positions (a) 17w, (b) 21w, (c) 22w and (d) 37w; game 25 pos. 14b.

A typical, crazy King's Indian! Black has a number of trumps in return for its material investment. Firstly, its development: all of Black's pieces are active, and even the queen on d8 supports a possible (risky) pawn grab on h4. By contrast, White still has to develop the bishop on f1 and find safety for the white king. However, White's space advantage and the extra pawns form a barrier to keep Black's

pieces at bay, and there is no clear way for Black to invade the White position. Moreover, the extra material allows White to contemplate returning the exchange (for example) in order to complete its development. There are a lot of weaknesses in Black's position, so Black must not run out of initiative.

The most obvious goal is to get a white knight to e4 from where it blocks ..e5-e4 and attacks the black bishop on f6 and the weakened kingside dark squares. **21.b3**. When you see how often the b-pawn hangs in variations, this becomes an excellent move.

21...a5, Fig. 4c. One of those great NN moves! The key to White's position is the solid queenside structure particularly after White sacrifices the exchange to ...Bb5xc4. 21...a5 will disrupt this solid structure with ...a4 and somehow, that is the key to holding the balance in this position! **22.Kf2 Nf5 23.Nc3 a4 24.b4 Bb5**. Black keeps on shaking at the foundations of White's position! Somehow LEELA keeps on finding new ways to do it! **25.Nxb5 Rxb5 26.Rc8 Qxc8 27.Bxb5 Rd8 28.Bc6 Qc7**, a great move, threatening ...e4. **29.g4 Qb6+ 30.Be3 Nxe3 31.Qxe3 Qxb4 32.h5 Be7 33.Kg2 Bc5 34.Qe4 Qd2+ 35.Kh3 Qg5 36.Bxa4 Rb8**, Fig. 4d.

The loosening started with 21...a5 has paid its dividends: the rook has a new avenue for invasion. White even needs to be a little careful. **37.Re1 Rb4 38.Qxe5 Qxe5 39.Rxe5 Rxa4 40.hxg6 fxg6 41.d6 Bxd6 42.Re6**, transposing to an RB vs R ending. Humans may worry about holding this, but STOCKFISH has no fear! **42...Bf4 43.Rxg6+ Kf7 44.Rc6 Ke7 45.Kh4 Rxa2 46.g5 Ra4 47.g6 Kf8 48.g7+ Kg8 49.Rc8+ Kxg7** ½–½.

Game 25. After two surprising games in which a topical line of the Schliemann held its own, we had another surprise. I'd called this variation of the 5…Na6 Slav a sure 1-0 opening but LEELA's defensive technique of relentless activity paid dividends, see Fig. 4e. By contrast, STOCKFISH was slowly ground into submission as LEELA picked a slightly better ending and nursed its advantage home. This was the start of a period of great drama as the next three games were also decisive. First of all …

Game 27. LEELA was caught napping by a trademark lightning STOCKFISH attack. Fig. 5a: **71...Bc6**.

Both sides had been manoeuvring 'aimlessly' for some moves but somehow LEELA's pieces had all ended up on the queenside and STOCKFISH was not slow to exploit this. **72.g4 fxg4 73.Qg1**, Fig. 5b. A great move that makes sense of all White's pieces: Qxg4 is coming with enormous pressure against the Black kingside.

73...gxf3 74.Rxh6 Be8 75.Kxf3 Nxb3 76.Rh3 Nd2+ 77.Kg2 Ne4 78.Qh2 Qxa4 79.Rh8+ Kf7 80.Rh7 Kf8 81.Qh3 Qc6 82.Nf4 Bf7 83.Qg4 g5 84.Qf3 gxf4 85.Qxf4 Qc7 86.Rh8+ Ke7 87.Qh4+ Kd7 88.Bb5+ and Black's position was gone.

Fig. 5. Game 27 positions (a) 71b and (b) 73b; (c) game 29 pos. 12w; game 33 positions (d) 23w and (e) 35b.

LEELA's reaction was immediate: STOCKFISH landed in a French-type structure and was put aside beautifully in 181 moves! STOCKFISH reacted again with a fine positional performance in a somewhat dodgy Benoni structure arising from the Queen's Indian, see Fig. 5c. The return game followed the sparkling KOMODO-HOUDINI game from DivP but STOCKFISH defended as only it can and denied LEELA a revenge win.

