

# Chess Aesthetics Research Survey Results

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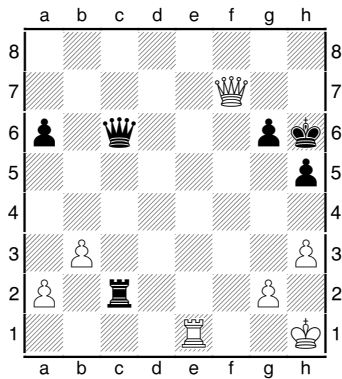
Between the months of June and July 2008, an online research survey was conducted with the help of Chessgames.com. Its visitors and members served as respondents. The survey was intended to gauge human player aesthetic assessment of direct mate-in-3 combinations. It was designed based on feedback from 5 expert players (2 GMs, 2 IMs and 1 FM). There were 4 survey sets in total.

Tournament games (between expert players) and (published) compositions were used in varying mixtures across the sets (Meson Chess Problem Database, 2008; Mega Database, 2008). Each set consisted of 20 randomly selected combinations. Respondents were asked to rate them between 1 and 10 based on beauty, and to ensure the ratings were precise to one decimal point (precision not explicitly stated for set 2). This encouraged respondents to decide one way or the other unless they were absolutely sure of equality between combinations. Respondents were free to modify their ratings at any time before submission e.g. after looking at all the combinations in the set.

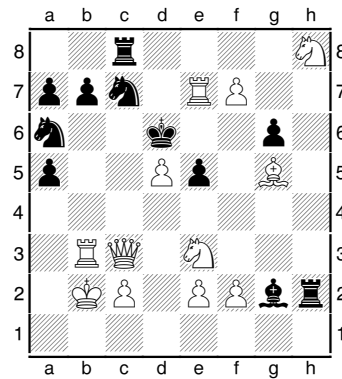
Validation was determined based on three criteria. First, a respondent had to answer two 'control questions' correctly. A certain level of competence - but not necessarily mastery - is necessary to appreciate beauty in the game. Second, their evaluations should not appear suspicious such as having too many similar values and no precision at all. This would suggest a hurried evaluation or even sabotage. Suspicious evaluations also included those with even one combination rating outside of the specified range. Third, repeat evaluations by the same person (for the same set) were discarded and only the most recent one used. The average human rating for each combination was then calculated and rounded to one decimal point for consistency.

There were 404 valid respondents in total (set 1: 116, set 2: 105, set 3: 102, set 4: 81). Approximately 99% identified themselves as male (which is apparently not unusual for an online chess community). The combinations and their mean ratings are shown below. Sets 3 and 4 consist of combinations taken exclusively from tournament games and compositions, respectively. Sets 1 and 2 are a mixture (the compositions have their ratings *italicized*). Using all these mean ratings, the tournament game combinations, on average, scored 5.0 whereas compositions scored 5.7. The difference was statistically significant based on a two-tailed, two sample t-test assuming unequal variances at a significance level of 1%;  $t(74) = -2.7$ ,  $P < 0.01$ . This survey and its results were further analyzed and used as part of a computational study of aesthetics in chess (Iqbal, 2008).

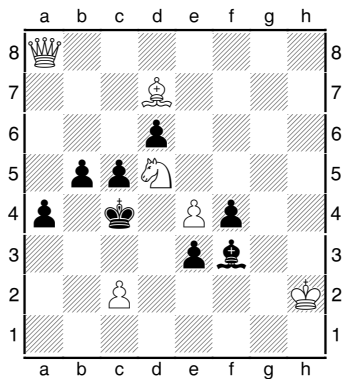
Set 1



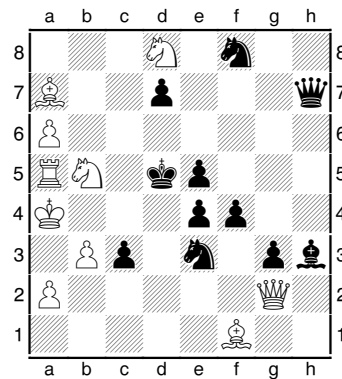
1.Qf8+ Kg5 2.Re5+ Kh4 3.Qf4#  
**1 (3.9)**



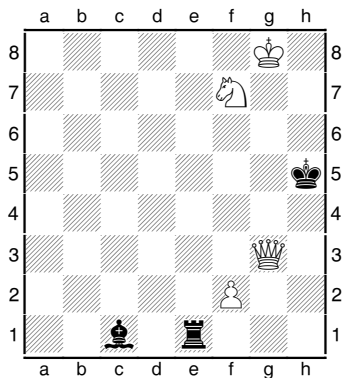
1.Nxg6 Re8 2.Rxb7 Nxd5 3.Rbd7#  
**2 (4.9)**



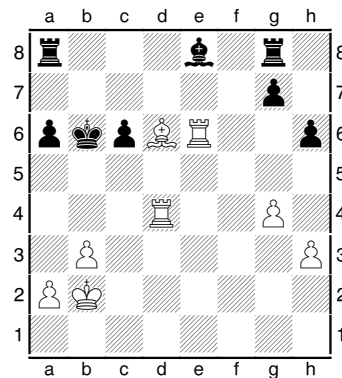
1.Qe8 Kd4 2.Qh8+ Kxe4 3.Nc3#  
**3 (5.7)**



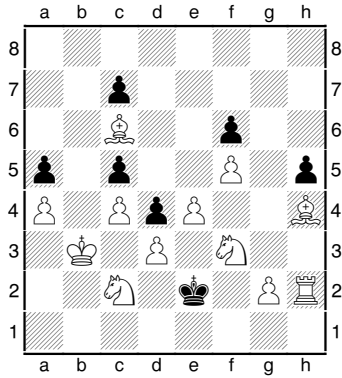
1.Kb4 Qe7+ 2.Nd6+ Kxd6 3.Bb8#  
**4 (6.4)**



