Rook versus Bishop

ROOK VERSUS BISHOP

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ABSTRACT

The focus here is on the influence of the endgame KRPKBP on endgames featuring duels between rook and bishop. We take advantage of the range of endgame tablebases and tools now available to ratify and extend previous analyses of five examples, including the conclusion of the justly famous 1979 Rio Interzonal game, Timman-Velimirović. The tablebases show that they can help us understand the hidden depths of the chess endgame, that the path to the draw here is narrower than expected, that chess engines without tablebases still do not find all the wins, and that there are further surprises in store when more pawns are added.

1. INTRODUCTION

There has been a tablebase revolution in the endgame rook against bishop. In general the theory of chess endgames is fairly stable compared to that of chess openings. It is very seldom that the theoretical verdict of a major cornerstone position is overturned but the complete solution of all endgames with seven men or less has of course changed several verdicts. For example, Ken Thompson created a KBBKN endgame tablebase (EGT) in 1983 which proved that in general two bishops win against a knight when the 50-move draw-claim rule is not taken into account (Roycroft, 1983, 1988). Human theory had thought that endgame was drawn if the defender reached the Kling-Horwitz position. Later John Nunn (2005) pointed out that amazingly, KQP(g)P(h)KQ is usually drawn if the defending king is well placed although human theory had assumed that the two extra pawns would win.

While in those two cases the evaluation of a whole type of endgame was changed, here we illustrate the influence of the KRPKBP tablebase on endgames featuring rook against bishop. Humans and computer engines without tablebases have big problems in several important positions as the dominance duels between rook and bishop can be surprisingly deep, difficult and incomprehensible to the human eye. One of the cornerstones of human theory has even been broken by computer analysis using the EGTs.

The following nomenclature and notation is useful:

DTC ≡ the metric 'Depth to Conversion', i.e. to mate and/or change of force (and *dtc* ≡ a DTC depth),
DTM ≡ the metric 'Depth to Mate' (and *dtm* ≡ a DTM depth),
DTZ ≡ the metric 'Depth To Zeroing of the ply count' (and *dtz* ≡ a DTZ depth),
SC^-M^- ≡ a move-choice strategy minimising DTC then DTM (and similarly, SC^-, SC^+, SM^- etc.),
° ≡ only move available, ′′′′ ≡ only value-retaining move,
′′′ ≡ only value-retaining move (after ignoring moves to a position four plies earlier),
′′ ≡ only optimal move, given the defined move-subsetting strategy (defaulted to $SM^{+/-}$), and
′ ≡ equi-optimal move, given the defined strategy

Today's endgame tables provide a definitive benchmark of endgame play as well as an opportunity to see how remarkably well the top players tend to play the endgame. The analyses here have been confirmed by one or more of Nalimov's sub-7-man DTM EGTs (Bleicher, 2014a; ChessOK, 2014a), FREEZER (Bleicher, 2014b; Rusz, 2014), Konoval's 6-man DTC EGTs (Konoval, 2014), the Lomonosov team's 7-man DTM EGTs (ChessOK, 2014b; MVL, 2014) and Romero's FINALGEN (2012).

These and other analyses may be played through and studied further using the accompanying pgn file and FREEZER EGTS available from Müller and Haworth (2014).

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2. SACHDEV-SCHUT (2012)

The first example here is a relatively easy 'warm up', a pure dominance duel in the 2012 game, Sachdev-Schut[2] (Chessgames.com, 2014a) starting with Figure 1a's position 56w. **56. Rc7**!? Nunn (2002) is a good reference here. White tries the best trick against the standard defence when Black's king is in the corner not controlled by the bishop. **56. … Be6?** Black falls for it. Among the drawing moves are 56. ... Ba2/Bd3=. **57. Kg6**! **Kh8**?! (This makes it relatively easy for White. 57. ... Bh3!? is the best try when White has only one way to win: 58. Re7!! (*58. Rf7? Bg2 59. Re7 Bc6 60. Re6 Ba4=*) 58. ... Kf8 59. Re5, Figure 1b. The central rook dominates the bishop. 59. … Bg2 60. Kf6 Bf3 61. Rf5 The rook forces the bishop to leave the shadow of the kings. 61. … Bc6 62. Rc5 Bd7 63. Rh5 Kg8 64. Rg5+ Kf8 (*64. ... Kh7 65. Rg7++-; 64. ... Kh8 65. Kf7*+-) 65. Rg1 Bc8 66. Rc1 Bd7 67. Rb1 Ke8 68. Rb8+ Bc8 69. Rxc8++-) **58. Rh7+! Kg8 59. Re7 1-0**, Figure 1c.

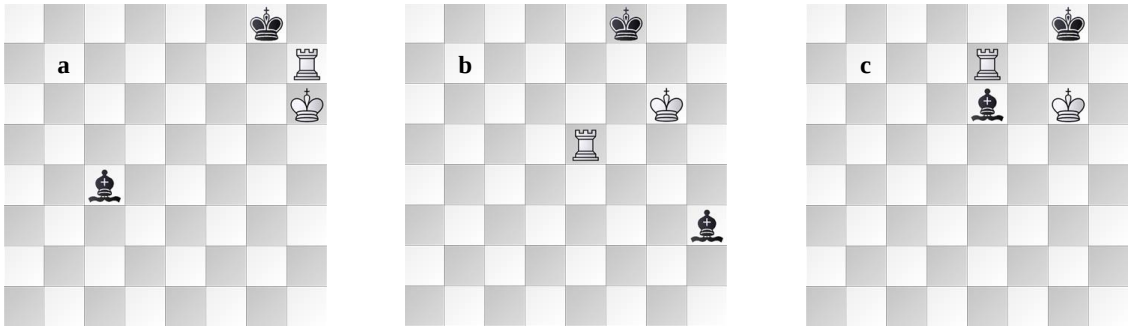

Figure 1. Sachdev-Schut (a) before 56w, (b) after sideline 59. Re5 and (c) after 59. Re7.

3. TIMMAN-VELIMIROVIĆ (1979)

The next example comes from the celebrated 1979 Rio Interzonal game Timman-Velimirović (Chessgames.com, 2014b), well known for the first appearance at the board of the KRP(a2)KBP(a3) endgame and for Timman's remarkable pre-emption of the expected 50-move draw-claim. It is also justly famous because of the initial analysis in 1948 by Chéron (1969) and the subsequent analysis by van den Herik and colleagues (1987, 1988a/b; Sattler, 1988), Timman himself (1981, 1996, 2011), Nunn (1981), and Müller and Lamprecht (2001).

As Timman (2011) says, Dvoretsky (2003) thought White should always win this endgame, and Chéron's work implicitly suggests as much. However, as Nalimov's DTM EGTs and Bleicher's FREEZER show, the game was drawn from KRPKBP position 64b until Velimirović's erronous **68. … Kf8??** FREEZER finds 81% of wtm KRP(a2)KBP(a3) positions won but only 39% of btm positions lost.[3] Timman (1981) correctly outlined the safe zones for the Black king showing that Chéron's target positions could not always be reached.

