

THE USE OF LOGIC IN SOLVING STUDIES

BY DAVID HODGE

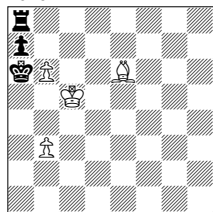
(Based on a lecture given on 9th November 2019 at St. Botolph's Church Hall, London – Ed.)

The topic of the talk concerned the use of logic and logical ideas (*not to be confused with the Logical School of composition* – Ed.) in solving studies. For illustrative purposes a number of examples were presented with the idea of noticing how logic can be used to aid in problem solving.

I certainly don't wish to overlook the artistry which has gone into the composition of these works and really want to appreciate them through solving them. Through solving studies I often discover those elements placed there by the composer to hold the problem together, sometimes accidental side lines that are amazing in their own right or perhaps not even noticed before. I do see solving studies as a markedly different pursuit to their composition. Their composition often begins with an amazing idea, some key configuration or theme around which the work of art is then formed. The published study is one of the final positions the composer ever has on their board, after having found an elegant way to wind back time to when the amazing idea is not yet visible. From the solvers' point of view, the composer has hidden this concept from us. By constructing an introduction to the main idea often all the key pieces are not yet on their necessary squares, and the challenge is to uncover the mystery of what the composer has hidden within.

Four particular ideas useful in study solving will be demonstrated in looking at a few examples. These logical techniques can be described as: (a) the exploitation of 'only moves'; (b) move order tricks (also particularly useful in helpmates); (c) using strong defences and threats; and (d) reducing options.

S1 Pal Benko
1 Pr *Magyar Sakkelet*
1975



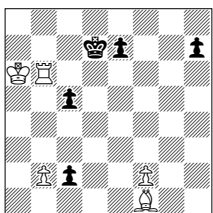
Win

In **S1**, a relatively simple example, there are very few candidate moves: 1.b7, 1.Bc4+ and against other moves 1...axb6+ is very strong ((c)). Against 1.b7 the analysis yields a draw after 1...Kxb7 2.Bd5+ Kb8 3.Bxa8 Kxa8 4.Kc6 Kb8! A seasoned solver would suspect that 1.b7 Kxb7 2.Bd5+ is probably not the intended solution; however, the 'only sensible move' nature of many of Black's replies in this line do lend themselves to quick analysis for the purposes of ruling out this sideline, and clearing the way for confident study of the main line.

We are left with only one logical first move, 1.Bc4+ Ka5. Now we again have limited choices, clearly both 2...Rc8+ and 2...axb6+ are very strong threats ((c)), so 2.b7 and 2.b4+ are the main choices (not 2.bxa7 Rc8+ when 3...Kb6 and 4...Kxa7, or 2.Bb5 axb6+ 3.Kc4 Rc8+). Here we have an opportunity to apply (b), noting that after 2.b4+ Ka4 we can only now consider 3.b7 or 3.Bb5+, and after 3.Bb5+ Ka3/b3 we will be forced to play 4.b7. So why not start with 2.b7? We can play 3.b4+ next if we wish. Is there any possible advantage to starting with 2.b4+ first?

Technically there is a small difference: after 2.b4+ Ka4 3.Bb5+ Black may choose 3...Ka3 or 3...Kb3 before deciding where to play the rook along the back rank. In this line, if Black plays 3...Ka3 then after 4.b7 4...Rg8 is possible, whereas after 3...Kb3 then 4.b7 Rg8 5.Bc4+. In contrast, after an initial 2.b7 we note that 2...Rg8 is not possible, thus by playing 2.b4+ first the only real difference is to provide Black with a further defence, ((d)), we didn't need to offer! Thus by (b) we deduce that rather than playing 2.b4+ it must be superior to play 2.b7. We have now reached the mainline 1.Bc4+ Ka5 2.b7, and the details after 2...Rf8 and 2...Rh8 are less interesting and omitted from this article. The main line of the solution proceeds: 2...Rf8 3.Bd3 Rg8 4.b4+ Ka4 5.Bc2+ Ka3 6.b5 Re8 7.Bd1 Rg8 8.Bg4 Rb8 9.Kc6 Kb4 10.Be2 Re8 11.Kd7 Rf8 12.Kc7 Rf7+ 13.Kb8 and wins.