Games 31 and 32 were again 1-ply games starting with **1.e4**. 'Boring LEELA' chose the Berlin as Black, but STOCKFISH chose the Najdorf Sicilian to face 1.e4. LEELA came close in a tense game but had to settle for a draw.

Games 33 and 34. These were again perfect illustrations of the different characters of the engines. STOCKFISH's win in game 33 was awesome. There was criticism of LEELA for once again leaving its king undefended, but that was harsh in my opinion: more a result of some stellar STOCKFISH middlegame play and Black's urgent need to seek counterplay.

Fig. 5d, **23.Bd4**, a very strong move. Once the bishop on g7 disappears, so do any remnants of Black's play. Black must devise a new plan to mobilise its pieces and create counterplay. The only way the bishop on c8 can be developed is on b7 or a6, but this reinforces White's control of the d-file by also providing an entry point into d7. Black 's best way of developing counterplay is to exploit the advanced extra c-pawn and turn this into a distracting passed c-pawn by supporting it with ...b5–b4. All the elements of Black's plan are fairly clear but what state Black's kingside will be in while Black is doing all this... well that's anyone's guess!

23...Bxd4 24.Rxd4 Qc5 allowing the b-pawn to advance to b4. **25.f5 b5 26.Rad1** firmly taking hold of the d-file. **26...Ba6 27.a3** trying to gain White some extra time for its kingside attack by holding back the b-pawn which will make it harder for Black to create a passed c-pawn: this is particularly effective as ...Ba6 has blocked the supporting move ...a5. **27...Rab8 28.h4 Bb7**, a decisive error according to the TCEC STOCKFISH as its evaluation jumped to 1.81, but it is far from obvious why this is decisive (it IS obvious that it is dangerous!) It does feel a bit odd playing first 26...Ba6 and then 28...Bb7. **29.h5 gxh5 30.gxh5 Qe5 31.Qh4 c5 32.Rd7**, 3.77 now! LEELA is still on 0.28.

32...b4 33.f6 Kh8 34.Rxf7 Bc6 35.Rg7, Fig. 5e. A move that neither LEELA nor STOOFVLEES saw before it was played! In general terms, it is logical for White to block the g-file - a source of counterplay for Black - but the follow-up is not clear as the black queen on e5 is a dominating presence in defence. The queen stops White's obvious attempt of f7 followed by mating via Qf6, and it isn't easy to improve this idea as the queen cannot be driven away from the a1–h8 diagonal.

35...c3 36.bxc3 Rf8. 36...bxc3: I will freely admit that I scratched my head for a while before I understood what was wrong with this line. White's idea is not too difficult but has an unusual twist that is easy to overlook. 37.Rf1 *(37.Rg5 c2)* 37...c2 38.Qg4 threatening Rxh7+ 38...Rg8 39.h6 with an equally insidious threat! 39...c1Q *(39...Qxf6 40.Rxf6 c1Q+ 41.Kh2 and either Rff7 or Qf5 is coming in.)* 40.Rxg8+ Rxg8 41.Qg7+ Rxg7 42.hxg7+. The winning move is not what you would expect! *(42.fxg7+ Kg8 and Rf8# is illegal!)* 42...Kg8 43.f7+ Kxg7 44.f8Q+ Kg6 45.Rxc1 wins. And this exact line was played later on in one of my STOCKFISH – FAT FRITZ engine matches! 45...Qd4+ 46.Kh1 Bxe4 47.Qe8+ Kf5 48.Rf1+ Kg5 49.Qe7+ Kg6 50.Bxe4+ Qxe4+ 51.Qxe4+ Kg7 52.Qg4+ Kh6 53.Rf6# 1–0.

37.Rf1 bxc3 38.h6 Be8 39.f7 Bxf7 40.Rfxf7 Rxf7 41.Rxf7 c2 42.Rf1 Rg8 43.Rc1 Qd4+ 44.Qf2 Qd1+ 45.Qf1 Qd4+ 46.Kh1 Qd6 47.Rxc2 and STOCKFISH cleaned up efficiently.

The return was however once again a let-down for STOCKFISH fans. LEELA chose a completely different path to STOCKFISH, establishing a solid central structure to restrict STOCKFISH's pieces (the light-squared bishop in particular). Fig. 6a shows position 37b. LEELA gradually optimised its pieces until STOCKFISH broke.