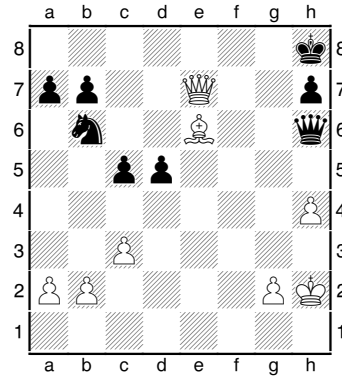
1.Kh7 Rh1 2.f3 Rg1 3.Qh2#  
**5 (4.8)**



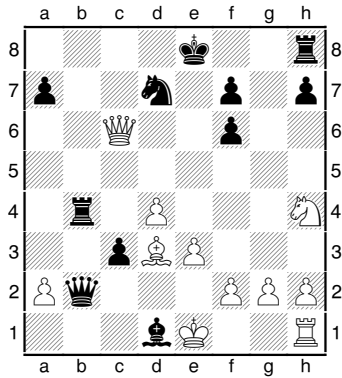
1.Rb4+ Ka5 2.Rb7 c5 3.Bc7#  
**6 (5.2)**



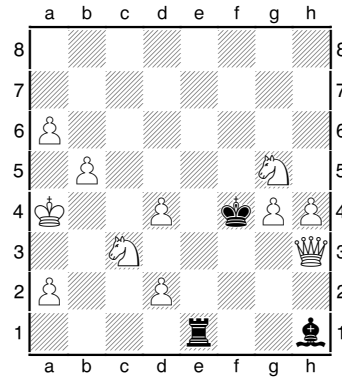
1.Kb2 Kxd3 2.g3 Kxc4 3.Bb5#  
7 (5.4)



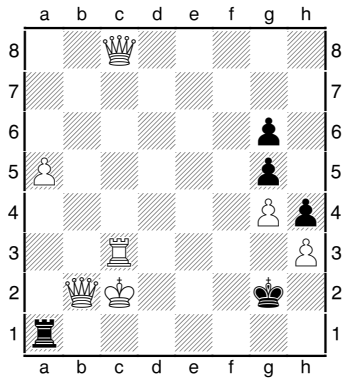
1.Qe8+ Kg7 2.Qf7+ Kh8 3.Qg8#  
8 (4.2)



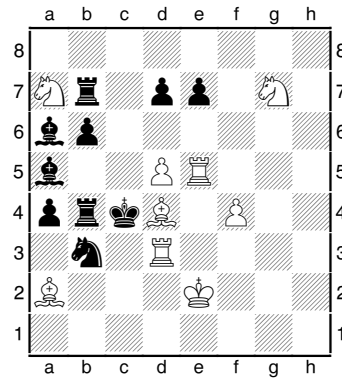
1.Qc8+ Ke7 2.Nf5+ Ke6 3.Qc6#  
9 (5.3)



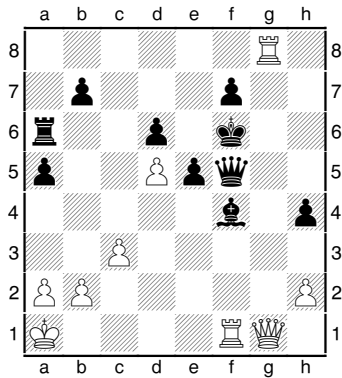
1.a3 Re5 2.Nge4 Rxe4 3.Nd5#  
10 (5.9)



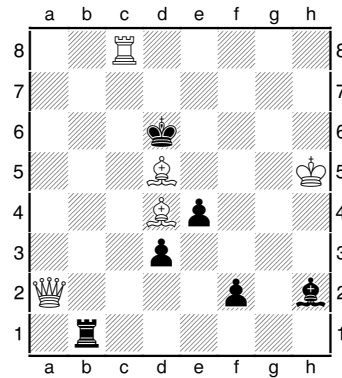
1.Qxa1 Kf2 2.Qc5+ Kg2 3.Qag1#  
11 (3.1)



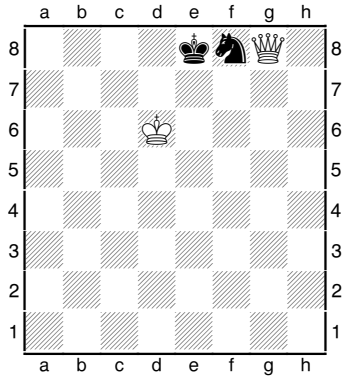
1.Ba1 Kc5 2.d6+ Kc4 3.Rd4#  
12 (6.0)



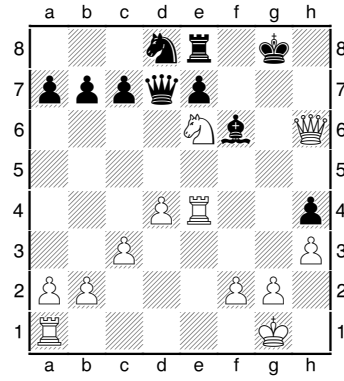
1.Qg7+ Ke7 2.Qf8+ Kf6 3.Qd8#  
13 (5.5)



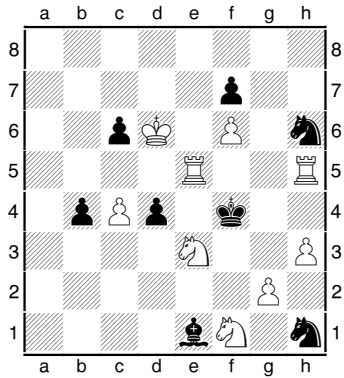
1.Qxf2 Kxd5 2.Qf5+ Kxd4 3.Qc5#  
14 (6.1)



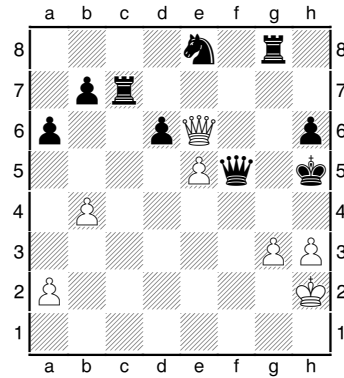
1.Qg7 Ng6 2.Qf6 Nf8 3.Qe7#  
**15 (4.9)**



