TAMING THE SLIPPERY KING

A fundamental difficulty in multi-dimensional chess is that of confining and mating the king. Joe Joyce's four-dimensional **Hyperchess [Joyce]** uses a method which appears to be novel.

The first reference in the literature to four-dimensional chess appears to have been in a paper by Dawson in the December 1926 issue of the *Chess Amateur*. This presented three problems, one on a 3x3x3x3 board and the other two on a 4x4x4x4, and employed the natural analogues of two-dimensional rules: the rook moved in one dimension, the bishop simultaneously in two, a "unicorn" in three, and a "balloon" in four. The queen moved as R+Bi+U+Ba, the king similarly but one step only. No initial array was specified and the variant seems never to have become more than a vehicle for these three problems, but in principle it would appear to have been playable. In particular, K + Q v K was a win, so there was a reasonable chance of converting a modest middle-game advantage into a win by playing for the ending and promoting a pawn.

(If king and queen are allowed to move in any number of dimensions simultaneously, K + Q v K is a win on a board of size up to 5x5x5x... in any number of dimensions. The stronger side simply moves its king to the central cell, and lets the queen do the rest. However, mating a king other than by pushing it to a side face and plonking a guarded queen directly in front of it is almost impossible.)

Parton, in his Sphinx Chess (*Chessical Cubism*, 1971), adopted a different approach. He set up a 3x3 array of 4x4 boards, and a piece was allowed to move either within a board or to the same square on another board. So, supposing the boards to be numbered from A1 to C3, a bishop on square c4 on board A1 could move to squares b3-a2 and d3 on board A1, and to square c4 on boards B2 and C3 (always supposing any intermediate squares to be empty). This gave a more restricted bishop, queen, and king than the 1926 rules, while there was no analogue of the unicorn and balloon at all. The knight was replaced by a "centaura" which moved like a knight on a board and like a queen between them. But it was now impossible for K + Q to force mate against a bare king, and even Parton's suggested restriction of the kings to boards B1 and B3 didn't help. Presumably in compensation, Parton stated that perpetual check could be claimed as a win.

Joe Joyce's approach is basically that of Parton, though with a 4x4 array of boards and many differences of detail. "Diagonals are evil," he writes. "The only way to make the game playable was to dump most of them." It has to be said that an unfortunate error in the 1926 paper bears him out, one of the problems being meaningless because the Black king is already standing in check from a unicorn. Not only was this overlooked by Dawson, but Anthony Dickins appears not to have noticed it when quoting the problem in *A Guide to Fairy Chess* (1967/69).

To control the king and make mate possible, Joe introduces the idea of a "held king": when a player moves his king to the same 4x4 board as is already occupied by his opponent's king, his opponent's king (though not his own) is "held" and cannot leave that board. If his own king leaves the board and his opponent's king follows it to its new board, it is now his own king which is "held".

There are many other differences from Parton's game and indeed from what happens in normal chess, and although these differences may seem rather arbitrary they were apparently inspired by practical experience. In particular, the bishop can make a one-step rook move to change colour, the knight slides two-and-one without jumping, and the pawn is allowed a sideways move and captures with its normal move. The full rules can be found on the Chess Variants web site

<www.chessvariants.org>

and there is a Zillions implementation. For those who prefer playing against people, Joe is

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and would welcome opponents.