# *The data-mining of studies database 'HHdbIV'*

# The Data-mining of Studies Database HHdbIV

**By Guy Haworth, Harold van der Heijden & Eiko Bleicher**

In his recent Spotlight columns, Jarl Ulrichsen (2012a/b) made and later revisited a note that, to his surprise, it was still possible to find sub-7-man (s7m) positions in the studies of HHdbIV which signal cooks and/or duals. Particularly for those readers of **EG** who are similarly and in fact unnecessarily surprised, we explain here what exactly was done with the s7m-positions in creating HHdbIV.

The first author decided to examine the s7m positions in the mainlines of the studies in HHdbIII. The two goals, in priority order, were to examine the correctness and uniqueness of White's move, that is, to identify:

– those mainline positions with values incompatible with the stipulation of the study, and

– those mainline positions where there were alternative moves which pre-served value.

The set of win studies with s7m positions in the mainline was identified using CQL (Costeff, 2003) and the lines were converted into lists of positions using the utility PGN2FEN (Foden, 2010). These positions were regrouped in line with the studies they came from and the now-redundant positions with at least 7 men were discarded. The same process also created a set of mainline positions from draw studies.

Both sets of positions were evaluated using Nalimov's DTM Endgame tables by Eiko Bleicher (2012), both with the side-to-move and, because the frequency of zugzwangs was also of interest (Haworth et al, 2011b), with the opposite side-to-move. The information was sent to Harold van der Heijden who, it transpired, was in the final stages of publishing HHdbIV. He asked for the 'HHdbIV studies' that were not in HHdbIII to be evaluated as well. It was then clear that 3,068 studies contained between them some 18,741 s7m mainline positions whose value was incompatible with the stipulation of the study. In some cases, it was the stipulation that was wrong (i.e. data entry error).

Details of the data-mining exercises have been published (Bleicher et al, 2010; Haworth et al, 2011a). In a few months, Harold transformed almost all the 'wrong position value' information into '@-indicators' in HHdbIV with comments on a selection of moves as to what would have been the right move for White. The first author would therefore like to suggest that the attributions to cook-authors 'GH/EB', over 5,100 of them, should be changed in HHdbV to 'GH/EB/HH'. Harold also led in the publication of two articles in **EG** (Van der Heijden et al, 2010a/b) which focused on the chess aspects of some chosen cooked studies.

To emphasise the status of the work prior to the publication of HHdbIV, the first author did not examine the values of s7m positions in studies' sidelines. This was because no automatic method was known for determining whether a position was meant to be won or drawn. Further, there was no time before the publication of HHdbIV to process the data about alternative value-preserving moves as this requires a mix of difficult, automatable but not yet automated, technical assessment (Haworth and Rusz, 2012) as well as artistic, chessic judgement.

It is worth putting the incidence of equioptimal and suboptimal moves into context by distinguishing four types of mainline position. In 150,649 of 234,634 s7m positions, the value-preserving move is absolutely unique. In

59,409 positions, the DTM-optimal move is unique but there are DTM-suboptimal moves, and one of the latter was played in 8,167 positions. In 13,186 positions, there are only alternative equi-optimal moves. In 11,390 positions there are both equi-optimal moves and DTM-suboptimal moves, and one of the latter was played in 1,665 cases.

There were 320,579 DTM-suboptimal moves available, and 9,832 cases of one being chosen, indicating a dual of some sort if not a chessic or data entry error. These include missed mates in 1 (25), in 2 (67), in 3 (90), in 4 (129) and in 5 (172), many not remarked on to date. One might conjecture that the shallower the DTM-depth and the greater the DTM-concession, the greater is the error likely to be. Many DTM-suboptimal moves will in future be proved to be merely time-wasting moves, allowing repetition of position or no better progress to the next mainline position.

There are 24,576 positions involving 44,227 equi-optimal moves where the downstream-convergence (or lack of it) of those equi-optimal moves should be examined.