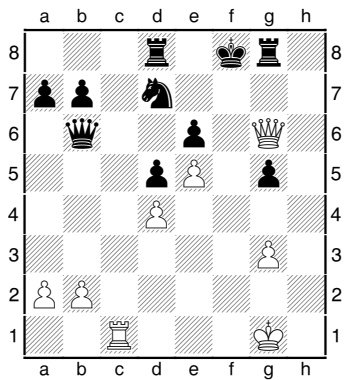
1.Qg6+ Kh8 2.Rxh4+ Bxh4 3.Qg7#  
**16 (5.8)**



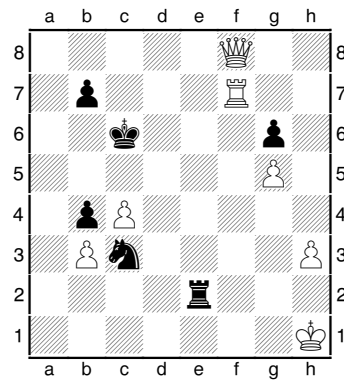
1.Nc2 Bd2 2.Rh4+ Ng4 3.Rxg4#  
**17 (4.8)**



1.Qxf5+ Rg5 2.g4+ Kh4 3.Qf2#  
**18 (5.6)**

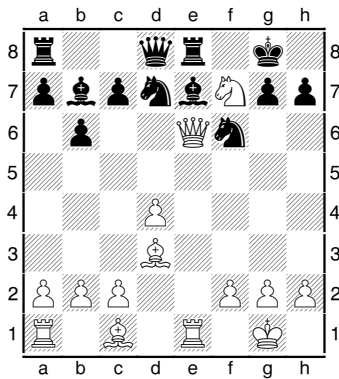


1.Rf1+ Nf6 2.Rxf6+ Ke7 3.Qf7#  
**19 (4.5)**

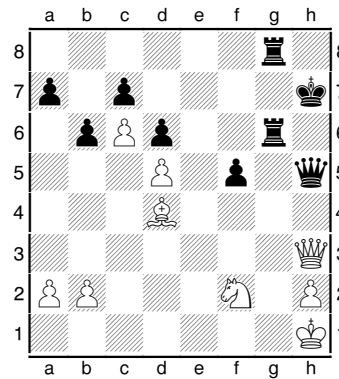


1.Qc8+ Kd6 2.Qc7+ Ke6 3.Qe7#  
**20 (4.7)**

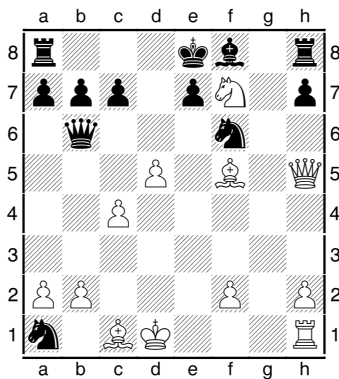
Set 2



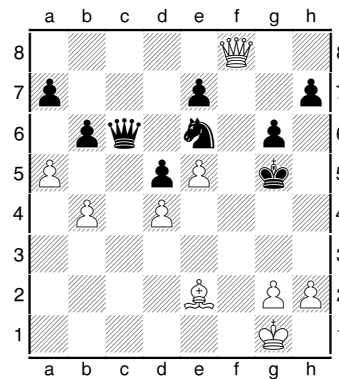
1.Nh6+ Kh8 2.Qg8+ Nxc8 3.Nf7#  
**1 (6.8)**



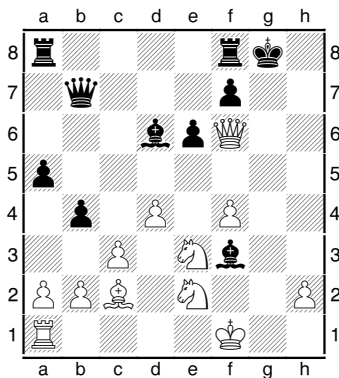
1.Qxh5+ Rh6 2.Qf7+ Rg7 3.Qxg7#  
**2 (3.5)**



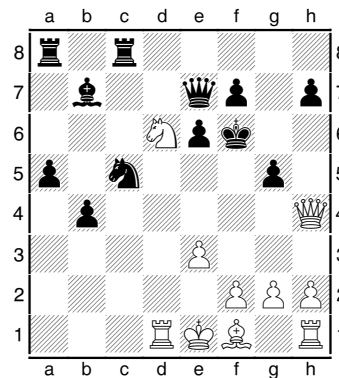
1.Nd6+ Kd8 2.Qe8+ Nxe8 3.Nf7#  
**3 (7.1)**



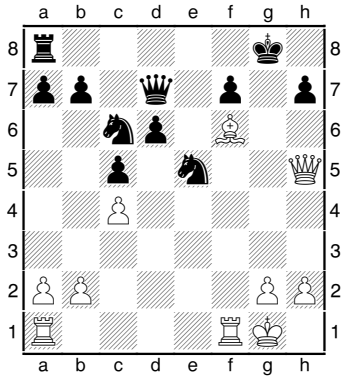
1.h4+ Kxh4 2.Qh6+ Kg3 3.Qh2#  
**4 (5.3)**



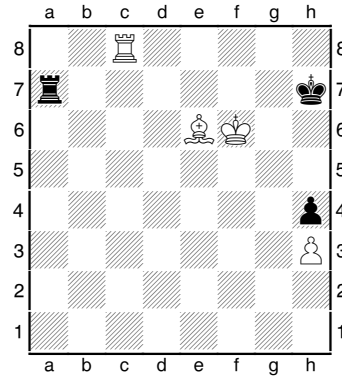
1.Qg5+ Kh8 2.Qh6+ Kg8 3.Qh7#  
**5 (3.2)**



