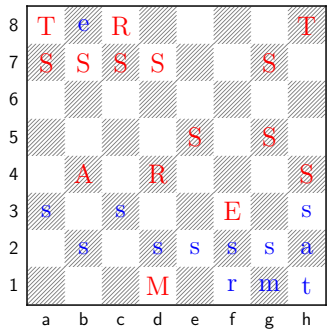
# Retro Chess Puzzle Solution

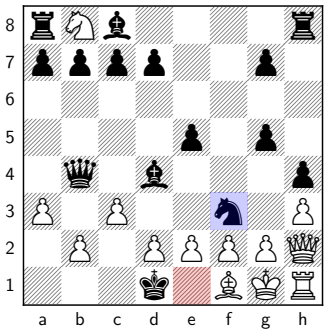
These are *retrograde chess rebus* puzzles, as described in, e.g., Jeff Coakley's *Year of the Rebus* and *Chess Mysteries in a Retro World*. The two armies are represented by CAPS and lowercase letters, with the same letter representing the same piece type (regardless of case). The first piece (going left-to-right) on rank 1 is assigned to the CAPS side. There should be only one assignment so that the position could be legally reached from the starting position, plus it is often possible to say something about the last move (and occasionally several more), using retrograde analysis.

An additional twist is that we use *Chess 960* starting positions, with the conventions found on *Wikipedia*, where 518 is standard chess. Thus, we have two solutions for each diagram. The pawns say SHIFT R for standard chess, and SHIFT L for the 960 positions. We take the origin square for the last move {file: a..h, rank: 1..8}, getting the letter corresponding to the piece that starts on that file (♖ | ♘ | ♗ | ♕ | ♔—ordered to suggest initial placement on rank 1 in standard chess), and then we apply the operation of shifting with the rank as the parameter, extracting one letter per diagram, which gives NINE L X for the chess puzzles, as the variant is sometimes called *9LX*, mixing Arabic and Roman numerals, and the answer LOSING for the 960 puzzles.

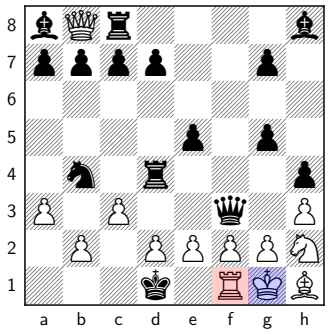
518: RNBQKBNR
435: BRNNQKRB




♘e1−f3+
M shifts 1 to N



M shifts 1 to L
O−O+ (♔: f1−g1)

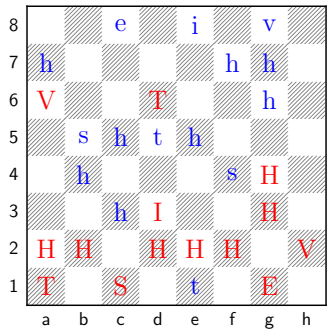


"Masters": **S**=♙, so CAPS is black. **M**=♔, not **A** or **E** due to impossible double check from pawns. White is missing three pieces, one of which is the dark-squared ♗, which never moved and was captured on its original square (*c1* or *a1*), another is ♖, which never got past its pawns, and ♘ was captured on *g5/g6* by ♟.

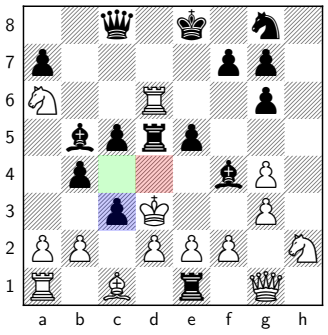
So, in standard chess (518), **R**=♗ (trapped) and **E**=♘ (jumped to *b8*), while **T**=♖ and **A**=♕. ♞*f3* could only come from *e1*. For extraction, with *e1* as the relevant square, we have $e \to$ ♔ $\to$ m, and $\text{shift}_{\text{right}}(M, 1) = N$.

In *Chess 960* variant 435, similarly, **T**=♗ and **R**=♖ (♖ can't reach *h2*), while **E**=♕ (no check), and **A**=♘. ♖*f1* could only have come via castling. For extraction, this is the only diagram where the same letter is shifted for both solutions, and we have $\text{shift}_{\text{left}}(M, 1) = L$.