When the technical assessment aspect has been automated in a relatively small production process (Haworth and Rusz, 2012), there will be an increased opportunity for the endgame community to make both technical comments and artistic judgements, particularly about the seriousness of duals.

The endgame scenario is likely to take one step forward soon as a set of, as yet unverified, DTM EGTs for 7-man chess has been created (Haworth, 2012; MVL, 2012). Lists of 7-man positions are to hand.

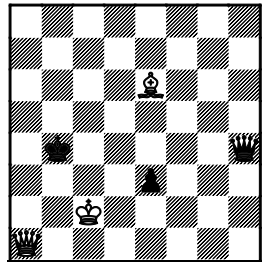
| | HHdbIV | | | | | | DTM- | conc./ | DTM-opt. |
|---|---|---|---|---|---|---|---|---|---|
| # | # | Author | GBR | Year | FEN | DTM | conc. | DTM | move |
| 01 | 21861 | Khatchaturov | +0041.00c6c8 | 1945 | 3k4/8/2KN4/b3B3/8/8/8/8 w - - 6 4 | 1 | 22 | 22.00 | 4. Bf6# |
| 02 | 23282 | Bron | +0052.12d3c1 | 1948 | 8/8/8/8/b3B3/2KN4/8/3k4 w - - 4 10 | 1 | 22 | 22.00 | 10. Bf3# |
| 03 | 70034 | Borisenko | +4010.01c2b4 | 2003 | 4B3/2Q5/8/8/1k5q/4p3/2K5/8 w - - 26 14 | 1 | 15 | 15.00 | 14. Qc3# |
| 04 | 05118 | Hatheway | +0041.00f6f8 | 1908 | 5k2/5B2/b1N2K2/8/8/8/8/8 w - - 6 4 | 2 | 24 | 12.00 | 4. Ne5 |
| 05 | 05414 | Amelung | +0133.00b3a1 | 1909 | 8/8/3n4/8/2K5/8/7R/k7 w - - 3 4 | 2 | 20 | 10.00 | 4. Kb3 |
| 06 | 05701 | Troitzky | +0002.02d4f3 | 1910 | 8/8/7p/6pN/7k/6N1/6K1/8 w - - 16 9 | 3 | 20 | 6.67 | 9. Nf6" |
| 07 | 00870 | Cozio | +1300.01a5b8 | 1766 | k7/p2Q4/1r6/K7/8/8/8/8 w - - 6 4 | 4 | 18 | 4.50 | 4. Qc8+" |
| 08 | 17800 | Dedrle | +1300.01h3h1 | 1937 | 8/8/8/8/8/5Q1K/4r2p/6k1 w - - 2 2 | 5 | 32 | 6.40 | 2. Qxe2" |
| 09 | 69962 | Borisenko | +0014.00b6b8 | 2003 | 1k6/8/8/1NK2B2/8/8/n7/8 w - - 30 16 | 6 | 31 | 5.17 | 16. Kb6" |
| 10 | 03841 | Meyer | +0002.02f6h6 | 1897 | 8/7k/5K2/4p3/4p2N/4N3/8/8 w - - 12 7 | 7 | 28 | 4.00 | 7. Nf5" |
| 11 | 19331 | Dedrle | +1060.00f5c2 | 1939 | 8/b7/8/8/1Q6/1b6/2k1K3/8 w - - 6 4 | 8 | 43 | 5.38 | 4. Qd2" |
| 12 | 21450 | unknown | +0116.00g3c5 | 1944 | 8/4n3/4R1n1/2k5/8/8/B4K2/8 w - - 4 3 | 30 | 108 | 3.60 | 3. Kf1" |
| 13 | 20833 | Szulc & Kopac | +0134.00d4e6 | 1942 | 8/8/4k3/1N6/n2K4/R7/2b5/8 w - - 6 4 | 50 | 87 | 1.74 | 4. Ra1" |