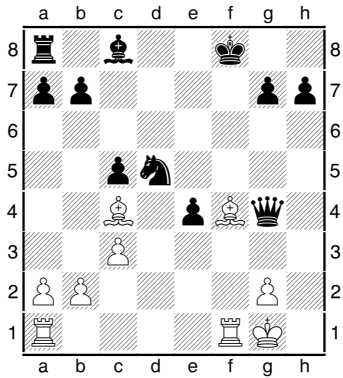
1.Qh6+ Ke5 2.f4+ gxf4 3.exf4#  
**6 (5.5)**



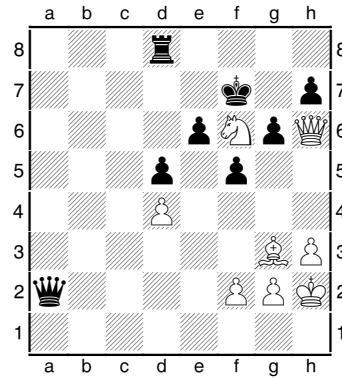
1.Qg5+ Ng6 2.Qh6 a5 3.Qg7#  
7 (3.8)



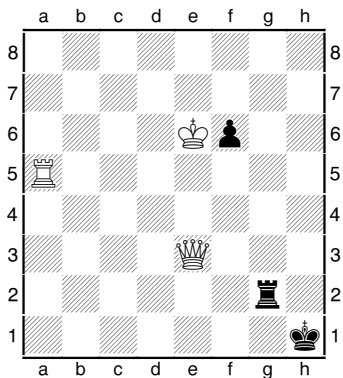
1.Bf5+ Kh6 2.Rh8+ Rh7 3.Rxh7#  
8 (4.0)



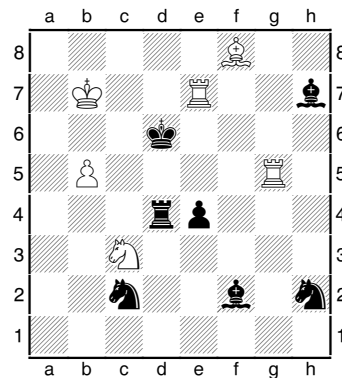
1.Bd6+ Ke8 2.Bb5+ Bd7 3.Rf8#  
9 (6.1)



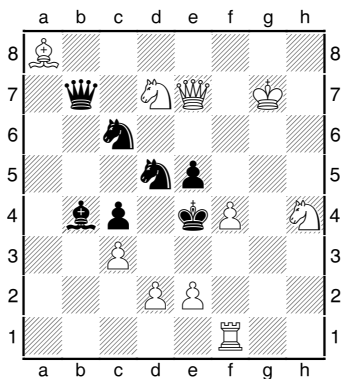
1.Qxh7+ Kxf6 2.Be5+ Kg5 3.f4#  
10 (6.2)



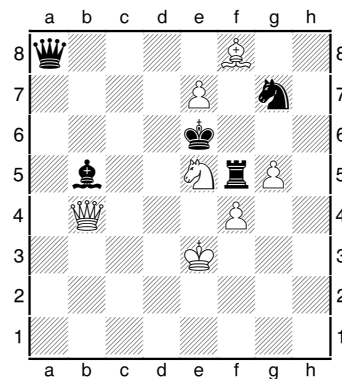
1.Qe4 Kh2 2.Qh4+ Kg1 3.Ra1#  
11 (4.8)



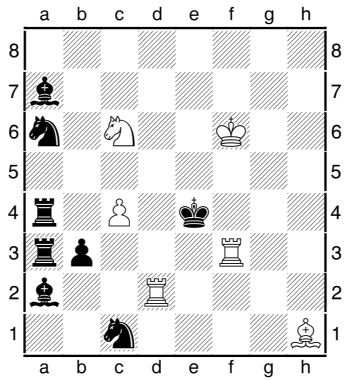
1.Nd5 Kc5 2.Rc7+ Kxb5 3.Nc3#  
12 (6.5)



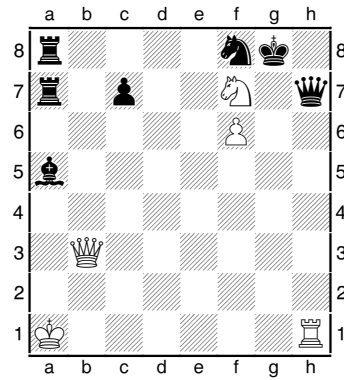
1.Rf3 Nxc3 2.Nf6+ Kd4 3.Nf5#  
13 (6.0)



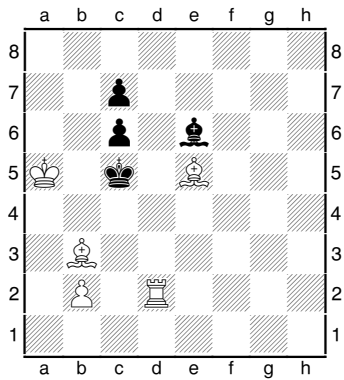
1.Qd6+ Kxd6 2.e8N+ Kd5 3.Nc7#  
14 (8.1)



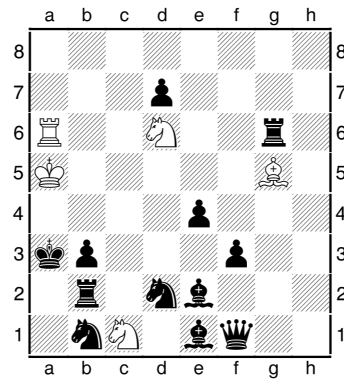
1.Rd5 Ra5 2.c5 Kxd5 3.Rc3#  
**15 (6.8)**



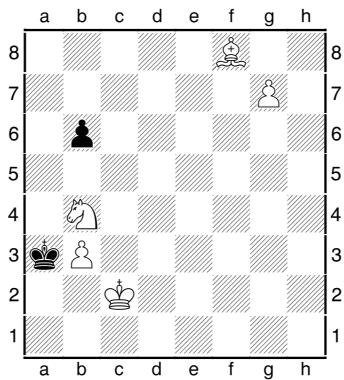
1.Nh6+ Kh8 2.Qg8+ Qxg8 3.Nf7#  
**16 (7.1)**



