

Chapter 24

Cylindrical, toroidal, and spherical boards

[The boards in this chapter occupy a half-way house between two-dimensional and three-dimensional boards, being two-dimensional in nature but needing to be bent around in a third dimension if they are to be accurately realised. That said, 'cylinder chess' is most often played on a normal 8x8 board, the players imagining the join between the extreme left and right hand files, and the other games in this chapter can be played on planar boards with a greater or lesser degree of imagination.]

24.1 Cylindrical boards

Cylinder Chess. Origins unknown: the board was used by the Marquis Teodoro Ciccolini (whose main occupation appears to have been the invention of a perpetual motion machine) in the early 19th century (*feenschach*, January-March 1980, quoting an article by Adriano Chicco in *L'Italia Scacchistica*, August 1939, itself citing Ciccolini's 1836 book *Il Cavallo degli Scacchi*). It was later introduced as a problem theme by A. Piccinini in 1907, and has been claimed for others since. The 8x8 board is considered to be wrapped round a vertical cylinder so that files a and h are contiguous. This has the fortuitous effect of guarding every man in the array. Continuous movement, and a move which permits the position to remain unchanged, are disallowed. NOST allowed cylindrical castling: Ke1-g1, Ra1-f1 and Ke1-c1, Rh1-d1. The game is not difficult to absorb but a little care is needed initially: 1 b3 e5 2 Bxd8. Cylinder Chess has been successfully combined with Progressive Chess. AISE, which called this variant **Tamerlane's Progressive Chess**, ran correspondence tournaments. Cylinder boards of other dimensions have also been used.

[It is instructive to compare the 8x8 board of Cylinder Chess with the 16x4 Circular Chess board which we met in the last chapter. In many respects they are similar, and in each case K+Q v K+R is only a draw and K+R cannot force a win against a bare K unless the attacking king is already holding the defending king against an edge. However, the bishops are far stronger in Cylinder Chess, and K+2B have a fairly easy win against a bare K

whereas in Circular Chess they can only draw (*Variant Chess* 48). And of course if the number of files is odd the distinction between 'black' and 'white' bishops vanishes, and a single bishop can reach all squares.

A curious endgame situation arises when White has Ka4, Pa5/b7 (3) against Black Ka7 (1). The winning move in ordinary chess is 1 a6 to defend the b-pawn, and if 1...Kxa6 then 2 b8(R) (promotion to Q would give stalemate). This doesn't work in Cylinder Chess because K+R v K is not a win, but now 1 a6 Kxa6 2 b8(Q) wins because there is no stalemate. Neither line works in Circular Chess because K+R v K is still not a win and 2 b8(Q) once again gives stalemate, but there is no need to hold on to the b-pawn because K+aP v K is a win once the pawn is defended; the move 1 a6, needed to win in ordinary and cylindrical chess, is the only move *not* to win in circular!]

Moebius Chess (W. Pflughaupt, 1953). The board is a moebius ring on which a chessboard has been superimposed. It can be visualised as a cylinder board which has been twisted through 180 degrees so that a1 and h8 are adjacent, as are a8 and h1. Problem theme, but attempts have been made to play it as a game. The twist effectively destroys the distinction between 'forwards' and 'backwards', and Pflughaupt apparently regarded the pawns as able to move in either direction at will; George Jelliss prefers them to retain their original orientation, only changing direction after going 'round the twist'. (*Chessics* 10) [Text slightly revised]

Incredulon (Bruce R. Trone, 1986). 8x8 vertical cylinder (a-file next to h-file). Orthochess with some confusing additions. (1) A player can exchange the positions of two of his men that are adjacent to each other. (2) A man may move to any square controlled by his own side. (3) Any number of men of one colour can occupy a square and move as one of them. (4) Any group can be dissolved by each piece moving to a different square according to its powers, this counting as one move. (5) A man may be pushed any number of squares by an adjacent man in the manner of the latter; however, a pawn cannot be pushed across the centre of the board. (6) Any number of men adjacent to each other in a straight line may be pushed one square from a piece at either end of the line provided its

power corresponds to the direction of movement. (7) Any block of four squares may be rotated as desired by a player who occupies more squares within the block than his opponent (this counts as one move). And concluding on a sober note: a king must get out of check with a regular move. [Personal communication assumed; source material missing from David's files.]

Chromopolis (Alexandre Muniz, 1999) is the game from which Chromopolis Simplified was generated (see chapter 17). 40-square cylindrical board on seven files, a1-f6 and g2-g5; rules and array as for the simplified game. The number of files being odd, prelates are no longer restricted to squares of one colour. (Chess Variant Pages) [Text editorial]

24.2 Toroidal boards

Toroidal Chess, also known as **Anchor-Ring Chess** and **Torus Chess**. Origins uncertain. The board is bent into in the shape of a torus. The 1st and 8th ranks are adjacent to each other, forming a horizontal cylinder, as are the a- and h-files, simultaneously forming a vertical cylinder. The square a1 is diagonally adjacent to h8 and similarly h1/a8. Pieces have complete freedom of movement wherever placed on an empty board.