Games 35 and 36. Another big shock however was still to come as LEELA won the Sicilian Dragon series 1.5-0.5 which I certainly had not anticipated. LEELA's active and confusion-oriented style of defence worked much better than STOCKFISH's attritional style. In game 35, LEELA got the position of Fig. 6b but in game 36, STOCKFISH got the position of Fig. 6c. All the commentators on the chess24 broadcast simultaneously made a disgusted face and said "Ugh" when they saw this position for Black! LEELA converted it in typical NN fashion, using a transposition to a rook and opposite-coloured bishop ending to seal the win.
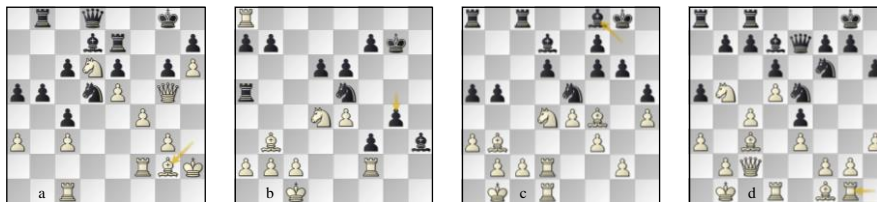

Fig. 6. (a) game 34 pos. 37b; (b) game 35 pos. 30w; (c) game 36 pos. 21w; (d) game 38 pos. 17b.

Games 37 and 38. STOCKFISH fans suffered still more pain as STOCKFISH went badly astray in a 2-ply opening 1.d4 Nc6, reaching a type of position in which it lost as helplessly as STOCKFISH 8 did against ALPHAZERO. After **17.Rg1**, Fig. 6d, Black's counterplay was already impossible to imagine. …a5 is never good if Black cannot follow up with …c6. Here the knight on b5 and rook on d1 combine to stop this break leaving Black with precious few options for developing queenside play. White by contrast can prepare f4 at its leisure and start driving back the black knights.

The match definitely had swung LEELA's way after an uncertain start but LEELA's time management and occasional blunders and STOCKFISH's enormous strength in open positions where king safety is a factor were enough to keep the outcome - and the spectators! - uncertain until the very final games.

Game 40. The fantastic Game 40 was featured on the chess24 live broadcast! On the Black side of the French, STOCKFISH found a concrete path to gain space for its pieces and create weaknesses in White's position reaching one of the best French openings I have ever seen it achieve against LEELA! However, STOCKFISH's manoeuvres had cost time, and LEELA seized the moment… Fig. 7a: **15.Qxd3**.

Looking at this position, it's hard to imagine that six moves later White will be at Black's throat! There's something about gaining the bishop pair that gives you a false sense of security: you see the extra bishop on your own side, you see the squares in the opponent's camp that the bishop is no longer protecting and you forget about the time you have spent capturing it (four moves: ...Nf6–d7–c5xd3 compared to just one development move Bd3 for White) and the cost that carries somewhere in your position!

15...Qc7. This feels somewhat risky and loose: getting the kingside developed and the king out of centre feels like the most urgent task. **16.Rb1 Be7 17.f5**. Suggested by Laurent Fressinet during the

Chess24 live broadcast and to everyone's amazement LEELA whacked it out too! **17...Nxe5**. The brave option is the only one!

18.Qe2 Bc8 A very ugly move but a necessary one, partly to defend the e6–pawn but more urgently to remove the bishop on b7 from the attack of the rook on b1. However, while falling further behind in time (undeveloping instead of developing) Black's positional advantages are accruing: next to the two bishops, Black also has destroyed White's main central pawn. It means that as White's attack gains pace, it also increases White's risk. It's the typical STOCKFISH defensive technique of sawing the legs of your ladder off as you climb the parapet! **19.Bf4 Bd6 20.Ne3 0–0 21.f6**, Fig. 7b. A very dangerous attempt. Positionally, White's position looks pretty ragged but this bone in Black's gullet cannot be removed, and that is going to cause severe problems in Black's kingside.