S2 Adolf Herberg
1 HM *Schach Echo* 1962



Win

S2 was recently used in the Belgian Championship, 2019. In this study a little move order logic goes a fairly long way. Stopping the black c2-pawn is urgent, and brief investigation suggests that only 1.Bh3+ and 1.Bb5+ are sensible. In fact, after some analysis 1.Bh3+ Kc7 White has nothing better than a draw with 2.Kb5! The other first move is 1.Bb5+ Kd8, after which more progress is quickly made ((a)), so even though we may not know when solving if this line is correct, it is easier to search. Noting that 1...Kc7/c8 lose to an immediate 2.Rc6+ and 3.Rxc5. We now refer to our first critical position **S2a**.

The line 2.Rb8+ Kc7 3.Rb7+ Kd6 4.Rd7+ Ke6 leads nowhere. So White must try for a mating net. One obvious attempt is to play 2.Rc6 c1=Q 3.Kb7 threat 4.Rc8#, when Black's natural defences are 3...Qh1 and 3...e6/e5 after which White may have some ideas with Kb8 and Re6. However, there is an immediate snag.

What if White plays 2.Kb7? Black cannot respond with 2...e5/e6 since 3.Re6 leads to mate, and other moves than 2...c1=Q lose to 3.Rc6 (or 3.Ra6!, a line which we shall return to shortly).

So we have discovered that 2.Kb7 c1=Q 3.Rc6 cannot be the solution, else 2.Rc6 c1=Q 3.Kb7 would also win ((b))! In fact, with a little analysis we see that after 2.Rc6 c1=Q White's only other reasonable try is probably 3.b4 but it does not seem to be particularly threatening. We don't need to analyse 3.Kb7 – even though it may be the strongest white move after 2.Rc6.

This suggests we should return to 2.Kb7! c1=Q 3.Ra6! a side-line we noticed earlier, and a line in which move order is critical (note that starting the white king on a7 would destroy the uniqueness). It's simple to see that 3...Qh1+ 4.Bc6 loses immediately, so Black must try 3...e5/e6 4.Re6 followed by 4...Qh1+ with the idea of 5...Qh5 to prevent mate. We will see shortly that Black definitely prefers to keep the e-pawn on the board. So, playing 3...e5 4.Re6 Qh1+ 5.Kb6! Qh5 we reach this critical position **S2b**.

It certainly appears that having the Black pawn on e5 is more challenging, but the endgame after 6.Re8+ is difficult to analyse (though it is drawn). Luckily we note that White is certainly not obliged to play 6.Re8+, indeed no black pawn moves (except 6...c4) improve their endgame position, though 6...c4! is quite a strong threat ((c)) as it currently could cause 7.Re8+ to lead to a worse (and indeed losing!) endgame, with White unable to capture the c-pawn en route to the h-file. So we may logically try the waiting move 6.b3 first, as a move after which Black cannot improve their position. Sure enough a black zugzwang quickly emerges upon noticing that 6...e4 loses quickly to 7.Re8+ owing to the fact that both black central pawns can be captured by the white king on route to stopping h1=Q.

The solution therefore proceeds 6.b3! (not 6.Bc6? c4! 7.Bb5 e4! and the pawn endings are bad for White after Re8+) h6 7.f3! Qf7 8.Rd6+ and White wins simply after both ...Kc8 and ...Ke7.

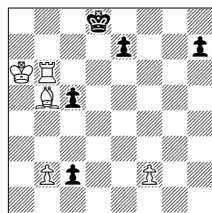
In **S3** the first difficulty comes at move one, with 1.Qd8+ spawning a number of difficult lines to analyse. The easiest involves Black playing 1...Ke5 offering the g7-bishop but threatening to draw simply by mopping up White's queenside pawns (a perpetual is straightforward after 2.b7). Furthermore, the black pawn on h2 is a real difficulty for White as two-move threats to win a black rook are too slow with this pawn on the board. Studying 1.a5 has the advantage of ((a)) in that Black has very few moves that do not immediately lose, for example 1.a5 Rxa5 2.b7 Rb5 3.Qd8+ after which White is quickly spoilt for choice with winning lines. It is worthy of note that in many of these lines Qg8+ allows either b8=Q+ or Qxg7+ next, both which win quickly.