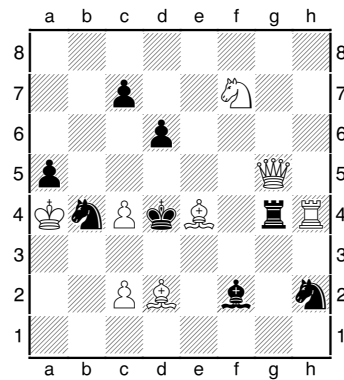
1.Rd7 Bxb3 2.Rd4 Ba2 3.b4#  
**17 (6.4)**



1.Be7 Nc4+ 2.Kb5+ Na5+ 3.Nc4#  
**18 (6.8)**

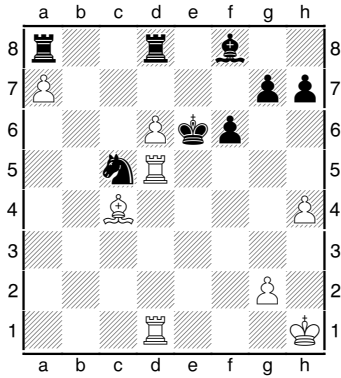


1.g8N b5 2.Ne7 Kxb4 3.Nc6#  
**19 (7.7)**

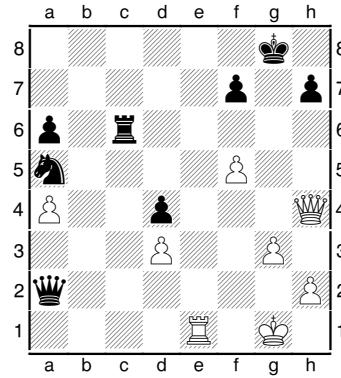


1.Kb5 Rxc5+ 2.Bf5+ Bxh4 3.c3#  
**20 (7.2)**

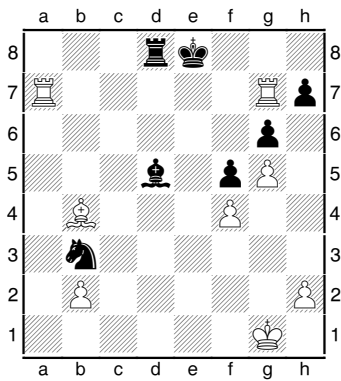
Set 3



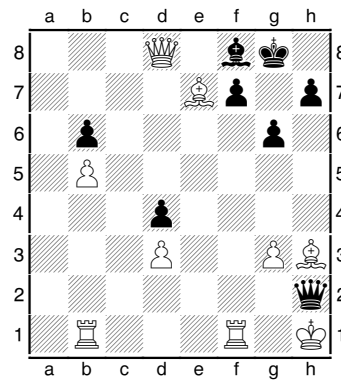
1.Rxc5+ Kd7 2.Rc7+ Ke8 3.Bf7#  
**1 (5.4)**



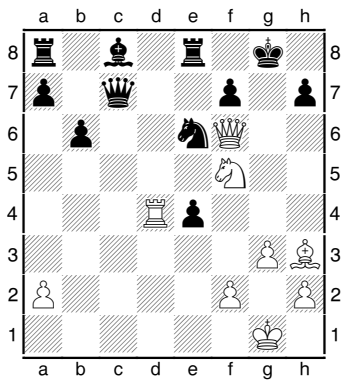
1.Re8+ Kg7 2.Qg5+ Rg6 3.f6#  
**2 (5.8)**



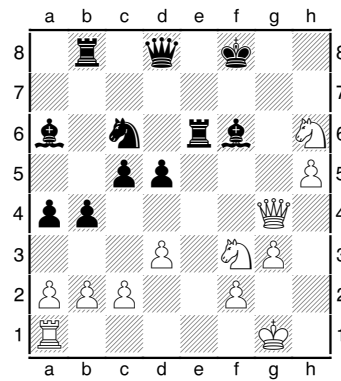
1.Rae7+ Kf8 2.Ref7+ Ke8 3.Rf8#  
**3 (4.5)**



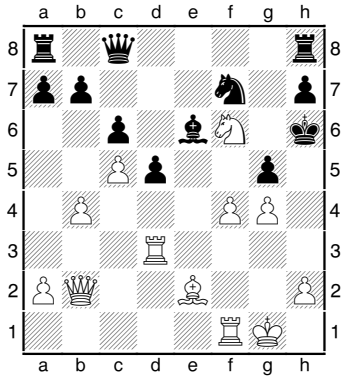
1.Kxh2 h5 2.Qxf8+ Kh7 3.Rxf7#  
**4 (2.8)**



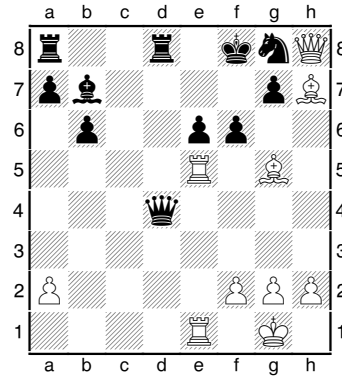
1.Nh6+ Kf8 2.Qh8+ Ke7 3.Nf5#  
**5 (6.0)**



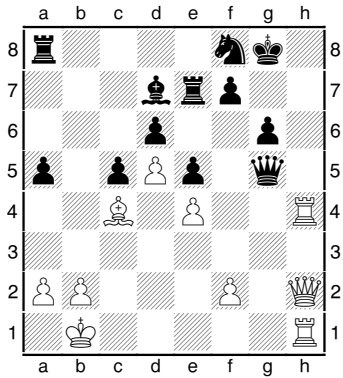
1.Qg8+ Ke7 2.Qf7+ Kd6 3.Nf5#  
**6 (5.7)**