A problem theme which poses various difficulties as a game. Giving mate requires at least three men since there are no corners or edges to which to drive the king (K+Q cannot mate bare king). Philip Cohen proposed kings restricted to orthogonal movement, bare king and stalemate as losses. As regards the initial array, one solution (Berloquin) is to start with an empty board, each side placing a man in turn until all are entered, pawns being allowed to move orthogonally in any direction; no promotion (*100 Jeux de Table*). Philip Cohen came up with a similar idea (*Nost-algia* 248) but restricted White to one half of the board and Black the other, with two further strictures: pawns may only be placed on the first three ranks and a check must be parried at once or the game is lost (before it's started!).

A king attacked on more than one line succumbs. Pawns move one square at a time (and in one direction only), promotion on 8th rank. Chris Tylor (*Chessics* 7, as **Toral Chess**) suggested a diagonal arrangement with White Kc3, Qb3, Ra1/d1, Bb2/c2, Na4/d4, Pb4/c4 (moving up), a2/a3 (moving left), d2/d3 (moving right), b1/c1 (moving down), promotion in any of the four squares b2/b3/c2/c3, Black the same mirrored in the diagonal h1-a8. Pawns would require directional markings. Matthias (*Eteroscacco* 19/20) set WKc2, Qd2, Rf2/f3, Bb2/e2, Na1/a2, Pb3-e3/b1-e1, Black mirrored in the board centre, and offered a sample game.

Larger boards have been tried. Berloquin suggested increasing the board to 10x10, allowing each side to assemble within a 4x4 square without abutting one another. Bruce Trone (*Nost-algia* 194, as **Megachess [Trone]**) has a 14x14 board with 22 pawns a side, normal baseline arrays on d4-k4/d11-k11 completely surrounded by pawns. Pawns move directly away from their original positions, corner pawns having a choice of direction; promotion on opponent's baseline. [Text revised to lay greater stress on the mating difficulties]

24.3 Spherical boards

Spherical Chess. The idea of wrapping a chessboard round a globe is a recent concept. The board is in effect a vertical cylinder with a- and h-files adjacent. The end ranks theoretically meet at a point (the poles) but in practice the poles are often represented as circular or octagonal zones which may or may not be designated board spaces. There are two constructional problems; one is the suspension of the board so as to give access to all squares, the other is securing the chessmen in position (gravity can induce mirth when the pieces start falling off). Added to these is the difficulty players have in visualising the game position since only half the board can be seen from any viewpoint. All these problems can be overcome by using the 8x8 board and adjusting piece movement according to the game rules. Another solution is to have two circular plane boards, one centred on the N pole and the other on the S, with the perimeter of both boards serving as the equator.

Trans-polar movement poses no problem for a rook in any game: the piece re-enters the board four files removed from the file of its departure (a1-a8-e8-e1). It should be noted that when crossing a pole a R traverses successively two squares of the same colour. Pawns can never make a trans-polar move, whilst, since the board has no edge, kings always have eight adjacent squares. Trans-polar moves of bishops and knights are not clear-cut, and it is the rules on these which separate some games.

Grayber's Spherical Chess (H. D. Grayber, 1950s). Possibly the first game on a sphere (*Nouveaux Jeux d'Échecs Intéressants*); rules not given, but the game may equate to that described by Berloquin (*100 Jeux de Table*). The trans-polar move of a B forms a loop, its path re-crossing the 2nd/7th rank square (Bh3-a2-b1-h1-a2-b3). Whether on the 1st or 2nd rank, the knight covers only six squares (Ng2 to a1/a3/h4/f4/e3/e1, Ng1 to a2/b2/h3/f3/e2/d2). Notice that in two cases the knight starts and ends its move on the same colour square.

Miller's Spherical Chess (Don Miller, 1965). Played on a two-dimensional board. B as

Grayber (or Berloquin). N as Grayber from g1, but from g2 has two additional squares: b1 and d1. The game has been used as a problem theme. (*Ye Fairie Chesseman 2*)

Yaspan's Spherical Chess, also known as **Global Chess** (Peter Yaspan, 1970). Gyromatic mount enables globe to be freely rotated; squares are replaced by magnets which, whilst forming the regular chequerboard pattern, avoid the linear distortions associated with spherical chess. Polar zones may not be occupied and a piece traversing the pole may not capture. An extension of this rule is that a piece cannot give check over a pole. An infinite move is prohibited but a stay-still move, for example by a rook circuiting the sphere, is legal. A diagonally-moving piece (K, Q, B) makes an inter-polar move (e.g. a7-b1) but not a trans-polar one. There are four possible ways to castle subject to the usual conditions: K moves two squares in either direction and either R is moved to square the K passed over. The array has WKe1 and BKd8. The first Spherical Chess Tournament, won by Jeffrey Shuster, was held in New York in 1972.