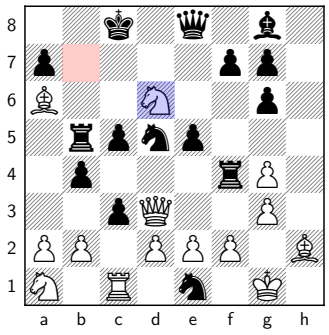
518: RNBQKBNR
444: RBNNQKBR




♟d4×c3+ (en passant)
E shifts 4 to I



V shifts 7 to O
♘b7−d6+

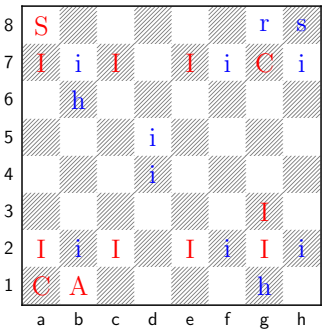


"Thieves": **H**=♙, CAPS is white. All missing pieces are accounted for as pawn captures, so:

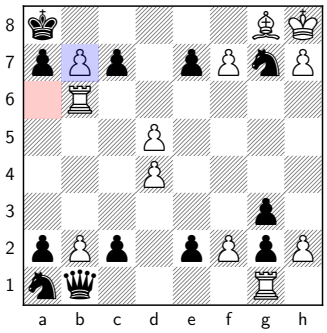
518: **S**=♗ and **T**=♖ (can't escape), so **V**=♘. Then **I**=♔ and **E**=♕ (otherwise impossible check from ♜*e1*). Double check must be via *en passant* capture on *c3*.

444: **V**=♗ (can't escape ♟*f7-g7-g6*), so **E**=♔ and **I**=♕ (otherwise both sides in check or impossible double check). Then **T**=♘ and **S**=♖. Double check from ♗*a6* and ♘*d6*.

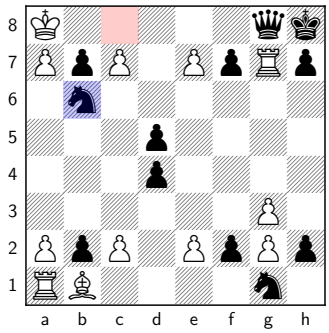
518: RNBQKBNR
436: RBBNNQKR



♙a6×b7+
H shifts 6 to N



A shifts 8 to S
♞c8−b6+

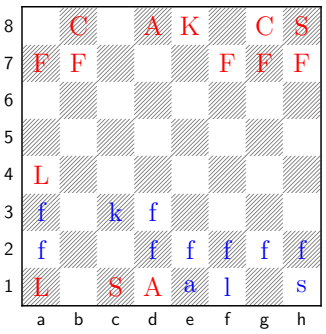


"Chairs": **S**=♔ (only one appearing exactly once for each side), **I**=♙ (all others appear on a back rank), all missing pieces accounted for by pawn captures: CAPS captured left, lowercase captured right. **C** and **H** are ♖ and ♘ (in some order), as they appear twice for a side on same-color squares.

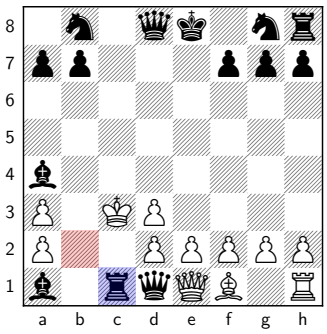
518: CAPS is black (otherwise ♗*f1* not captured by ♟). ♙*b7* check had to be a capture from *a6*. To avoid impossible double check, **H**=♖ and **R**=♗, so **C**=♘ and **A**=♕.

436: CAPS is white (otherwise ♝*b8* not captured by ♙). So, **A**=♗ and **C**=♖ (trapped), while **H**=♘ and **R**=♕, with a double check by ♕*g8* and ♞*b6*.

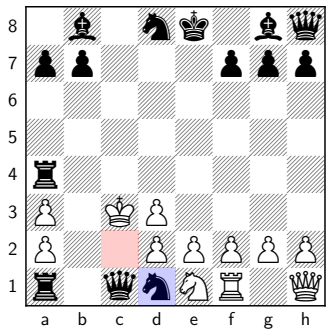
518: RNBQKBNR
764: RBKNNRBQ



♟b2×c1=R+
C shifts 2 to E



K shifts 2 to I
♟c2×d1=N+



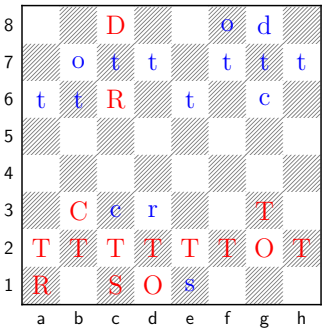
"Flacks": **F**=♙ (all others appear on a back rank) and CAPS is black. **K**=♔ (only one appearing exactly once for each side). Black is missing two pieces, both accounted for by ♙ captures. White is missing four pieces.