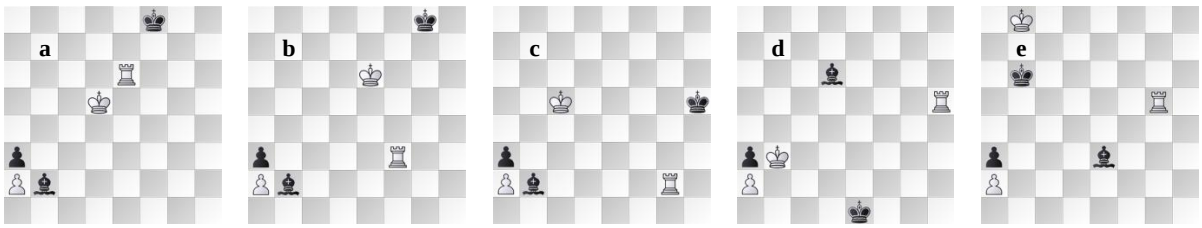

Figure 2. Timman-Velimirović: (a) main line 69w and (b) 78w, (c) after Line B's 81. Kc5, (d) after Line D, 100. Rh5. Off the board, (e) the maxDTC/Z KRP(a2)KBP(a3) position: *dtc/m* = 55/82m.

At the board, Timman had to contend with the FIDE draw-claim rule (of no interest to study enthusiasts including himself) but he was helped by his second, Ulf Andersson, during adjournments (Donner, 2007) at positions 44b, 64b and 78w. The goal is clearly to zero the ply-count before move 114b by mate, or by capture of the pawn or bishop: therefore the key metric is DTC. FREEZER and Konoval confirm that at 69w, *dtc* = 36 moves with best play but finding the win in time was a major challenge. In fact, Andersson and Timman improved on Chéron's

[2] Varying from FIDE's listing of her name, we recognise 'Tania' as Ms Sachdev's given name.
[3] The equivalent KRKB statistics are: 35% of wtm positions are won and only 3% of btm positions are lost.

"indispensable" analysis and found enough to achieve a confident and impressive win. Velimirović also had the benefit of Chéron's extensive analysis and put up a robust defence. Nevertheless, he never came close to the possibility of a 50-move draw-claim. As the following game line shows, annotated from FREEZER results relative to the DTC metric, neither player conceded more than 9 moves of depth in the next 35 moves:

Line A, 8/8/4k3/2p2r2/7b/p2K5/P7/5R2 w - - 1 64, game, =:
64. Rxc5 {KRPKBP, =: adjournment 2} **Bf6‴′ 65. Rc6+ Ke7 66. Ke4 Bb2 67. Kd5 Kf7 68. Re6 Kf8??** {not …Kg7?? as in many sources. Figure 2a, 1-0, *dtc/m* = 36/56m. Ba1/c3/d4/f6/g7/h8 draw} **69. Ke4‴′ Kf7′ 70. Kf5‴′ Kf8″ 71. Kg6** {+1m} **Bc3** {-1m} **72. Ra6″ Bb2″ 73. Ra7″ Ke8″ 74. Kf5″ Kf8″** {*dtc/m* = 30/50m} **75. Ke6″ Kg8″ 76. Rf7″ Bc3′ 77. Rf3** {+1m} **Bb2″** {Figure 2b, (Chéron, 1969, p323; Timman, 1996, p26), *dtc/m* = 28/47m: adjournment 3} **78. Ke7″ Kh7′ 79. Rg3″ Kh6″ 80. Kd6!′ Kh5″ 81. Kc5′ Kh4″ 82. Rg8′ Be5″ 83. Kd5** {+1m} **Bb2′ 84. Kc4″ Bf6** {-2m, *dtc/m* = 20/39m} **85. Rg6″ Bg5″ 86. Kd3** {+2m} **Bc1** {-2m} **87. Ke4″ Bb2** {-1m} **88. Kf5** {+1m} **Kh5″ 89. Rd6** {+1m} **Kh4″ 90. Rd3″ Bc1″ 91. Rc3** {+1m} **Bb2″ 92. Re3!′ Bc1″ 93. Re1″ Bd2″ 94. Rh1+** {+1m} **Kg3° 95. Rd1″ Bb4″ 96. Rd3+′ Kf2′ 97. Ke4′ Ke2″** {*dtc/m* = 10/30m} **98. Kd4″ Bc5+′ 99. Kc4′ Be7′ 100. Rh3″ Bd6′ 101. Kb3′ Bf8** {-1m} **102. Rh8″ Bd6** {-1m} **103. Ra8″** {*dtc/m* = -2/-23m: 103. ... Kd2/3 inviting Rxa3?? but 104. Rd8″} **Resigns** 1-0.

The first computation of a 6-man EGT addressed this KRP(a2)KBP(a3) endgame (van den Herik, 1987) and provided the DTC-minimaxing line B below, confirmed correct by FREEZER:[4]

Line B, 5k2/8/4R3/3K4/8/p7/Pb6/8 w - - 9 69, SC^-/SC^+, *dtc/m* = 36/56m:
69. Ke4‴′ Kf7′ {Kg7′} 70. Kf5‴′ Kf8″ 71. Re4′ {Re1/2/3′} Kf7″ 72. Re3″ Bc1″ 73. Rc3″ Bb2″ 74. Rc7+‴′ {and here, SM^+ prefers Kf8/g8} Ke8′ {Kf8/g8′} 75. Ke6″ Kf8″ 76. Rf7+″ Kg8″ 77. Ke7″ Kh8″ 78. Rf2′ {Rf1′} Kg7′ {Kh7′} 79. Rg2+″ Kh6″ 80. Kd6′ {Ke6′} Kh5″ 81. Kc5′ {Kd5′} {and here, Figure 2c, the bishop steps away from the pawn, q.v., line C below} Be5″ 82. Kb4′ {Kc4′} Bd6+″ 83. Kb3″ Kh4″ 84. Rg6′ {Rd2′} Be7″ 85. Kc3′ {Kc4′} Kh5″ 86. Rg2″ Kh4′ {Bd6′} 87. Kd3′ {Kd4′} Bf6″ 88. Ke4″ Bc3′ {Ba1/b2′} 89. Kf5″ Kh3″ 90. Rg4″ Be5″ 91. Kg5″ Kh2″ 92. Kg6″ Kh3′ {Bd6′} 93. Kf5″ Bd6″ 94. Ra4″ Kg2′ {Kg3′, Be7/f8′} 95. Ke4′ {Ke6′} Bf8″ 96. Kd3′ {Kd4/5′} Kf3″ 97. Kc3″ Ke3″ 98. Ra8″ Bd6″ 99. Ra6″ Bc5″ 100. Kc4″ Bf8″ 101. Ra8″ Bd6″ 102. Rd8″ Be5′ {Bc7/e7/f4/g3/h2′} 103. Rd3+‴′ Ke4′ 104. Rxa3‴′ {KRPKB, *dtc/m/z* = -8/-19/-2m} 1-0.