21...g6, such an interesting position. White's problem is that its attack is fairly one-dimensional: essentially White has to get its queen to h6 or nothing will happen. That aids Black's defence as Black does not have to worry about dangers coming from multiple angles. It seems in general that Black is holding but that assumes some excellent evaluation of far-from-obvious positions and some nerves of steel! 21...gxf6 led to mate all over the shop! 22.Ng4 Nd7 *(22...Nxg4 23.Qxg4+ Kh8 24.Qh4 Bxf4 25.Qxf6+ Kg8 26.Rxf4 e5 27.Qg5+ Kh8 28.Qf6+ Kg8 29.Rf5 h6 30.Rh5 1–0, STOCKFISH 11 – FAT FRITZ)* 23.Nxe6 fxe6 24.Qxe6+ Kh8 25.Bxd6 Nb6 26.Qe7 Qxe7 27.Bxe7 Bxg4 28.Bxf8 1–0, FAT FRITZ – STOCKFISH 11.
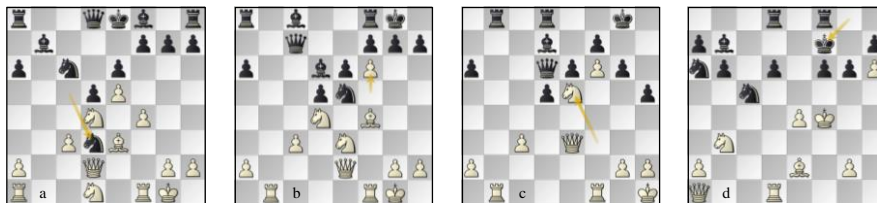
Fig. 7. Game 40 positions (a) 15w, (b) 21b and (c) pos. 29b; (d) game 50 pos. 23w.

22.Qe1 Rd8 23.Kh1 h5 24.Qg3 Nc4 25.Qg5 Nxe3 26.Bxd6 Qxd6 27.Qxe3 Bd7 28.Nf3 Rab8 29.Ne5, Fig. 7c. During the game, this looked like a nightmare brewing for STOCKFISH. from a human perspective, White looks great: pawns on f6, impregnable knight on e5, bad bishop for the opponent, weak king... and all this for just a pawn. However, STOCKFISH finds a great defence.

29...Rxb1 30.Rxb1 Rb8. A blunder? It seems to lose a piece! **31.Rxb8+ Qxb8 32.h4**. 32.Nxd7 Qb1+ 33.Qg1 Qxa2 is astonishingly seen as even by both engines. The a-pawn is a distraction and White's king lacks cover to be able to avoid a perpetual if the white queen leaves its side. **32...Ba4 33.Qh6 Qf8 34.Qxf8+ Kxf8 35.Kg1**. This looks so good... but it's trivially drawn! The bishop moves to the a6–f1 diagonal to protect the pawn on a6 and White can make no progress. If the knight moves too far away from e5 then the passed e-pawn will roll!

The Scandinavian with 3…Qd6 took a hammering in game 43 and 44 and then a series of draws started from game 45 to game 65. Not that there wasn't plenty of drama in those! We'll just mention a couple of them.

Game 50. This featured a crazy queen sac line played in Firouzja–Karthikeyan, Asian Continental Open, 2019. LEELA handled this opening rather more successfully than STOCKFISH, creating winning

chances with both colours. The position after the 22nd move, Fig. 7d, was extraordinary. White's king is already on f4 and Black plays 22…Kf7 to meet it!

Game 61. Another game that particularly appealed to me was LEELA's handling of the Black side of this very dangerous Trompovsky Gambit! LEELA's defence was a curious mix of extreme activity – trying to strike back immediately with 7…e6 rather than trying to ride out the storm – followed by a switch to a fortress-style of defence.

1.d4 Nf6 2.Bg5 c5 3.d5 Qb6 4.Nc3. This was the last move specified in the TCEC book. It's a sharp gambit favoured by top Trompovsky practitioner English GM Julian Hodgson. **4...Qxb2 5.Bd2 Qb6 6.e4 d6 7.f4**, Fig. 8a.

White has sizeable compensation for the pawn. In a Benoni-type structure, Black has not yet made a start on developing its kingside, and both of Black's developed pieces are targets: the Nf6 to e4–e5 and the Qb6 to Rb1. LEELA now takes a typical NN decision - the type of decision we have seen ALPHAZERO take on many occasions: LEELA doesn't wait for White to optimise its position further and strikes back, sharpening the play immediately. Contrast that with STOCKFISH's choice 7...Qd8 which aims to keep its head low and hang in there! **7...e6 8.Nf3 exd5 9.e5 dxe5 10.fxe5 Ne4 11.Nxd5 Qd8 12.Bc4 Be6 13.0–0**. A novelty, tactics allowing White to avoid the loss of a piece.