Most of the duals spotted (see Table) are boring from an artistic point of view, but there are some exceptions:

**(D.1)** Intended: **1.Qc3+ Kb5 2.Bd7+ Kb6 3.Qc6+ Ka7 4.Qc5+ Kb7 5.Bc6+ Kc7 6.Bb5+ Kb8 7.Qd6+ Kb7 8.Bc6+ Kb6 9.Bd5+ Kb5 10.Qc6+ Ka5 11.Qc7+ Kb5 12.Bc6+ Kc5 13.Be8+ Kb4 14.Qd6+ Kc4 15.Qc6+ Kd4 16.Qa4+**, overlooking 14.Qc3 mate!

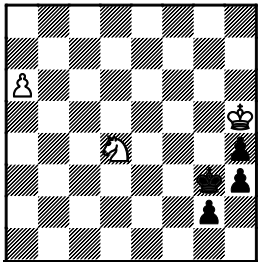
Not all sub- (and equi-) optimal moves spoil an endgame study. The following illustrative example **(D.2)** has been used before, but it does no harm to examine it again:

**D.1.** I. Borisenko
3rd prize *Narodnaya Tribuna* 2003



c2b4 4010.01 3/3 Win

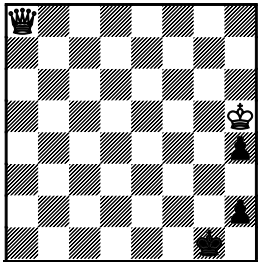
**D.2.** H. Aloni
2nd commendation *Szachy* 1960



h5g3 0001.13 3/4 Win

**(D.2)** We concentrate on the main line: **1.a7 g1Q 2.Se2+ Kf2 3.Sxg1 h2 4.Sh3+ Kg3 5.Sf2 Kxf2 6.a8Q Kg1 7.Qa1+ Kg2 8.Qb2+ Kg1 9.Kxh4 h1Q+ 10.Kg3** wins.

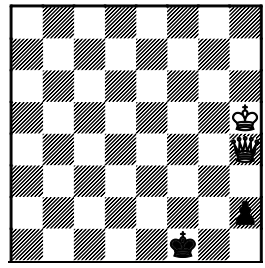
This is the position after move 6:



The EGTB indicates three winning moves: 7.Qa1+ (solution) with a DTM of 14 moves, 7.Qa7+ DTM: 14 and 7.Qg8+ DTM: 13 moves. Many people now jump to conclusions: 7.Qg8+ must be a cook as the EGTB indicates a shorter DTM.

Let's examine the optimal moves: **7.Qg8+ Kf2 8.Qd5 Kg1 9.Qg5+ Kf1 10.Qxh4**, and now we are in a very interesting critical position: *(see diagram next column)*

Now the EGTB indicates that 10…Ke2!? is the optimal move for Black with a DTM of 9 moves. Of course, an o.t.b. player would never consider this move since 11.Qxh2 is an immediate win. The more natural move is **10…Kg2** (DTM 8) **11.Qe4+ Kg1 12.Qe1+ Kg2 13.Kg4 h1Q 14.Qe2+ Kg1 15.Kg3** This final position



(at move 15) is almost identical to the main line (at move 10!) and has the same idea. So 8.Qg8+ is merely a time wasting dual. That seems to be strange, because Black did not play DTM-optimally in this line. The explanation is that, in the solution, Black plays the natural 8...Kg1 (DTM 8), while 8...Kg3 (DTM 12) is optimal. But this also is a weak move to an o.t.b. player who would quickly find 9.Qb7 followed by 10.Qh1 leaving Black without any chance.

In conclusion, one should keep in mind that a DTM-optimal defence may be a very stupid move for a player or endgame study composer. Every claim based on an EGTB needs to be thoroughly examined, even if the EGTB indicates that the alternative has a shorter DTM.

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