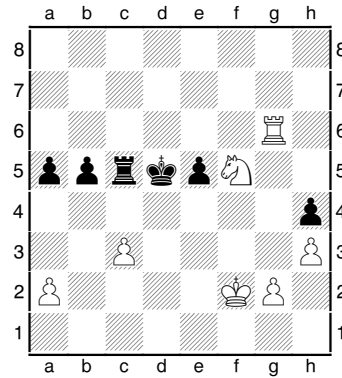
1.Ng8+ Qxg8 2.Qf6+ Qg6 3.Rh3#  
7 (6.2)



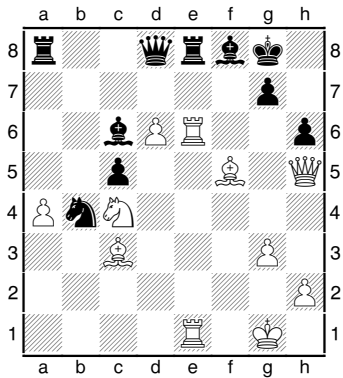
1.Qxg8+ Ke7 2.Qxe6+ Kf8 3.Qg8#  
8 (4.4)



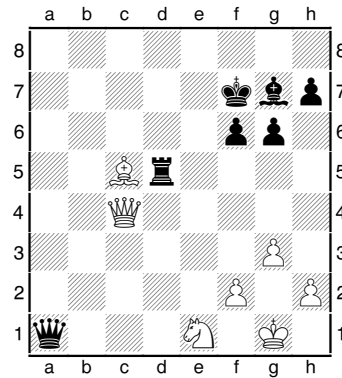
1.Rh8+ Kg7 2.Rg8+ Kf6 3.Qh8#  
9 (5.7)



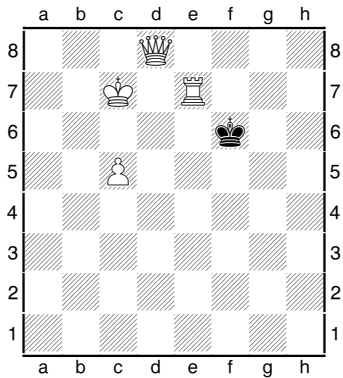
1.Ne3+ Ke4 2.Ke2 Rxc3 3.Rg4#  
10 (6.7)



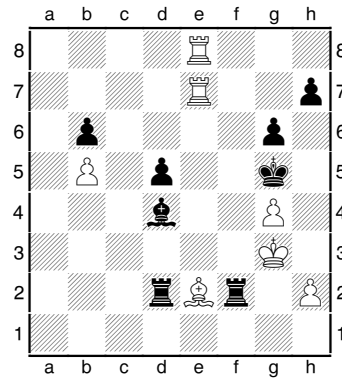
1.Qg6 Rxe6 2.Bxe6+ Kh8 3.Qxh6#  
11 (6.2)



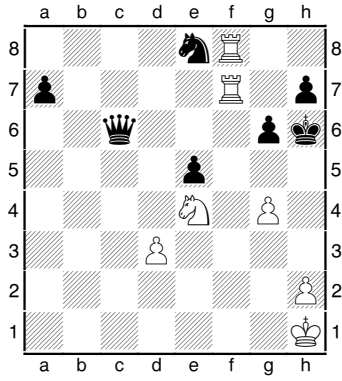
1.Qxd5+ Ke8 2.Qe6+ Kd8 3.Bb6#  
12 (4.9)



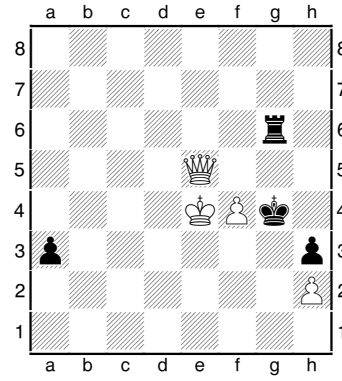
1.Qf8+ Kg6 2.Rg7+ Kh6 3.Qh8#  
13 (1.9)



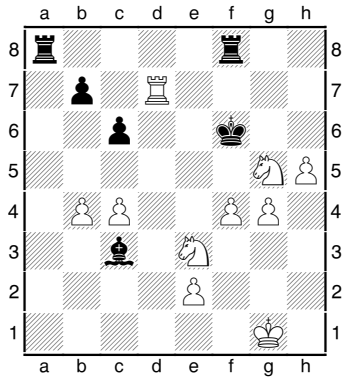
1.h4+ Kf6 2.g5+ Kf5 3.Bg4#  
14 (5.2)



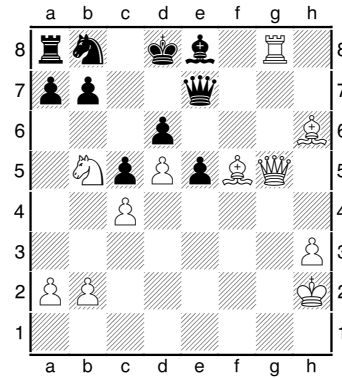
1.g5+ Kh5 2.Rxh7+ Kg4 3.h3#  
**15 (6.1)**



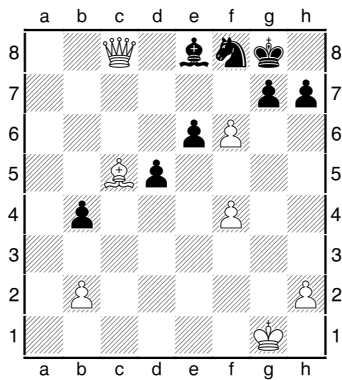
1.Qf5+ Kh4 2.Qxg6 a2 3.Qg5#  
**16 (3.5)**



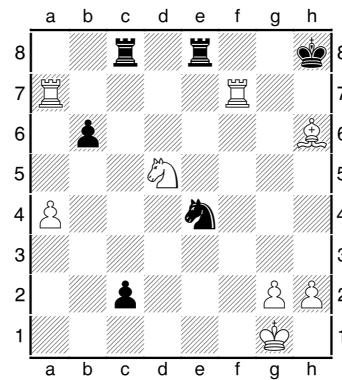
1.Ne4+ Ke6 2.Nc5+ Kf6 3.g5#  
**17 (6.4)**