13...Nc6. STOCKFISH 11 – FAT FRITZ: 13...Bxd5 14.Ba5 Nc3 15.Bxd8 Nxd1 16.Bxd5 Nc6 17.Raxd1 Rxd8 18.Ng5 Nxe5 19.Bxf7+ Nxf7 20.Rde1+ Ne5 21.Rxe5+ Kd7 22.Rd1+ Bd6 23.Nf7 Kc6 24.Re6 Rhf8 25.Nxd6 Rf6 26.Nf7+ Rxe6 27.Nxd8+ Kb6 28.Nxe6 1–0.

14.Be1 getting the bishop out of the range of the knight on e4 while covering c3 (and thus stopping the counter ...Nc3). Black's knight on e4 is now in danger. LEELA takes the sharpest option again, counterattacking the knight on d5. 14.Be3 Nc3. **14...Qd7 15.Qd3 0–0–0 16.Rd1 Nd4**. Again the sharpest line, blocking the communication of White's pieces with the knight on d5. **17.Bh4 Bxd5 18.Bxd5 Qxd5 19.c4** - completely unexpected! **19...Qd7 20.Qxe4 Be7**.

A brave decision from LEELA but an extremely good one. LEELA aims for a position in which White has a nominal material advantage but no way to break through. The interesting thing is that LEELA seems to understand that this position carries no danger for Black whereas STOCKFISH was assessing the position as clearly better to winning for White. It was something I had also noticed in my rapid matches between FAT FRITZ and STOCKFISH. Compared to STOCKFISH, FAT FRITZ seemed relatively strong in assessing which positions were 'fortresses' and thus viable defensive positions to aim for.

21.e6 Nxf3+. 21...fxe6 22.Ne5 Qe8 23.Bxe7 Qxe7 24.Rf7. **22.Qxf3 Qxe6 23.Rfe1** pins the queen and wins material - but **23...Bxh4 24.Rxd8+ Rxd8 25.Rxe6 fxe6 26.Qh5 Bf6 27.Qxc5+ Kb8**, Fig. 8b.

Fig. 8. game 61 positions (a) 7b and (b) 28w; (c) game 66 pos. 12w; game 83 positions (d) 15b and (e) 22b.

LEELA assessed this position as close to equal. Indeed in my rapid matches, STOCKFISH was unable to beat FAT FRITZ from this position. Even without the e-pawn, Black has no problems: its rook has a solid outpost, its king's position is safe - and cannot be opened up by any pawn breaks - and the bishop is happy defending one key point on the kingside (g7).

Game 66. The run of draws was interrupted by another LEELA win in a King's Indian where STOCKFISH committed the cardinal sin of exchanging its dark-squared bishop in an open position: **11…Bxc3**.

LEELA played a great game from Fig. 8c, sacrificing multiple pawns along the way. From a human point of view I had already lost interest! It is so obvious you cannot (or **must not** be able to) do this!

Games 67-76 were also draws and fairly well-balanced. It was interesting to see how promising English Grandmaster Tony Miles favourite **1.e4 Nc6** looked for Black in LEELA's and STOCKFISH's hands! Game 77 gave STOCKFISH fans fresh hope as STOCKFISH once again beat an NN in the Chigorin: STOCKFISH 8 had also inflicted a rare defeat on ALPHAZERO in this line too (a fantastic BB vs NN fight). Here STOCKFISH transposed into a better double rook ending that it converted with flawless technique. In the reverse, LEELA was unable to break through STOCKFISH's obdurate defence.

Games 83 and 84. Game 83 was another bruising experience for LEELA on the Black side of a suboptimal Sicilian: Figs. 8d, 8e and 9a should give you the idea! Ouch!

However, LEELA once again repeated the trick of grinding STOCKFISH down in 187 moves! It featured an unusual late blunder from STOCKFISH, allowing a promising exchange sacrifice when it wasn't clear LEELA knew how to proceed.

I found the contrast in approach striking and thought-provoking. In these Open Sicilians, STOCKFISH honed in on the dynamic potential of the White position and turned it almost immediately into a virulent attack. LEELA's approach seemed to turn this dynamic potential back into a positional advantage (such as a superior structure) and then optimise its pieces within that structure until the opponent collapsed. STOCKFISH's play fits the Steinitz maxim that if you are dynamically better, you have to attack or risk losing your advantage; LEELA's approach is strange… but also effective!

STOCKFISH continued to hit back at LEELA. In a King's Indian in game 87, LEELA seemed to be demonstrating superior understanding and better manoeuvring but out of the blue, STOCKFISH was winning! However, this blow was returned in the next game as LEELA got a small stable space advantage out of the opening and then transformed this with exquisite play into a winning position.