Perhaps at 68b in the game, Velimirović wished to continue the direct defence of his pawn. But the above line shows the bishop multitasking, exercising more control of the board, particularly of squares d4 and e5. The defence is foreshortened by 15 moves merely by constraining the bishop not to play 81. … Be5″ in Line B:

Line C, 8/8/8/2K4k/8/p7/Pb4R1/8 b - - 34 81, Figure 2c, SC^-/'constrained SC^+', *dtc/m* = -21/-42m:
81. ... Kh4 82. Kb4″ Kh3″ 83. Rg8′ Kh4″ 84. Kb3′ Kh3″ 85. Rg5′ Bc1″ 86. Rc5″ Bb2″ 87. Rc4″ Kg3′ 88. Ra4″ Kf3′ 89. Rxa3″ {KRPKB, *dtc/m/z* = -7/-19/-2m} 1-0.

Line B diverged unnecessarily from an SM^+ strategy at position 74b. The following minimaxes both DTC and DTM for a further 26 moves until position 100b, highlighting why these goals can conflict with each other:

Line D, 8/2R2k2/8/5K2/8/p7/Pb6/8 b - - 20 74, SC^-M^-/SC^+M^+, *dtc/m* = -30/-50m:
74. ... Kf8′ 75. Ke6″ Kg8″ 76. Rf7″ Bg7″ 77. Ke7″ Kh7″ 78. Rf2″ Bd4′ 79. Rg2″ Kh6″ 80. Ke6′ Bb2′ 81. Kd5″ Kh5″ 82. Kc4″ Be5″ 83. Kb3″ Bd6″ 84. Rd2″ Bf8″ 85. Rd3″ Kg5′ 86. Kc4″ Kf4″ 87. Kd5″ Be7″ 88. Ke6′ Bc5″ 89. Rc3″ Bf8″ 90. Rh3″ Ke4″ 91. Rh8″ Bc5″ 92. Rh4+″ Kd3″ 93. Kd5″ Be3″ 94. Rh3″ Ke2″ 95. Ke4″ Bc5″ 96. Rh2+″ Kf1″ 97. Kd3′ Bf8′ 98. Kc2′ Ke1″ 99. Kb3′ Bd6″ 100. Rh5′ {Figure 2d, *dtc/m* = -4/-24m. Black must lose the pawn earlier or hasten mate by losing the bishop later.} Bf8 *(SM^-C^-/M^+C^+: 100. … Ke2′ 101. Ra5″ Ke3″ 102. Rxa3″ dtc/m/z = -10/-22/-2m)* 101. Rf5″ Bd6″ 102. Ra5″ Kd2″ 103. Rd5+″ *(100. Rxa3?? Bxa3‴′ 101. Kxa3 Kc3‴′=)* Ke3′ 104. Rxd6″ {*dtc/m/z* = -1/-12/-1m} 1-0.

The appendix and accompanying pgn file provide the maxDTC KRP(a2)KBP(a3) position (Figure 2e), the maxDTC and maxDTM KRPKBP positions, and appropriate depth-minimaxing lines from them.

[4] The EGT itself did in fact prove to have a few errors related to rare, unlikely and unconsidered positions (van den Herik et al, 1988b; Sattler, 1988; Timman, 1996, p143) but these were irrelevant to this game, the authors' sole focus.

4. ELKIES (1993)

In the next example, #4 of van der Heijden (2010) and Figure 3a, the computer was needed to break the defence. Human theory had thought that Black can draw but this is not the case as the rook can win the domination duel, a fact established by Noam Elkies in 1993. **1. Rb3 Bd6 2. Kg4** and White has three plans. He can invade with the king to f6 or h6 or play g5-g6 under the right circumstances. Black cannot frustrate all three plans. **2. … Bf8** (2. ... Bc5 3. Rb5 Bd4 (*3. ... Ba3 4. Kf5 Be7 5. Rb8+ Kf7 6. Rb7+- and White wins by bringing the king to h6.*) 4. Kh5 Bc3 (*4. ... Bg7 5. g6 h6 6. Rb8+ Bf8 7. Rxf8+ Kxf8 8. Kxh6+-*) 5. Rb8+ Kg7 6. Rb7+ Kh8 7. g6 h6 8. Kxh6 Bg7+ 9. Kg5 Bd4 10. g7+ Kh7 11. Rf7 Be5 12. g8=Q+ Kxg8 13. Kg6+-) **3. Kf5 Bc5 4. Rd3 Bb4 5. Kf6 Ba5 6. Rb3 Bd8+ 7. Kf5 Ba5 8. Kg4 Bc7 9. Rb5 Bd6 10. Kf5 Bc7 11. Rd5**, Figure 3b. The central rook dominates the bishop: **11. … Bb6 12. Kf6 Bc7 13. Rd7 Ba5 14. Rg7+ Kh8 15. Kf7+-**, Figure 3c, **1-0.**

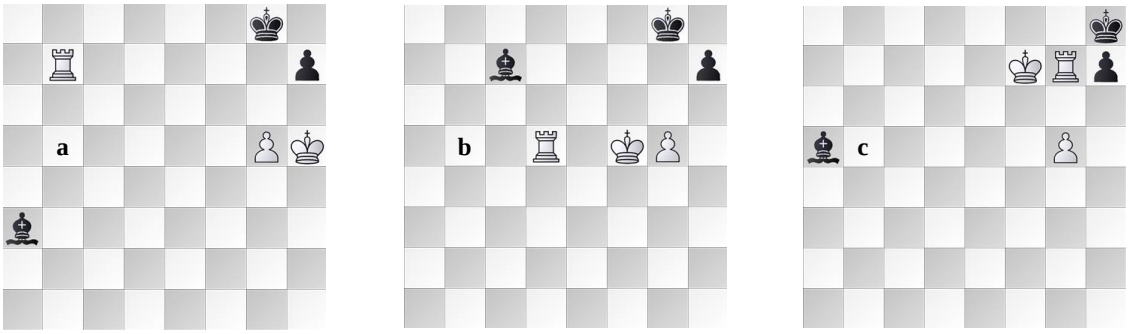

Figure 3. Elkies' study: main line positions (a) 1w, (b) 11b and (c) 15b.

5. GELFAND-IVANCHUK (2011)

The discussion of the next two positions is a slightly expanded version of Endgame Corner 143 (Müller, 2011). Position 54w from Gelfand-Ivanchuk (Chessgames.com, 2014) is of very high practical importance. Chess engines with 6-man EGTs could not find a win and it took FINALGEN, with the computational advantage of the facing pawns, to declare the position a fortress draw. But the drawing margin is not as large as it seems: Black must defend very carefully. It is not enough just to keep the bishop on the long diagonal and wait.

