

## The Destiny of Chess

by Michel Deza (*École Normale Supérieure, Paris*)

Chess, like any game of normal form, has a unique result if both White and Black play in the best possible way. This result (we discard games stopped by agreement) is one of  $W_+, B_+, W_0, B_0$ , denoting respectively win for White, win for Black, draw with last move by White, and draw with last move by Black. It is not possible at present to compute which of these results should be the finale of an 'optimal' game; which is the 'destiny' of chess.

But perhaps one can approach this problem indirectly by considering simpler games or problems with similar 'destiny'. Can we identify small variations of the rules which do not affect the destiny of chess? Here are three ideas in that direction: two in terms of variant chess and a third one in terms of enumeration.

**I. Rotation Chess.** In this variation, the board is turned round after each  $t$ th move of Black. For  $t = 10$  or 15 the game was actually played in England. Let  $T$  be the maximal number of moves in an optimal chess game. Clearly, for  $t \geq \lfloor T/2 \rfloor$ , [where  $\lfloor x \rfloor$  indicates 'integral part of  $x$ '] the destinies of rotation  $t$ -chess and orthochess are the same. But how about  $t = \lfloor T/2 \rfloor - 1$ ? For smaller  $t$  the difference between those games should increase. How does the destiny of rotation  $t$ -chess vary (if it does vary) with diminishing of the period  $t$ ?

**II. Time Chess.** Suppose now that both White and Black do not care about winning, but merely care about the length (i.e. the number of moves) in the game. Remember that ending a game by agreement is excluded. Suppose White to have *Shiva* temperament — to minimise the length of the game — while Black (*Vishnu*) wants to maximise it. The game is again in normal form. So there exists a number  $N$  which is the length of any such game when both play optimally. Probably any such game would have the same result, in terms of  $W_+, B_+, W_0, B_0$ , as usual chess. In fact, it looks as if for both purposes — to win or to control length of the game — one needs first to get material advantage to carry them out. Time Chess can be fun as a role-playing game; it can be interesting also to estimate  $N$ .

**III. Optimal versus Typical.** It has been remarked that ideal beauty is not far from the average of variation of all involved parameters. In this vein it will be interesting to compare the destiny of chess with the relation between the numbers  $w_+, b_+, w_0, b_0$ , denoting the numbers of all possible games with results  $W_+, B_+, W_0, B_0$ , respectively. I believe that (a)  $w_+ = b_+$  and (b)  $w_0 + b_0 \gg w_+ + b_+$  [where  $\gg$  means 'much greater than']. If true, this will point to the draw as the probable destiny of chess.

A way to check (a) will be to show that for any feasible position in chess, the opposite position, i.e. one differing only by interchange of colours White-Black, is also feasible. Clearly, feasibility of both opposite positions will imply that all possible games going via those

positions contribute equally to  $w_+, b_+$  and to  $w_0, b_0$ . Co-feasibility of pair of opposite positions implies the same for any pair of positions subsequently derived from them; so it will be enough to show co-feasibility for opposite 'initial' positions. For example, for each game with double-step of pawn as first Black move one can give an opposite game with two single steps of pawn as first two White moves.

I believe also in (b) because, probably, for each possible winning game, one can find a lot of draws by replacing one or two last moves by some sequences of moves fixing a legal draw. One may ask: does there exist a (feasible) position in which any modification of the last move stops the game?



A rotation game under the  $t = 10$  rule, played between C. D. Locock (white) and T. R. Dawson (black) in 1913, is recorded in the *Encyclopedia of Chess Variants*, where David Pritchard comments that if a win is not in prospect when the board reversal is getting close, it may be good tactics to play weakly: 1. e4 e5 2. d4 e×d4 3. Bc4 Nf6 4. Nf3 Bb4† 5. c3 d×c3 6. b×c3 Bc5 7. e5 Ke7 (weakening the Black position) 8. Qc2 a6 9. 0-0 and Black, with two moves to make before sides are switched, announced mate in seven moves.

This was one of a series of games under various different rules played between these two about that time. A game of Reflex Chess, won by Locock, was apparently published in one of the Pittsburgh papers. If anyone can track it down *Variant Chess* readers would like to see it.



The editor has just been reading *Astounding Days: A Science Fictional Autobiography* by Arthur C. Clarke in which he mentions the story *The Fairy Chessmen* by Lewis Padgett (a pen-name of the husband and wife team of Henry Kuttner and C. L. Moore) in *Astounding*, the sf magazine, for Jan/Feb 1946. After quoting Padgett's description of Fairy Chess, Clarke writes (p.184):

"In 1951 I had the privilege, though it was completely wasted on me, of watching a game between Lord Dunsany (one-time chess champion of Ireland) and Dr Dawson, who if I remember correctly was the editor of *The Fairy Chess Review*. Dawson told me that he had also played many games of three-dimensional chess — and one in four dimensions, though not on a full 8×8 board."

"This way, I decided, lay madness, and it confirmed my resolution never to learn the rules even of old-fashioned two-dimensional chess."

Later (p.197) he writes: "When I met Lord Dunsany in 1951 ... I took the train from Charing Cross, got out somewhere in Kent, and walked to Dunstall Castle. I remember that I was carrying a novelty — one of the first truly portable radios .... I was also carrying a copy of *The Charwoman's Shadow* ... Lord Dunsany inscribed his name on the first page; it was the only time I have ever seen anyone use a quill pen. ..."