Fig. 9. (a) Game 83 pos. 25b; ALPHAZERO–STOCKFISH positions (b) 13w and (c) 13b;
game 90 positions (d) 23w and (e) 26w.

Games 89 and 90. These featured an unusual line of the Nimzo-Indian that ALPHAZERO and STOCKFISH had contested in 2018. I was so struck by the line that I spent a lot of time analysing it in *Game Changer* (Sadler and Regan, 2019). In particular, two moments flabbergasted me: 12…Bxc3 (Black gives up its dark-squared bishop that could defend the chronically weak kingside dark squares) and 13.Ne2 (ALPHAZERO doesn't take it!!).

ALPHAZERO – STOCKFISH 8 [E47]: **1.d4 Nf6 2.c4 e6 3.Nc3 Bb4 4.e3 0–0 5.Bd3 b6 6.e4 Bb7 7.e5 Bxg2 8.exf6 g6 9.Bg5 d5 10.Qg4 Bxh1 11.0–0–0 dxc4 12.Bc2 Bxc3**, Fig. 9b. **13.Ne2**, Fig. 9c.

Now there's an update to be made to the chapter as STOCKFISH played **12…Nd7** against LEELA. It's one of my big regrets now that I only asked ALPHAZERO about the lines it wanted to play after **12…Bxc3**, and not earlier! The game between LEELA and STOCKFISH was a thriller and funnily enough demonstrated quite a few of the defensive techniques we discussed in *Game Changer*, most notably the weakening of White's king position to allow the black queen to generate counterplay. That counterplay came… just in time!

1.d4 Nf6 2.c4 e6 3.Nc3 Bb4 4.e3 0–0 5.Bd3 b6 6.e4 Bb7 7.e5 Bxg2 8.exf6 g6 9.Bg5 d5 10.Qg4 Bxh1 11.0–0–0 dxc4 12.Bc2 Nd7 13.Nh3 Bxc3 14.bxc3 h6 15.Bxh6 Nxf6 16.Qh4 Ne4 17.Qg4 Nf6 18.Qe2 Qd5 19.Nf4 Qa5 20.Kb2 Qb5+ 21.Kc1 Qa5 22.Rxh1 Qxc3, Fig. 9d.

23.Qe5 Rfd8 24.Nxe6 Qa3+ 25.Kb1 Rd5, Fig. 9e. A form of counterplay we had noted in *Game Changer* too. It's just enough for the perpetual!

26.Qxf6 Rb5+ 27.Bb3 Rxb3+ 28.axb3 Qxb3+ 29.Kc1 Qc3+ 30.Kd1 Qb3+ 31.Ke1 Qb1+ 32.Kd2 Qd3+ 33.Kc1 Qc3+ 34.Kd1 Qb3+ 35.Ke2 Qd3+ 36.Ke1 ½–½.

Games 91-94. Heading into the last 10 games, LEELA suddenly seemed to find an extra gear. Winning the Traxler games 1.5-0.5 was a massive shock, see Fig. 10a: I had that down as a big STOCKFISH chance.

There was another Chigorin disaster for LEELA in game 93, both in terms of LEELA's play and the opening! English Grandmaster Tony Miles once lost a game in this line in 15 moves to a young Dharshan Kumaran, a fantastically talented English player who achieved his GM title without ever becoming professional and who by a nice coincidence currently works at DeepMind! However, LEELA managed to nullify this disaster with a 173-move grind. LEELA's technique didn't look totally convincing but it got there in the end… which was getting to be a common scenario in this Superfinal!
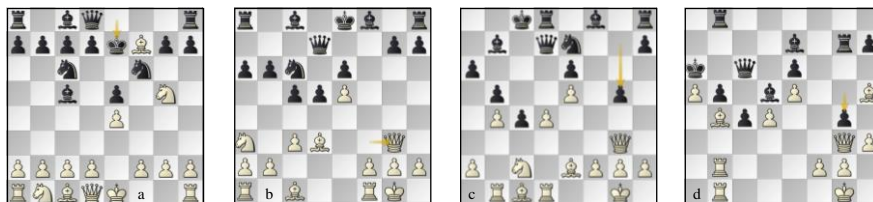

Fig. 10. (a) game 92 pos. 6w; game 95 positions (b) 13b, (c) 20w and (d) 38w.

Games 95 and 96. The Superfinal killer games! A French with Black at this stage of the match was always a scenario that would cause anxiety to STOCKFISH fans, so STOCKFISH's White game was of the utmost importance. However, LEELA chose this moment to play perhaps its best game of the Superfinal.