518: **L**=♗ (impossible squares to be on as **A**, **C**, or **S**). **S** is not ♕ (*h1* unreachable), **A** is not ♘ (triple check). Now, **S** is also not ♘ due to **S** on *h1* and counting captures[1]. So, **S**=♖, **A**=♕, and **C**=♘, with double check via promotion to ♜.

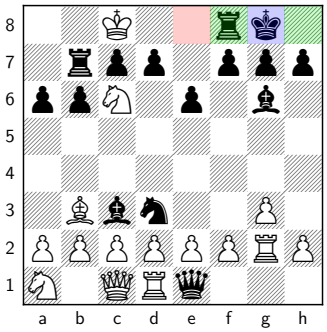
764: **C**=♗ and **S**=♕ (*g8* and *h8* trapped). So, **L**=♖ (otherwise illegal double check) and **A**=♘ (three captures suffice here), with double check via promotion to ♞.

[1]Black had to promote to ♕ (earlier) and with capture on the last move (as no ♞*d1*). So, black had ♟*b2*, which requires three prior captures to reach for ♟*e7*, assuming ♟*c7* became ♕ and ♟*d7* was captured on *d3* (nothing is gained in permutations). Now, if **S** were ♘, then ♖ starting on *h1* could not have escaped to be captured by ♟ and we don't have enough captures.

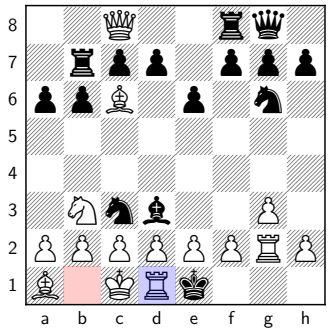
518: RNBQ**K**BNR
755: B**R**KNNRQB



...O−O+ (♚: e8−g8)
D shifts 8 to L



O shifts 1 to N
O−O−O+ (♖: b1−d1)

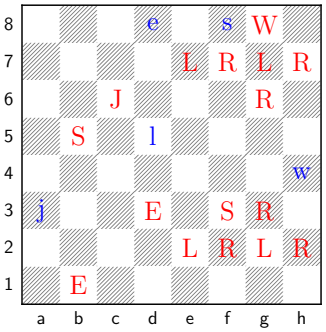


"Doctors": **T**=♙ and CAPS is white. Each side is missing one piece (no pawn captures). **O**=♖ (can't get past own pawns). So, **D** and **S** are ♔ and ♕ (in some order).

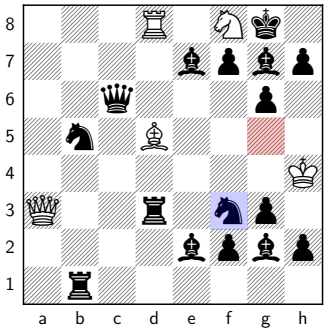
518: **R**=♘ (♗*a1* not possible) and **C**=♗, while **S**=♕ and **D**=♔ (both sides in check otherwise). ♜*f8* arrived via castling.

755: **D**=♕ and **S**=♔ (impossible rook check otherwise), while **R**=♗ (both sides in check otherwise) and **C**=♘. ♖*d1* arrived via castling.

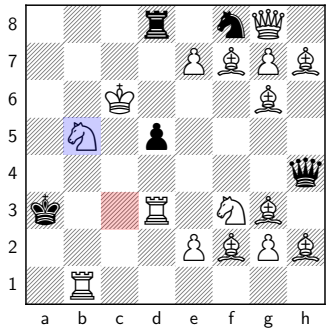
518: RNBQKR**N**R
748: RB**K**NNQBR



♘g5−f3+
S shifts 5 to X



J shifts 3 to G
♘c3?−b5+



"Jewelers": CAPS has all 16 pieces and multiple promoted. ♔ can be **J** or **W**, while ♙ could technically be **J**, **L**, or **R**, but it's straightforward to tell it's not **J**. So, **J** and **W** are ♔ and ♕ in some order. Also, ♗ can't be **E** or **S**, as both are on the same-color squares, which means **L** and **R** are ♙ and ♗, in some order, while **E**=♖ and **S**=♘ (otherwise both sides are in check).

518: **L**=♗ (otherwise ♗*f1* or ♝*f8* could never have moved) and **R**=♙; **J**=♕ and **W**=♔ (otherwise triple check). Finally, CAPS is black (otherwise triple check), and we have double check from ♝*e7* and ♞*f3*.

748: **R**=♗ (otherwise ♗*g1* or ♝*g8* could never have moved) and **L**=♙; **W**=♕ and **J**=♔ (otherwise impossible double check). Finally, CAPS is white (otherwise both sides in check), and we have double check from ♘*b5* and ♖*d3*.