Carelman's Spherical Chess (Proprietary game, Delta Concept; J. Carelman, 1971). Board 8x8 wrapped round a sphere; rules not recorded. (Photocopy of postcard dated 1987 showing the set) [Text slightly revised. The South pole of the globe appears to be occupied by the supporting base, and the North pole appears to be similarly out of the game; its apparent occupant is out of scale with the men shown elsewhere, and may be merely the small protruding knob of an axis about which the globe can be turned. I therefore suspect that what is portrayed may perhaps be no more than an attractive realisation of ordinary Cylinder Chess, possibly produced as an objet d'art.]

Nadvorney's Spherical Chess (Leo Nadvorney, 1975). A conscious modification of Miller's game. The B changes square-colour on crossing the pole, making a loop one file wider: Bh3-a2-b1-g1-h2-a3. The N commands eight squares wherever situated.

Castling as in Yaspan. Nadvorney represented the globe as a mercator projection, thus allowing the game to be played with ease on the usual 8x8 board. To facilitate both transpolar and lateral movement, he offered a diagram which afforded instant guidance when crossing the normal boundaries. An infinite move or one which does not change the position is illegal. Nadvorney also proposed **Spheralice Chess**, a next-to-unplayable (and probably unplayed) mix of Spherical and Alice Chess. (*Nost-algia* 185/188)

Nelson's Spherical Chess (Martin Nelson, 1976). An experimental game using magnetic pieces. Polar zones are regular octagons, each considered to be a one-square rank. These are locations of great power, for a Q, R or B commands from them every square on a vacant sphere. Similarly a knight at the pole controls the first two ranks (16 squares). A trans-polar move by a B does not involve a colour-change: Bh3-a2-b1-f1-e2-d3. Ng1 crosses the pole to b1 or d1. (Personal communication)

Globe Chess [Boholy] (János Boholy, 1987). Board 8x8 wrapped round a sphere with an octagonal cell at each pole, giving a playing area of 66 cells. Usual chessmen. Three games are offered, one of which ignores the poles and reduces to ordinary Cylinder Chess. In the second, pieces may pass over the poles but not stop on them; in the third, polar cells are part of the board as in Nelson's game. In both these latter games, the Black men are offset four files with respect to the White, thus (a8-h8) KBNRRNBQ. The board was featured on the front cover of *Ceskoslovensky Sach* (12/1990). There is a book on the game by the inventor: *A Gömb Sakkjáték Alapjai*, now in its third edition. (Personal communication)

Chessball [Gramolt] (Proprietary game, The Original Chessball Co. Ltd; William Gramolt,

1986). As reported in the April 1997 issue of *Science et Avenir*, the board had twice the normal number of squares, and the accompanying photograph supported this; as marketed in 1998, the number of squares had increased to 160 (20 files). Three levels of play, according to whether no, one, or both poles are used - or, of course, you can use just a portion of the board and play ordinary chess. (Proprietor's publicity leaflet)

Global Thinker (Proprietary game, Klaus Schroer, 1990). Board 8x8 wrapped round a sphere with two circular polar areas; typical transpolar bishop move is d2-c1-pole-g1-h2-a3. (*Schach Magazin* 64)

[All these games are affected by the 'polar anomaly' whereby the poles have to be treated specially. Perhaps this is a good thing, perhaps it isn't, but reflections on how it might be avoided caused me to look briefly at the possibilities of what might be called **4-6-10 Chess**, exploiting the semi-regular solid whose faces comprise 30 squares, 20 hexagons, and 12 decagons (*Variant Chess* 49). Suppose we choose two opposite cells as bases around which the two armies are arrayed, and give K, R, P their natural moves (K to any adjacent cell, R straight across cells as long as the road is clear, P one step directly forward, capturing on the next nearest cells to directly forward and promoting on reaching the opponent's base). K+R v K is now a win, so K+P v K will be enough to win if the pawn can promote; in fact the defending king will draw if it can occupy a square (not a hexagon or decagon) immediately in front of the pawn, otherwise the result appears to depend on whether the stronger side has or can gain the opposition (which here is held by whoever is not to move when the kings are on cells of the same kind). So at least the endgame behaviour appears sensible, and I am sure that a playable game using this board could be devised.]