Figure 4a: **54. Rc2** (54. h4 Ba1= (*54. ... Bd4?, Figure 4b, is a typical mistake which often occurs in practical play. 55. Rc4 Bb2 56. g4 hxg4 57. Rxg4 ′′′′ Kh7 58. Kf7 ′′′′ Kh6 59. Rxg6+ ′′′′, KRPKB, Kh5 60. Rg2 ′′′′, dtc/m = -36/-50m, Figure 4c, and White eventually wins the domination duel, e.g., 60. … Bc3 ″ 61. Rh2 ′′′′ Be1 62. Kf6 Bg3 ″ 63. Rh1 ″ Bf2 64. Kf5 ″ Be3 ″ 65. Rh2 Bg1 66. Rg2 ″ Bb6 ″ 67. Rb2 ″ Bc5 68. Rc2 ″ Be3 ″ 69. Ke4 ″ Bh6 ″ 70. Rh2 ″ Bg7 ″ 71. Kf4 ″ Bf8 ″ 72. Kf3 ″ Ba3 ″ 73. Ra2 ″ Be7 ″ 74. Re2 ″, Figure 4d, Bf6 ″* (74. ... Bxh4 is met by 75. Rh2 Kg5 76. Rh1+-, Figure 4e, very beautiful!). *75. Kf4 ″ Bd8 ″ 76. Rc2 ′′′′ Be7 ″ 77. Rd2 ″ Bb4 ″ 78. Rd8 ″ Bc3 ″ 79. Kg3 ″* +-)). (54. h3 Ba1 55. g4 hxg4′′′′ 56. hxg4 Bb2 57. g5 Ba1 58. Rf7 Bb2 59. Rf6, Figure 5a, just met by the calm Kg7′′′′=).

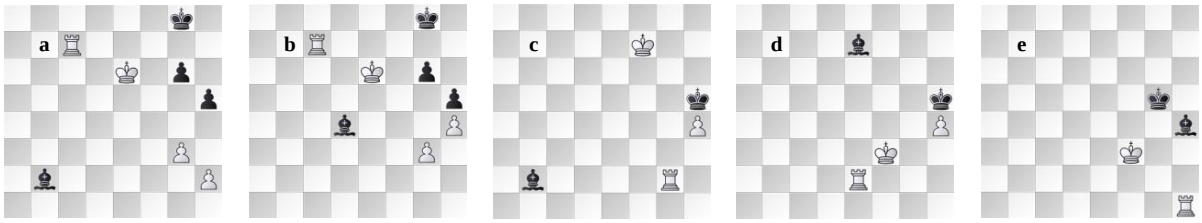

Figure 4. Gelfand-Ivanchuk: (a) 54w, and after (b) 54. … Bd4?, (c) 60. Rg2, (d) 74. Re2, and (e) 76. Rh1.

54. … Ba1 55. Rg2 Kg7 56. g4 hxg4′′′′ 57. Rxg4 KRPKBP **Bc3 58. Rc4 Ba1 59. Rf4 Bb2 60. Rf1 Bd4 61. Rf7+ Kg8 62. Rf4 Bc3 63. Rg4 Kg7′′′′** (63. … Kh7? 64. Kf7+-) **64. Rg2 Bf6 65. Rc2 Ba1 66. Rc7+ Kg8 67. h4 Bb2 68. Rc2!?** Figure 5b **Bd4′′′′** the only move. Black must indeed be very careful when defending this fortress. **69. Rd2** (69. Rg2 Kh7′′′′ 70. Kf7 Kh6′′′′ 71. Rxg6+ Kh5′′′′ 72. Rc6 Bf2′′′′ 73. Kf6 Kxh4′′′′=). After 69. Rc4, Figure 5c, the only move is the amazing Be3!! with the point 70. Kf6 Kh7′′′′ 71. Rg4 Kh6′′′′ 72. Rxg6+ Kh5′′′′ 73. Rg3 Bb6′′′′ 74. Rh3 Kg4 75. Rh1 Bd8+=. **69. ... Bc3 70. Rd3,** Figure 5d**, Be1′′′′**. Again Ivanchuk

finds the only defence. The bishop must leave the long diagonal as 70. ... Bb2? runs into 71. Rg3 Kh7 72. Kf7 Kh6 73. Rxg6+ Kh5 74. Rg2 and White wins as seen in the line 54.h4 Bd4?

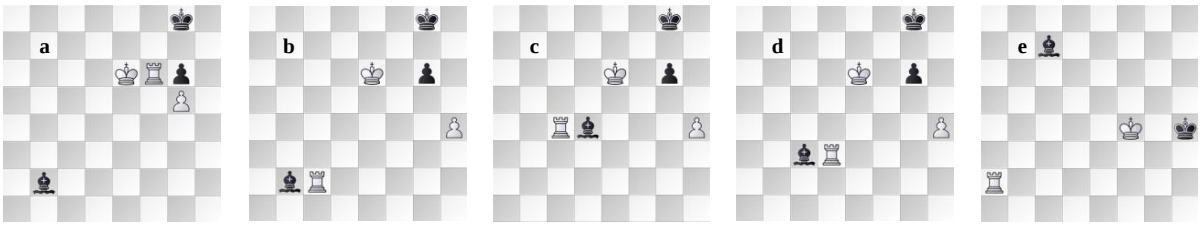

Figure 5. Gelfand-Ivanchuk after (a) 59. … Rf6, (b) 68. Rc2, (c) 69. Rc4, (d) 70. Rd3 and (e) 89. Bc7.

71. Kf6 (71. Rd4 Kg7 72. Rg4 Kh6 73. Kf6 Kh5 74. Rxg6 Kxh4 75. Kf5 Bd2=) **71. ... Bxh4+′′′′ 72. Kxg6** KRKB **Kf8′′′′ 73. Rh3 Bd8′′′′ 74. Rh7 Ke8 75. Kf5 Kf8 76. Ke6 Bg5 77. Rf7+ Kg8′′′′ 78. Rd7 Kf8 79. Rd5 Bc1 80. Rd1 Bb2 81. Rf1+ Kg7 82. Rf7+ Kg6 83. Rf2 Bc1 84. Rg2+ Kh5 85. Kf5 Kh4′′′′ 86. Rc2 Be3′′′′ 87. Ke4 Ba7 88. Ra2 Bb6 89. Kf4 Bc7+,** Figure 5e**, ½-½.**

6. TIVIAKOV-KORSUNSKY (1989)

Now finally comes a real revolution. Human theory has thought that Figure 6a's position 45w from Tiviakov-Korsunsky (Redhotpawn.com, 2014) is a fortress: the first author had also claimed this many times including (Müller, 2007). But White can win, as first pointed out by Jonathan Hawkins (2012) in his excellent book on page 105. Either White invades with his king to c6, this winning aim being known to human theory, or amazingly, White exchanges pawns with a3-a4 at the right time.