1.a5 h2! 2.Qxh2 Kf7! giving **S3a**. Black threatens 3...Rh6+ 4.Qxh6 Bxh6 5.b7 Bg7 and 6...Rh6#. So White has either 3.Qf2+ or 3.Qh5+. After 3.Qf2+ we can exploit the forced nature of the line to analyse efficiently. Following 3.Qf2+ Rf6 [only move] 4.Qa2+ [only move] Re6 [only move] it is clear White has no fruitful continuation, as Black soon has Rxa5 or Be5.

The solution therefore proceeds with 3.Qh5+ Kf8 and now we have reached the critical position **S3b**: Black's 4...Rh6+ is unavoidable, however, careful analysis suggests the reason why it fails may be the composer's beautiful intention. The line runs 5.Qxh6 Bxh6 6.b7 Ra7 7.a6 and wins. So the study comes down to how White can 'force' Black to try Rh6+ and run into the line above. 4.Qxg5 allows 7...Bf4 winning for Black in the above line, so only 4.Qh3, Qh2 and Qh1 are worth considering.

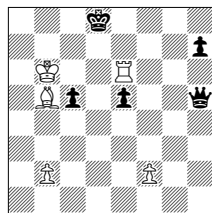
Clearly 4.Qh2 cannot be the solution due to 4...Kf7 repeating the position. So is there a difference between 4.Qh1 and 4.Qh3 with threats of

S2a
After 1...Kd8



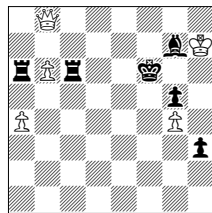
Win

S2b
After 5...Qh5



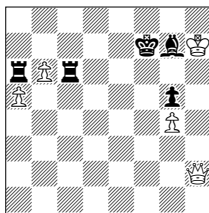
Win

S3 Andrzej Jasik
European Solving
Championship 2015



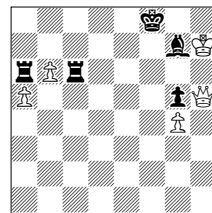
Win

S3a
After 2...Kf7



Win

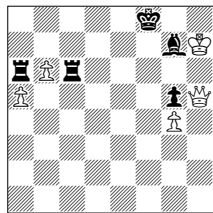
S3b
After 3.Qh5+ Kf8



Win

S3b

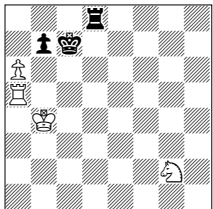
After 3.Qh5+ Kf8
Repeated diagram



Win

**S4 S.Hornecker,
M.Minski &
H.Reddmann**

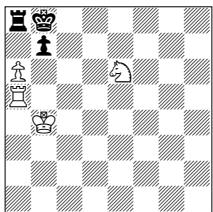
1 Pr Moscow Ty 2019



Win

S4a

After 2...Kb8



Win

5.Qxc6 and 5.Qa3+ respectively (as well as both allowing 5.Qf3+ and 5.Qf1+)? There is a concrete defence to 4.Qh3 Rxa5 5.b7 Rb5 6.Qa3+ Kf7 7.Qa2+ Re6 8.b8=Q Rxb8 9.Qa7+ Re7 10.Qxb8 Be5 and Black has a solid fortress draw. Indeed, careful following of this line shows that this time it is White's moves that are essentially forced ((a)) (with the exception of perpetual checks between the a3-f8 diagonal and the f-file) since Rh6# is a constant threat. So by elimination we are actually only left with 4.Qh1 as a plausible attempt to win.