1.Qxe7+ Kxe7 2.Bg5+ Kf7 3.Be6#  
**18 (6.4)**

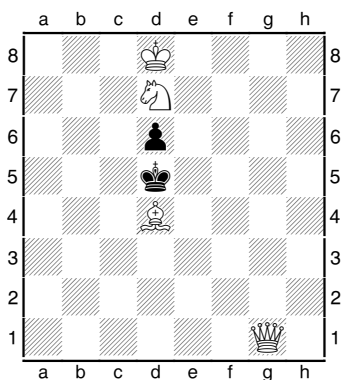


1.Qxe8 h5 2.Qxf8+ Kh7 3.Qxg7#  
**19 (2.9)**

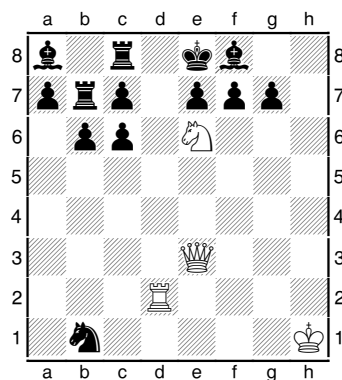


1.Rh7+ Kg8 2.Rag7+ Kf8 3.Rg6#  
**20 (4.5)**

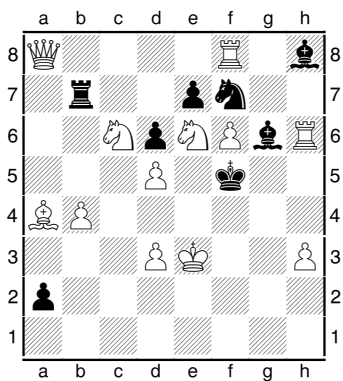
Set 4



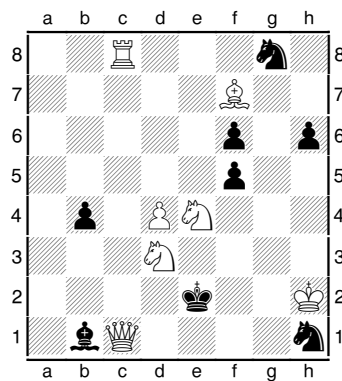
1.Qd1 Kc6 2.Qb3 d5 3.Qb6#  
**1 (4.9)**



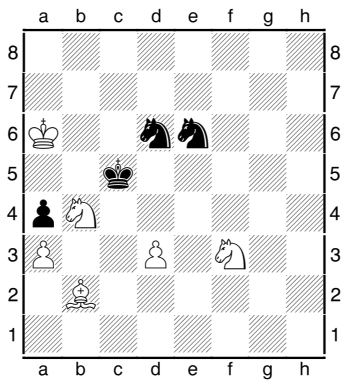
1.Qh3 fxe6 2.Qh5+ g6 3.Qxg6#  
**2 (4.3)**



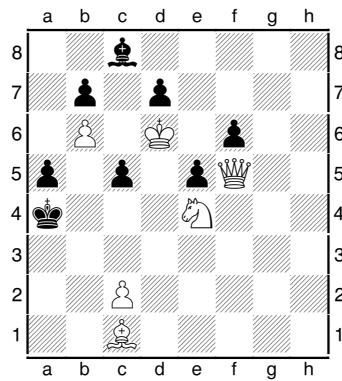
1.Bc2 Kxf6 2.Rxf7+ Kxf7 3.Qf8#  
**3 (5.3)**



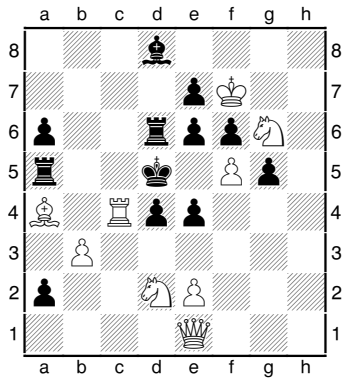
1.Rd8 Kxd3 2.Qd2+ Kxe4 3.Bd5#  
**4 (5.7)**



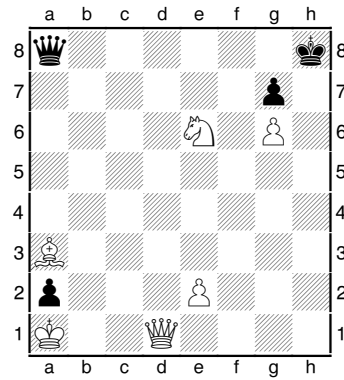
1.Bd4+ Nxd4 2.Ng5 Nc8 3.Ne4#  
**5 (7.6)**



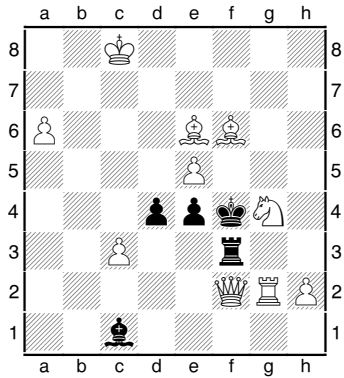
1.Qe6 Kb5 2.Qb3+ Ka6 3.Nxc5#  
**6 (5.2)**



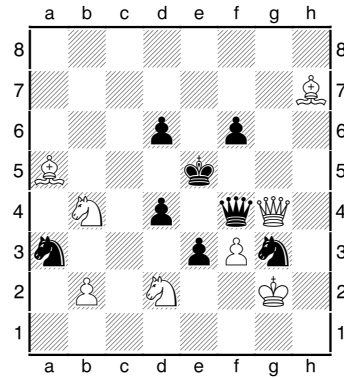
1.Nb1 Rc6 2.Qb4 Rxc4 3.bxc4#  
7 (5.4)