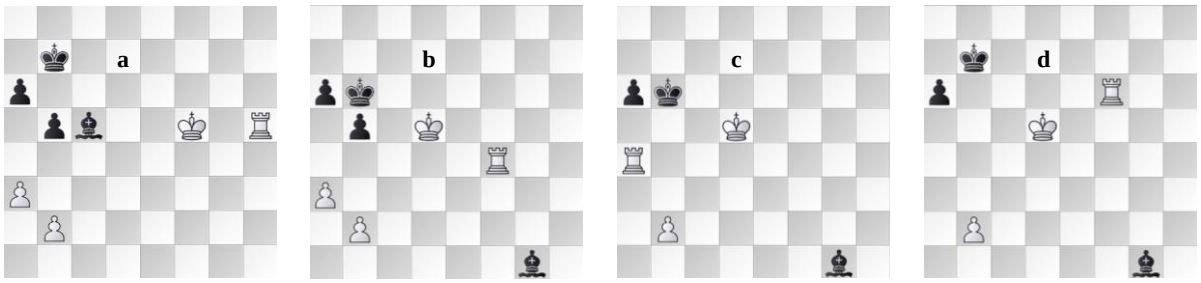

Figure 6. Tiviakov-Korsunsky: (a) 45w, and after sideline (b) 52. … Kb6, (c) 54. Rxa4 and (d) 56. … Kb7.

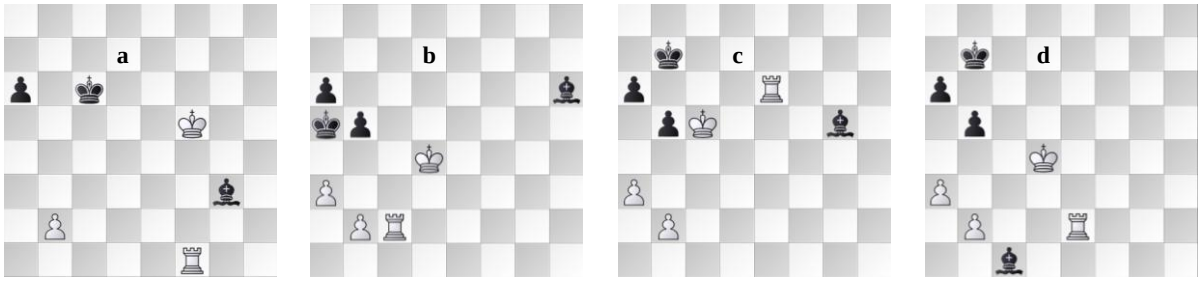

Figure 7. Tiviakov-Korsunsky after sideline (a) 62. Kf5, (b) 61. … Bh6, (c) 66. Kc5 and (d) 65. Re2.

45. Ke4 Bf2 46. Rf5 Bg1 47. Rf1 Bc5 48. Kd5 Be3 49. Rf7+ Kb6 50. Rf3 Bg1 51. Rf1 (51. Rf6+ Kb7 52. Rf4 Kb6, Figure 6b, is more direct. Now, remarkably, White should exchange pawns with 53. a4!! bxa4 54. Rxa4, Figure 6c, *dtc/m/z* = -50/-73/-41m. White's rook now wins a long domination duel as in, e.g., this initially DTC/M-minimaxing line from YK/AR: 54... Bf2′ 55. Rf4′ Bg1′′ 56. Rf6+′′ Kb7′′ Figure 6d 57. Rf1′′ Be3′′ 58. Rf3′′ Bg1′′ 59. Kd6′′ Bh2+′′ 60. Ke6′′ Kc6′′ 61. Rf1′′ Bg3′′ 62. Kf5′′ Figure 7a. This is really extraordinary! White's king has moved to f5 to win the domination fight. Chess really is a rich game! 62. … Bd6′′ 63. Rc1+′ Kb6′′ 64. Ke4′′ Bc5′′ 65. Kd3′′ Kb5′′ 66. Ra1′′ Kb6′′ 67. Kc4′′ Be3′′ 68. Re1′ Bf2′′ 69. Rf1′′ Be3′′ 70. Rf3′′ Bg1′′ 71. Kb4′′ Bd4′′ 72. Rb3′′ Be5′′ 73. Ka4+′′ Ka7′′ 74. Ka5′′ Bf6′′ 75. Kb4′′ Kb6′′ 76. Ka4+′′ Ka7′ 77.

Rb4″ SC⁻/SC⁺ Bd8 (*SM⁻C⁻/SM⁺C⁺: 77. ... Be5″ 78. Kb3″ Bd6″ 79. Rg4″ Be5″ 80. Re4″ Bg3″ 81. Kb4″ Kb6″ 82. Rg4″ Bb8″ 83. Kc4″ Kc6′ 84. Rg6+″ Kb7″ 85. Kd5″ Bf4″ 86. Rg4″ Bb8″ 87. Kc5″ Ba7+″ 88. Kd6″ Bb8+″ 89. Kd7″ a5″ 90. Rc4′ Kb6″ 91. Ke6″ Kb5″ 92. Kd5″ a4″ 93. Rc5+″ Kb6″ 94. Kc4″ Bf4″ 95. Rb5+″ Ka6″ 96. Kc5″ Be3+″ 97. Kc6″ Bc1″ 98. Rb8″ Ka5″ 99. Kc5″ Be3+″ 100. Kc4″ Bd2′ 101. Ra8+″ Kb6° 102. Rxa4″* +-) 78. Kb3″ Ba5″ 79. Rg4″ Kb7″ 80. Kc4″ Bb6″ 81. Kd5″ Bf2″ 82. Kd6″ Be1″ 83. Rg8″ Bb4+′ 84. Kd5″ Be1″ 85. Rf8′ Kb6″ 86. Rf6+′ Kb5″ 87. Rf4″ Bd2″ 88. Rf8″ Kb6″ 89. Rb8+″ Kc7″ 90. Re8″ Bc1″ 91. Re2″ Kb6″ 92. Kc4″ Bf4′ 93. Re6+″ Kb7′ 94. Kc5″ Bg5″ 95. Rb6+″ Ka7″ 96. Kc6″ Be3″ 97. Rb7+′ Ka8° 98. b4′ Bd4′ 99. Rd7″ Bf2″ 100. Rd2″ Be1″ 101. Rd1″ Bf2″ 102. Ra1″ Ka7″ 103. b5″ a5′ 104. Rxa5+″ +-)