The benefits of the 4.Qh1 line are that with the threat of 5.Qxc6 Black's choices are also limited and the focus is more upon inducing Rh6+. The details of the differences between Rd6, Re6 and Rf6 get quite complex, and although they do serve to help illustrate opportunities to exploit move order ((b)) there is a little too much analysis required than seems appropriate in this article. Black strongest 4th move is 4...Rf6, after which White has another decision. You may then be interested to see that after 5.Qh2 Black has no good defence to 6.Qb8+ (without also allowing 6.b7). So the solution continues 4.Qh1 Rf6 5.Qh2 Rh6+ 6.Qxh6 Bxh6 7.b7 Ra7 8.a6 Ke8 9.Kg8 and wins.

Finally, this recent prize winning study **S4** was discussed. Of particular interest is position **S4a**, reached after some analysis leading to the four-ply introduction 1.Sf4 Ra8 2.Se6+ Kb8! Black has a strong threat of 3...Rxa6 ((c)) and White doesn't possess many moves that improve their position. Only 3.a7+ and rook moves along the fifth-rank suggest themselves. The main idea is that after 3.Rf5 bxa6 4.Kc5 Ra7 5.Rf8+ Kb7 6.Sd8+ Kc7 7.Rf7+ wins. These ideas make 3.Rd5, 3.Rf5, 3.Rg5 and 3.Rh5 the obvious candidate moves. However, they all appear to be likely to lead to similar results, so is there any subtle difference?

However, what about 3.a7+? Suppose we begin 3.a7+ Rxa7 4.Rf5 then 4...Ra6!? would be a transposition. Unless Black responds 3...bxa6 to our rook move then 3.a7+ cannot be justified on uniqueness grounds ((b)), though it also provides Black with extra defences 4...Ra1/a2 ((d)).

These mean we should concentrate on 3.Rd5--h5, and sure enough after a little analysis the beautifully subtle difference between 3.Rh5! and the rest can be found. After 3.Rd5 Rxa6 4.Rd8+ Ka7 5.Sc7 then 5...Rc6?? loses to 6.Ra8+ Kb6 7.Sd5#. Similarly, 5...Rf6? loses to 6.Ra8+ Kb6 7.Sd5+. Amazingly, even 5...Rg6 loses to 6.Ra8+ Kb6 7.Sd5+ Kc6 8.Se7+! However, 5...Rh6! is just far enough away that the rook remains immune. In particular, after 8.Se7+ Black is not forced to play 8...Kd6??

After 3.Rf5 and 3.Rg5 an almost identical argument follows (except that white plays 4.Rf8+ and 4.Rg8+ respectively, and after 4...Ka7 5.Sc7 then Black's 5...Rf6?? and 5...Rg6?? respectively lose immediately rather to knight forks), save 5...Rd6? losing to an immediate 5.Sb5+ fork. However, in both cases 5...Rh6! comes to the rescue again. Hence we discover the subtle difference between White's third move rook lifts, 3.Rh5! is suddenly the winning move in preventing 5...Rh6. The line then proceeds 3...Rxa6 4. Rh8+ Ka7 5.Sc7! and all other black rook moves along the sixth rank lose as described in the 3.Rd5 line above. An amazing range of knight forks, a superb composition with so few pieces!

In summary, a number of problems were presented to illustrate some examples of techniques and ideas which use logic to assist in solving studies. As noted above, all such study solving does still entail a definite quantity of solid analysis, which can rarely be avoided. However, the reader will hopefully find some ideas here to make them more likely to find the beautiful creations of the composer before becoming too frustrated!

BENKO MEMORIAL TOURNEY – Example solutions (From page 255)

Ex.1 (a) 1...e2-e4 2.d7-d5 e4xd5 3.Kc5-d4 d5xe6 4.Kd4-e3 e6xf7 5.Rd8-d3 f7xe8=Q 6.Rf8-f3 Qe8xe5#

(b) 1...Ke1-f2 2.Rd8-c8 Kf2-e3 3.Rc8-c6 Ke3xe4 4.Se8-c7 Ke4-d4 5.Rf8-e8 e2-e4 6.Re8-e7 e4-e5#

Ex.2 (a) 1.Qf7-f3 + Kg3-h4 2.Qf3-a8 Bh2-e5 3.Bc8-b7 d6-d7#

(b) 1.Bc8-b7 d6xe7 2.Rd8-d2 e7xf8=S 3.Rh7-c7 Sf8-d7#