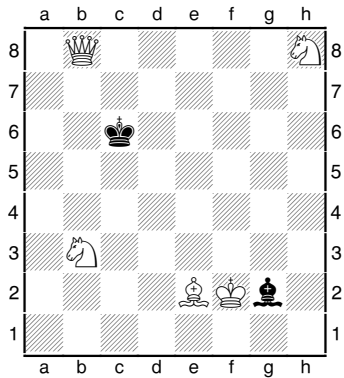
1.Qf1 Kg8 2.Qf7+ Kh8 3.Qxg7#  
8 (4.2)



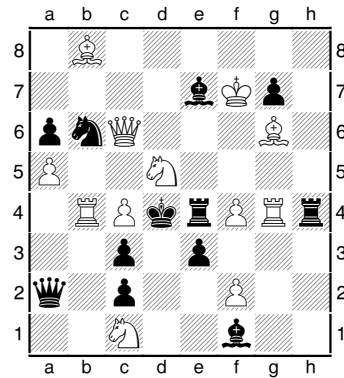
1.Bd8 dxc3 2.Qa7 e3 3.Qd4#  
9 (5.3)



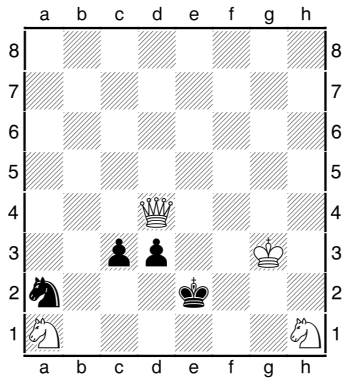
1.Qg6 Qxf3+ 2.Nxf3+ Ke6 3.Qe8#  
10 (5.0)



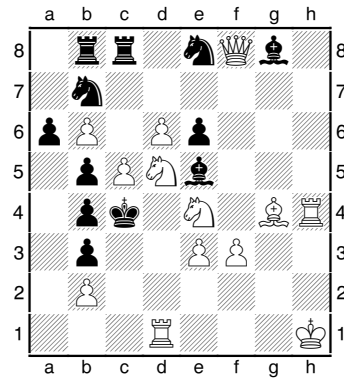
1.Ng6 Kd7 2.Bg4+ Kc6 3.Ne7#  
11 (4.9)



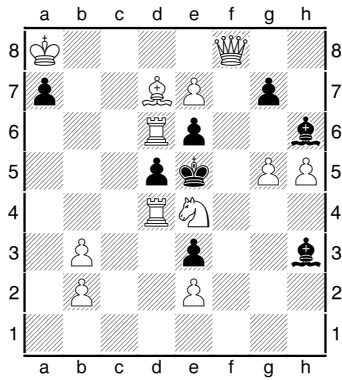
1.Nc7 Rxf4+ 2.Qf6+ Kc5 3.Nxa6#  
12 (6.2)



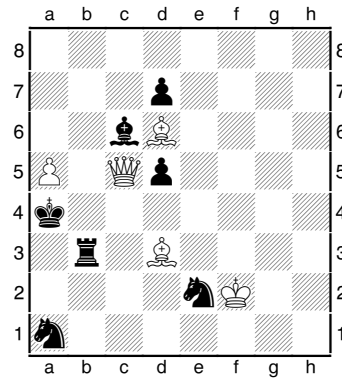
1.Kf4 Kd1 2.Qxd3+ Kc1 3.Qc2#  
13 (4.0)



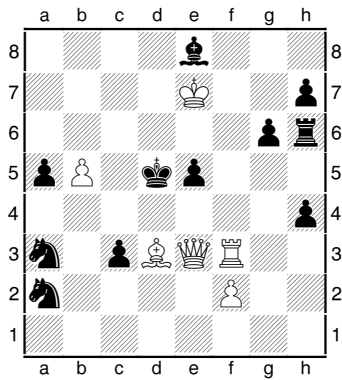
1.d7 Rxc5 2.Bf5 Rxd5 3.Nd2#  
14 (5.8)



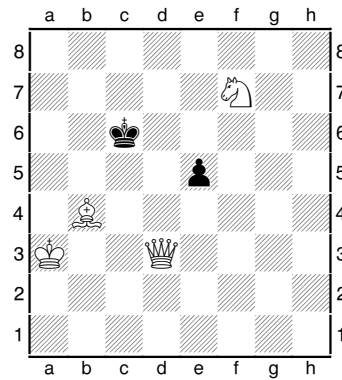
1.Ra6 Kxd4 2.Qf4 dxe4 3.Qd6#  
**15 (5.5)**



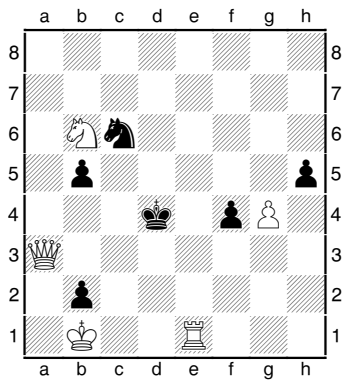
1.Ke1 Rb1+ 2.Bxb1 Nc2+ 3.Bxc2#  
**16 (5.1)**



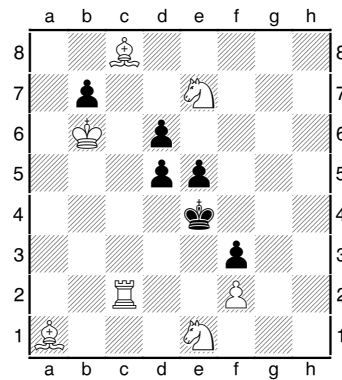
1.Rf4 exf4 2.Qe6+ Kc5 3.Qd6#  
**17 (5.4)**



1.Qh7 Kb7 2.Nd6+ Ka8 3.Qb7#  
**18 (4.2)**



1.Nd7 Kc4 2.Re4+ Kd5 3.Nf6#  
**19 (5.7)**



1.Bd4 Kxd4 2.Bxb7 Ke4 3.Rc4#  
**20 (5.8)**

## References

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