51. ... Be3 52. Ke4 Bg5 53. Rf5 Bc1 54. Rf2 Bg5 55. Kd4 Bc1 56. Re2 Ka5 (56. ... Bg5 57. Re6+ Kb7 58. Kc5 Bd8 59. b4 Bh4 60. Rb6+ Ka7 61. Kc6+-)

57. Kc3 Kb6 58. Kd4 Ka5 59. Rc2 Bh6 60. Rg2 Bc1 61. Rc2 Bh6 Figure 7b **62. Rc7?!** allows Black to get back in his house. (62. Rg2 wins more quickly, e.g., 62. … Bc1 (*62. ... Bf8 63. Kc3 Kb6 64. Rg6+ Kb7 65. b4+*-) (*62. ... Ka4 63. Rg6 Bc1 64. Kc3+*-) 63. Re2 Kb6 (*63. ... Bh6 64. Kc3 Bg7+ 65. Kb3 Bf6 66. Re6 Bd4 67. Ka2 b4 68. axb4+ Kb5 69. Kb3+*-) 64. Kd5 Bg5 (*64. ... a5 65. Kd4 a4 66. Kd5 b4 67. Rc2 Be3 68. axb4 Kb5 69. Rc8+*-) 65. Re6+ Kb7 66. Kc5, Figure 7c, and White's king invades to c6. 66. … Bd8 67. b3 Bg5 68. Rb6+ Ka7 69. Kc6+-)

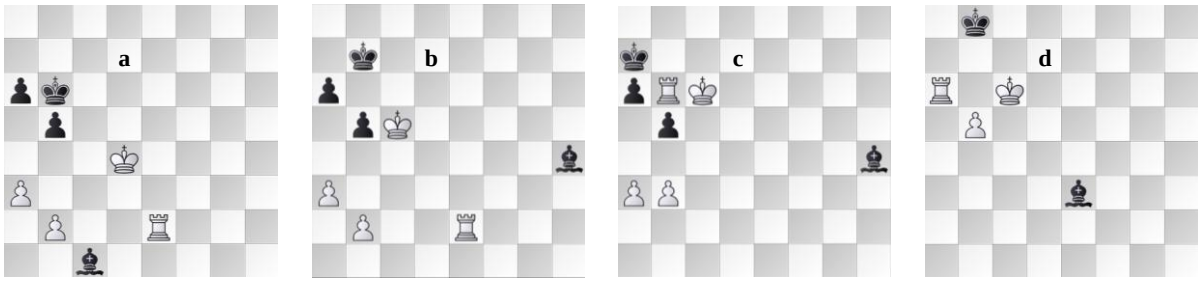

Figure 8. Tiviakov-Korsunsky after (a) 65. … Kb6?!, (b) 66. … Bh4, (c) 71. Kc6, and (d) 79. Rxa6.

62. ... Kb6 63. Re7 Bc1 (63. ... Bg5 64. Re6+ Kb7 65. Kc5 Bd8 66. b3 Bh4 67. Rb6+ Ka7 68. Kc6+-) **64. Re6+ Kb7 65. Re2**, Figure 7d. Even 65. Kc5 is playable. 65. … Bxb2 66. Re7+ Kb8 67. Re3 (*67. Kb6? Bd4+ 68. Kxa6 Bc5*=) 67. ... Kc7 68. Rf3 Kb7 69. Rh3 Kc7 70. Rh7+ Kb8 71. Kb6+-) **65. ... Kb6**?!, Figure 8a, and now the bishop is dominated. (65. ... Bg5!? 66. Kc5 Bh4, Figure 8b, was more tenacious, e.g., 67. a4 bxa4 68. Kb4 Bg3 69. Kxa4, *dtc/m/z* = -53/-76/-44m, and as in, e.g., this DTC/M-minimaxing line from YK 69... Bc7″ 70. Re6′ Bd8′ 71. Kb4′ Bb6″ 72. Kc4″ Bg1″ 73. Rf6′ Be3′ 74. Kd5″ Bg1″ +-, Figure 6d once again)

66. Kd5 Bg5 (66. ... a5 67. Kd4 a4 68. Kd5 b4 69. Rc2 Be3 (*69. ... bxa3 70. Rxc1 axb2 71. Rb1 a3 72. Kc4+*-) 70. axb4 Kb5 71. Rc8+-) (66. ... Ka5 67. Rc2 Be3 (*67. ... Bf4 68. Rc6+*-) 68. Rc6 b4 69. axb4+ Kb5 70. Rc8 Bf4 71. Rc5+ Kb6 72. Kc4+-)

67. Re6+ Kb7 68. Kc5 Bd8 (68. ... Bh4 69. Rb6+ Ka7 70. Kc6+-) **69. b3 Bh4 70. Rb6+′″″ Ka7 71. Kc6**, Figure 8c. White's king has reached the key square c6 and it is over. **71. … Bf2 72. Rb7+′″″ Ka8° 73. Rf7 Bg1 74. Rf4 Ka7 75. a4 bxa4 76. Rxa4** KRPKBP, *dtc/m* = -7/-12m **Bf2 77. b4″ Be3 78. b5″ Kb8″ 79. Rxa6″**, Figure 8d, **1-0.**

7. SUMMARY

The EGTs show that the defending side has less scope to draw than previously thought. It is for example not enough to hold the main fortress from Gelfand-Ivanchuk by just waiting with the bishop on the long diagonal and the structure from Tiviakov-Korsunsky can surprisingly be won in a long domination duel by the rook, which even current engines do not find and which can only be revealed by the EGTs. Chess really is a very deep game and we have much to learn, especially when more pawns appear on the board. Further study will be assisted by the accompanying pgn file, its light annotation and the FREEZER KRPKBP EGTs (Müller and Haworth, 2014). Recommended sources include Chéron (1969), Timman (1996) and Müller (2012).