1.e4 e6 2.d4 d5 3.e5 b6. The TCEC book. Not a STOCKFISH-friendly choice as Black as it leads to typical French structures but it still gives STOCKFISH excellent chances as White. **4.c3 c5 5.Na3**. I've noticed that STOCKFISH likes developing the knight to a3 nowadays. It's not bad here but maybe a little early. **5...Qd7** covering the a4–e8 diagonal to achieve ...Ba6 to exchange off the light-squared bishops. **6.Bb5 f**orcing the black knight to c6 and thus depriving ...Ba6 of any support. The bishop on b5 will be chased away with ...a6 but White's reasoning is that this tempo is of less value than the exchange of the light-squared bishops. **6...Nc6 7.Nf3 a6 8.Bd3 f6**. A sharp continuation, unbalancing the pawn structure. **9.0–0 fxe5 10.Nxe5 Nxe5 11.dxe5 Ne7 12.Qf3 Nc6 13.Qg3**, Fig. 10b.

I'm not very keen on this STOCKFISH plan. I imagine that STOCKFISH was anticipating Black kingside castling and wished both to make it more difficult (by attacking g7) and to position the queen for a subsequent kingside assault. LEELA's plan of castling queenside leaves the white queen a little offside. **13...Bb7 14.Nc2 0–0–0 15.Rb1**, a slow move again from STOCKFISH. My engines wanted the immediate 15.b4 and this seems very reasonable: the rook doesn't necessarily want to be on b1 once Black reacts to b4. **15...b5 16.b4 c4 17.Be2 d4 18.cxd4 Ne7**.

A good plan from LEELA: at the cost of a pawn, Black's pieces have gained greatly in scope and harmony. The bishop on b7 is now active and the knight has a wonderful outpost on d5. White's position is also not ideally suited to launching an attack against the Black queenside. For example, after a4 the white rook on b1 is misplaced: it would be much better on its original square. We are certainly not yet talking about a Black advantage - STOCKFISH was evaluating the position at 0.66 and LEELA at 0.70 - but it's clear that Black has got excellent fighting chances.

19.Rd1 g5, Fig. 10c. Another great active move. White does not want to capture the g-pawn as the combined pressure of a rook on g8 and bishop on b7 against g2 will be extremely unpleasant. However, if White does not react, then the white queen will soon be in the path of the onrushing black g- and h-pawns. **20.Ne3 Nd5 21.Nxd5 Bxd5 22.Bh5**. Again not a bad concept but somewhat passive. White is trying to stem the tide of Black kingside pawns and stifle Black's activity rather than strike back at Black's king.

22.a4 seems more aggressive and worked better in engine matches I ran. 22...Be7 23.Ra1 h5 24.axb5 axb5 25.Ra5 g4 26.Qa3 Bb7 27.d5 exd5 28.Be3 d4 29.Ra8+ Bxa8 30.Qxa8+ Kc7 31.Qa5+ Kb8 32.e6 Qc6 33.Rxd4 when White was at least having some fun! ½–½, FAT FRITZ – STOCKFISH 11.

22...Qc6 23.h3 Be7 24.Rb2 Rdf8 25.a3 Rf5 26.Ra2 Kb7 27.Rf1 Rg8 28.Qg4 Ra8 29.Bd2 Raf8. LEELA's evaluation was slowly converging to 0 (it was just 0.14 now) as these moves were played. **30.Rc2 a5**. Now LEELA started to like its position: –0.21. This move sets White a difficult choice. **31.bxa5**. A very risky decision but strangely enough Black was intending to play ...a5–a4 next move. Moving the a-pawn from a6 to a4 makes the black king's position very solid as White loses the opportunity to open the queenside with a3–a4. After Black plays ...a4, all Black needs to do is to eject the bishop from h5 and get the kingside pawns rolling. It worked quite well for Black in a few of my engine matches! **31...Bxa3**. So White has some possibilities to attack the black king but the positional stakes have been raised enormously: look at the two connected passed pawns that Black has acquired! **32.Qg3 Be7 33.Rb2 Ka6 34.Bg4**. Around now the evaluations of both STOCKFISH and LEELA went very heavily in Black's favour. And indeed, it looks great for Black!