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APPENDIX

The maxDTC KRP(a2)KBP(a3) win (Figure 2e), 1K6/8/1k6/6R1/8/p3b3/P7/8 w, *dtc/m* = 55/82m …
SC^-/SC^+: 1. Rd5′′′′ Bc1′′ 2. Rd8′′′′ Bb2′′ 3. Rc8′′′′ Be5+′′ 4. Ka8′′′′ Bc7′′ 5. Re8′′ Bf4′′ 6. Re4′′ Bc1′′ 7. Rc4′′ Bb2′′ 8. Kb8′′ Kb5′′ 9. Rc2′′ Kb4′′ 10. Rc6′′ Bd4′′ 11. Kc7′′ Bc5′′ 12. Ra6′′′′ **{and here, SM^+ diverges}** Kc3′ 13. Kc6′′′′ Kc4′′ 14. Ra4+′ Bb4′′ 15. Kb6′′ Kc3′′ 16. Kb5′′ Bf8′′ 17. Ra8′ Bd6′ 18. Re8′ Kb2′′ 19. Re2+′′′′ Kc3′′ 20. Ka4′′ Bc5′ 21. Re5′′ Bd6′ 22. Rb5′′ Be7′′ 23. Rb1′ Bd6′ 24. Rb3+′′ Kc4′′ 25. Rb6′′ Be7′ 26. Rc6+′′ Bc5′′ 27. Rc7′ Kd4′′ 28. Kb3′′ Kd5′′ 29. Rf7′ Bd6′ 30. Rf5+′ Kd4′ 31. Rf1′ Kd5′ 32. Rd1+′′ Ke6′′ 33. Rd3′′ Ke5′ 34. Kc4′′ Bf8′′ 35. Rf3′ Bd6′′ 36. Rf2′′ Ke6′′ 37. Re2+′′ Kf6′′ 38. Kd5′ Bb4′′ 39. Re3′ Kf5′′ 40. Rf3+′′ Kg4′′ 41. Rb3′ Bf8′′ 42. Rb7′ Bh6′′ 43. Rc7′′ Kh5′′ 44. Ke6′′ Kg6′′ 45. Rc3′′ Bf8′′ 46. Rg3+′′ Kh5′ 47. Kf6′′ Kh4′ 48. Rc3′′ Kh5′′ 49. Rc4′ Bh6′′ 50. Kf5′′ Bf8′′ 51. Rc8′′ Bg7′′ 52. Rc1′′ Kh4′′ 53. Rh1+′′ Kg3° 54. Rg1+′′ Kf3′ 55. Rxg7′′′′ **{KRPKP: *dtc/m/z* = -2/-9/-2m} {YK DTC EGT (Konoval, 2014), FREEZER DTC EGT (Rusz, 2014)}** 1-0.

The maxDTC KRPKBP loss, 8/6p1/8/8/1b6/2k5/6P1/3K2R1 b, *dtc/m* = -99/-121m (Konoval, 2014) …
SC^-/SC^+: 1. ... Kd3′′ {the maxDTC KRPKBP wtm win} 2. Rh1′′′′ Bd6′′ 3. Re1′′′′ Kd4′′ 4. Ke2′′′′ Ke4′′ 5. Kf2+′′′′ Kf4′′ 6. Rc1′′′′ Be7′′ 7. Rc4+′′′′ Kg5′ 8. Rc6′′′′ Kf4′′ 9. Kg1′′′ Bf6′′ 10. Kh2′′′′ Kg4′′ 11. Rc5′′′′ {zugzwang} Be7′′ 12. Rc4+′′ Kf5′′ 13. Rc6′′′′ Bh4′′ 14. Kh3′′′′ Be1′′ 15. Rc1′′′′ Bd2′′ 16. Rc2′′ Be3′′ 17. Kh4′′ Bg5+′′ 18. Kg3′′ Bh6′ 19. Rc6′′′ Kg5′′ 20. Rd6′ g6′′ 21. Rc6′ Bg7′ 22. Kf3′ Kf5′′ 23. Ke3′ Bh8′ 24. Kd3′′ Bg7′ 25. Kc4′′ Bh8′ 26. Kb5′′ Be5′ 27. Kc5′′ Bf4′ 28. Kd5′′ Bh6′′ 29. Rc3′ Kf6′′ 30. Kd6′′′′ Bf4+′′ 31. Kd7′′ Be5′′ 32. Re3′′′′ Bd4′ 33. Re7′′ Bc5′′ 34. Rh7′′′′ Be3′′ 35. Ke8′′ Bf4′′ 36. Rd7′ Kf5′′ 37. Rd5+′ Kg4′′ 38. Rd3′′′′ g5′ 39. Rf3′ Be5′ 40. Kf7′ Bh8′ 41. Ke6′′ Bd4′ 42. Kd5′′ Bg7′ 43. Ke4′′ Bh8′ 44. Ke3′ Bg7′ 45. Ke2′′ Bh8′ 46. Rd3′′ Kf4′′ 47. Kf2′′ g4′′ 48. Rd7′ Bc3′′ 49. Rf7+′′ Kg5′′ 50. Re7′ Kf4′′ 51. Rd7′′ Be5′′ 52. Rf7+′′ Kg5′′ 53. Rb7′′ Bd6′′ 54. Rb5+′′ Kh4′′ 55. Rb3′′ Bc7′ 56. Ke2′′ Bd8′ 57. Kd2′′ Be7′ 58. Rd3′ Bb4+′′ 59. Kc2′′ Bc5′ 60. Kc3′ Bf2′′ 61. Kc4′′ Kg5′′ 62. Kd5′′ Kf5′′ 63. Rc3′ Bh4′′ 64. Rc4′′ Bg5′ 65. Re4′′ Bh4′′ 66. Kd4′′ Bg3′′ 67. Ke3′ Bf2+′′ 68. Kd3′′′′ Bh4′ 69. Rc4′ Bf2′′ 70. Ke2′′ Bh4′′ 71. Rd4′′ Bf6′′ 72. Rd7′′ Ke4′′ 73. Rc7′ Bh4′ 74. Rf7′′ Bg3′′ 75. Kd2′′ Be5′′ 76. Kc2′′ Kd4′ 77. Kb3′′ Kd5′′ 78. Rf1′ Bc7′ 79. Kb4′ Bb8′ 80. Re1′ Be5′ 81. Kb5′′ Bd6′ 82. Rd1+′ Ke5′′ 83. Kc6′′ Bb8′′ 84. Rd8′′ Ba7′′ 85. Rf8′′ Be3′′ 86. Rf1′ g3′ 87. Re1′ Kf4′′ 88. Kd5′′ Bb6′′ 89. Re4+′ Kg5′ 90. Re5+′′ Kg4′ 91. Ke6′′ Bc7′ 92. Rf5′ Bd8′ 93. Rb5′ Bg5′ 94. Rb4+′′ Kh5′′ 95. Re4′′ Bh6′ 96. Kf5′′ Bd2′′ 97. Re7′ Bg5′ 98. Rg7′ Kh4′′ 99. Rh7+′′ Bh6° 100. Rxh6#′′ **{YK DTC EGT (Konoval, 2014), FREEZER DTC EGT (Rusz, 2014)}** 1-0.

The maxDTM KRPKBP wtm win, 8/3R2P1/7k/8/8/8/5p2/K5b1 w, *dtc/m/z* = 1/166/1m …
SM^-/SM^+: 1. g8=N+′′′′ **{KRNKBP: *dtc/m/z* = -5/-165/-5m}** Kg6′′ 2. Rd1′′′′ Kf5′ 3. Kb2′ Ke4′ 4. Kc2′′′′ Ke3′′ 5. Nf6′′′′ Ke2′′ 6. Ne4′′′′ f1=N′′ **{KRNKBN: *dtm* = 159m}** 7. Nc3+′′′′ Kf2′′ 8. Rc1′ Ng3′ 9. Kd3′′′′ Kg2′′ 10. Nd5′′′′ Ba7′′ 11. Rc7′′′′ Bb8′ 12. Rf7′′ Kh3′′ 13. Rf8′′′′ Be5′′ 14. Re8′′′′ Bd6′′ 15. Re6′′ Bc5′′ 16. Rc6′′ Ba7′′ 17. Rc4′′ Nh5′′ 18. Rc7′′ Bf2′′ 19. Rc8′′ Kg4′′ 20. Rg8+′′′′ Kf3′′ 21. Rf8+′′′′ Kg2′′ 22. Rf5′′ Ng3′′ 23. Rf6′ Nh5′′ 24. Rf8′′ Bg1′′ 25. Rg8+′ Ng3′′ 26. Nf4+′′ Kf3′′ 27. Ne6′′′′ Ba7′′ 28. Ra8′′′′ Bb6′′ 29. Rb8′′ Ba7′′ 30. Rb7′′′ Bg1′′ 31. Rf7+′′ Kg4′′ 32. Rg7+′′ Kh4′′ 33. Rg8′ Bf2′ 34. Nf8′′ Bg1′ 35. Nd7′ Kh3′′ 36. Rg6′′ Bf2′′ 37. Rf6′′ Bg1′ 38. Rf4′′ Nh5′′ 39. Ra4′′ Bf2′′ 40. Ne5′′ Bg3′′ 41. Ng6′′′′ Bf2′′ 42. Rc4′′ Kg2′′ 43. Ne5′′ Bg3′′ 44. Nf7′′′′ Bb8′′ 45. Rc8′′ Ba7′′ 46. Rh8′′ Nf4+′′ 47. Ke4′′′′ Ne2′′ 48. Ng5′′ Bb6′′ 49. Rf8′′ Ng3+′′ 50. Kd3′′ Nh5′ 51. Rf5′′ Ng3′ 52. Rb5′′ Bf2′′ 53. Rb7′ Nf5′ 54. Rb2′′ Ng3′′ 55. Rc2′′ Nh1′′ 56. Ne6′′ Ng3′′ 57. Nd4′′ Nh1′′ 58. Ke4′′ Kh3′′ 59. Nc6′′′′ Kg3′′ 60. Ne5′′ Bg1′′ 61. Rc7′′ Nf2+′′ 62. Kd5′′ Nh1′′ 63. Rf7′′ Bb6′′ 64. Rh7′′ Kg2′′ 65. Nc4′′′′ Bg1′′ 66. Rf7′′ Ng3′′ 67. Ke5′′′′ Nf1′′ 68. Kf4′′ Bh2+′′ 69. Kg4′′ Bg3′′ 70. Rb7′ Nh2+′′ 71. Kf5′′ Nf1′′ 72. Ke4′′ Bh4′ 73. Rg7+′′ Kf2′′ 74. Kd3′′ Kf3′′ 75. Ne5+′′ Kf4′′ 76. Ng6+′′′′ Kg4′′ 77. Nf8+′′′ Kf3′′ 78. Ne6′ Ng3′′ 79. Rf7+′′′′ Kg2′′ 80. Ke3′′ Nf1+′′ 81. Ke4′′ Ng3+′′ 82. Kf4′′ Nf1′′ 83. Ke5′′ Nd2′ 84. Rd7′′ Bg3+′′ 85. Kd4′′ Nf1′′ 86. Rg7′′ Kf2′′ 87. Kd3′′ Be5′ 88. Rg5′′ Bd6′′ 89. Rd5′′ Bh2′′ 90. Rb5′′ Kf3′′ 91. Rb4′′ Be5′′ 92. Re4′′ Bb2′′ 93. Rf4+′′ Kg2′′ 94. Ra4′′ Bh8′′ 95. Ra6′ Be5′′ 96. Ke4′′ Bg3′′ 97. Ra7′′ Nd2+′ 98. Kd3′′′′ Nf3′′ 99. Rg7′′ Kh3′′ 100. Ke3′′ Nh2′ 101. Ke4′′ Nf1′ 102. Rg8′′ Nd2+′ 103. Kd3′ Nf1′ 104. Ke2′′ Nh2′′ 105. Nd4′′ Bf4′ 106. Nf5′′ Be5′ 107. Ke3′ Bc7′′ 108. Rc8′′ Be5′′ 109. Rc4′′ Kg2′′ 110. Ke2′′ Bf6′′ 111. Rc6′′ Be5′′ 112. Rg6+′′ Kh3′′ 113. Kf2′′ Bc7′′ 114. Rg7′′ Bf4′′ 115. Rg8′′ Be5′′ 116. Rg5′′ Bf4′′ 117. Rg7′′ Be5′′ 118. Rb7′′ Kg4′′ 119. Ne3+′′′′ Kg5′′ 120. Rb5′′′ Kf4′′ 121. Rb4+′′′′ Kg5′′ 122. Kg2′′′ Kg6′′ 123. Rc4′ Kf7′ 124. Ra4′′ Kg6′′ 125. Ra6+′′ Kf7′ 126. Ra5′′ Kf6′′ 127. Rd5′′ Bb8′ 128. Rd8′′ Be5′′ 129. Rf8+′′ Ke7′′ 130. Rf2′′ Kd7′′ 131. Rd2+′′ Ke6′ 132. Re2′′ Kf6′′ 133. Rf2+′ Kg6′′ 134. Kh3′′ Bd4′′ 135. Rg2+′′′′ Kh5′ 136. Nd5′′′′ Be5′′ 137. Rf2′′′′ Kg5′′ 138. Rf8′′ Bd6′′ 139. Rf7′′ Be5′′ 140. Ne7′ Bb8′′ 141. Rf8′ Bc7′′ 142. Rf5+′′ Kh6° 143. Rf2′′ Kg5′ 144. Rf8′′ Kh6′ 145. Nd5′′ Be5′ 146. Re8′′ Bd6′′ 147. Re6+′′ Kg5′′ 148. Rxd6′′ **{KRNKN: *dtc/m/z* = -12/-18/-12m}** Nf3′′ 149. Kg3′ Nd2′′ 150. Nf6′′ Nc4′ 151. Rd4′′ Ne3′ 152. Kf3′ Nf5′ 153. Rf4′′ Ne7′ 154. Ke4′′ Ng6′ 155. Rf1′ Ne7′ 156. Nd5′′ Nc6′ 157. Rg1+′ Kh5′′ 158. Rg2′ Kh4′′ 159. Rg6′ Nd8′ 160. Nf4′ Nc6′′ 161. Rxc6′′ **{KRNK: *dtc/m/z* = -4/-5/-4m}** Kg5′ 162. Kf3′ Kf5′′ 163. Ng6′′ Kg5° 164. Nh4′ Kh5′ 165. Kf4′′ Kxh4° **{KRK: *dtx* = 1m}** 166. Rh6#′′ **{Nalimov DTM EGTs}** 1-0.