34...R5f7 35.Bh5 Rg7 36.Rfb1 Rb8 37.Bb4 g4, Fig. 10d. A great move! 38.Bxg4 loses a piece to 38...h5 so White must recapture with the h-pawn. But now the bishop on h5 is cut off from the rest of White's position. **38.hxg4 Be4 39.Rc1 Rd8 40.Bxe7 Rxe7**. White's position is becoming a ruin: now

the d4–pawn is in danger. White jettisons g2 to keep the black rooks at bay. **41.Qe3 Bxg2 42.g5 Bd5 43.f4 Rb7 44.Kf2 b4 45.Be2 Rc8**. The pawns are rolling! In order to slow this down, White sacrifices the f-pawn to distract Black with a passed e-pawn. However, as always such attempts also damage the White position and give Black additional opportunities for generating problems.

46.f5 exf5 47.Rbc2 Qb5 48.e6 f4. And here it is! LEELA uses the f-pawn to harass the pieces around the white king. **49.Qe5 b3 50.Rb2 f3 51.Bd3 Ka7 52.a6 Rbb8 53.Qg7+ Ka8 54.Qd7 Qxd7 55.exd7 Rc6 56.Bxc4 Rxc4 57.Rxb3 Rd8 58.Rxc4 Bxc4 59.Rxf3 Rxd7**. The ending needs a little care but LEELA makes no mistake.
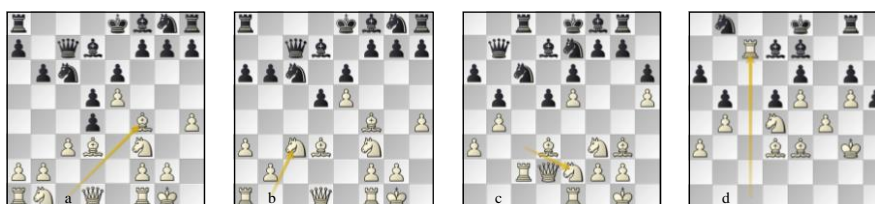
Fig. 11. Game 96 positions (a) 9b, (b) 11b, (c) 21b and (d) 43b.

Game 96 also featured a fantastic opening concept from LEELA. **1.e4 e6 2.d4 d5 3.e5 b6 4.h4 c5 5.c3 Nc6 6.Nf3 Bd7 7.Bd3 Qc7 8.0–0 cxd4**. After a rook's pawn thrust at the very earliest moment (4.h4!) LEELA met STOCKFISH's exchange on d4 with the stunning **9.Bf4**, Fig. 11a.

9...a6 10.a3. Insisting! **10...dxc3 11.Nxc3**, Fig. 11b. This pawn sacrifice reminds you of the Milner-Barry variation of the French. For the missing pawn, White has a big space advantage, faster development and an open c-file. STOCKFISH is reduced to helplessness in a manner reminiscent of the ALPHAZERO–STOCKFISH matches.

11...b5 12.Rc1 Qb6 13.Be3 Qb8 14.Re1 Nge7 15.b4 h6 16.h5 Qb7 17.Bf4 Rc8 18.Qd2 Rc7 19.Bg3 Rg8 20.Rc2 Rc8 21.Ne2, Fig. 11c. You have the strangest feeling that White has made lots of moves while Black wasn't looking. Around here I tweeted that White was simply going to exchange pieces to free up an entry channel on the c-file and then win due to the passive rook on g8. I know my ALPHAZERO strategies!

21...Na7 22.Nfd4 Rxc2 23.Qxc2 Nac6 24.Bh7 Rh8 25.Bd3 Rg8 26.Bh7 Rh8 27.f4 Nxd4 28.Nxd4 Qc8 29.Rc1 Qxc2 30.Bxc2 Nc6 31.Bf2 Nb8 32.Bd3 Be7 33.Rc7 Kd8 34.Rc2 Ke8 35.g4 Rg8 36.Kg2 Kd8 37.Kg3 Rh8 38.Rc1 Rg8 39.Bg1 g6 40.hxg6 fxg6 41.Be3 h5 42.g5 Ke8 43.Rc7, Fig. 11d. Job done! LEELA finished off the ending quite comfortably.

The match was decided but LEELA had one more great game to play in a theoretically important Mar del Plata King's Indian, dominating STOCKFISH from start to finish. STOCKFISH had one more chance to show its mettle by again demonstrating its nasty streak in the Open Sicilian, but it was too late. After a draw in the final game, LEELA won the match 52.5-47.5, 17 wins to 12. An epic match! Can't wait until the next one!

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