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Abstract Games

... for the competitive thinker

~ Winner of the S imultaneous Movement Game Design Competition

~Liubo: Reconstruction of an ancient Chinese game

~ Super Halma

~ Snort

Front Cover

We can define a race game as a game in which the players compete to be the first to move all their pieces into predetermined positions. Trippples and Halma could therefore be classed as race games, although usually one thinks of the pieces moving around a one-dimensional track, as in Backgammon, Chebache, and a myriad of traditional games from around the world. On the other hand, Kimbo does not have such a fixed race track, although I think nobody would dispute that Kimbo is a race game.

In any case, the "race track" games, to be more specific, nearly all have one thing in common: the movement of the pieces is determined by dice, or some other method of randomization. Bantu is one of a very select group of such games that do not use dice. It is sometimes claimed that Hare and Tortoise is a race game without luck, but the hare spaces do introduce a random element. The only other race-track games of pure skill that I could track down are China Moon by Bruno Faidutti and Elefantenparade by Henri Sala, although there are probably others.

The copy of the game shown was produced by Parker Brothers in 1955. As far as we can determine, this was the only edition of the game ever printed. As is typical of games produced before the 1980's, nothing is known of the designer(s). Nevertheless, Bantu was reviewed in *Games & Puzzles* #68 by Phil Orbanes and apparently was produced privately, with some changes, by Paul Jefferies, under the name Sack. There is more on this at http://www.game cabinet.com/sumo/Issue20/node10.html.

Playable by 2, 3, or 4 people, Bantu is probably best for 2, otherwise the board can get snarled up, with too many blockages. Each player has four pieces, marked with the numbers 1 to 4. A piece must move the number of vacant spaces around the board in a clockwise direction according to its designation. The higher a piece's number, the further it starts from the goal. Enemy pieces that are landed on by exact count are sent back to their starting positions. The originality of Bantu is that two or more pieces on radially connected circles each gain a movement power equal to the sum of the numbers of the connected pieces. It is this mechanism, together with capturing, that enables one player skillfully to pull ahead of another in the race home. Also, pieces are immune from capture if two or more rest on radially connected circles. This rule enables blocking situations to be set up.

There are obvious tactical considerations involving blocking, capturing, and combining pieces to get ahead faster. There are also interesting strategic questions, such as whether to move the high-numbered pieces around first or whether to hold them back. Clearly, getting one's pieces bunched together makes sense in terms of mutual protection and extra speed, but on the other hand, it is nice to come from behind to make captures later in the game. I suspect that there is more than one workable strategy, just as there is for Backgammon. Bantu is a fine old game. – KH.

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A Note on Gender
Pronouns "he," "him," etc. have been used in many non-gender-specific situations. We realize that women play games, too, and this is merely to avoid awkward constructions such as "he/she."

Editorial

Chess was the first game that I tried to get good at, when I was about thirteen. I read *The Game of Chess* by Harry Golombek, which I think was my first game book. Within a year or two I had found *Discovering Old Board Games* by R. C. Bell, and this inspired me to get hold of his masterly two-volume *Board and Table Games from Many Civilizations*. By this time I had overcome my cultural programming about the superiority of Chess, and I was avidly investigating many different games.

I was fascinated by Trevor Leggett's *Shogi: Japan's Game of Strategy*, but I was hampered by the lack of opposition. Backgammon was easier to find opponents for, and I loved Bruce Becker's *Backgammon for Blood*. Other favorite games were Epaminondas, Mentalis, Hexagonal Chess, and Wari. Sid Sackson's great *A Gamut of Games* was a good source for games.

We also played theme games like Kingmaker, Civilization, Brittania, Diplomacy, and Risk, as well as fantasy table-top war gaming inspired by *The Lord of the Rings*. I was captivated by Dungeons and Dragons, and I remember being very impressed with the brilliance of the role-playing concept. We played card games, too. On an exchange trip to Germany when I was fifteen I spent the whole time playing Skat. It was great!

I had tried Go, but none of the presentations I had seen did it justice, and it was not until university that I finally got involved with Go after reading Kaoru Iwamoto's *Go for Beginners*. At the time I felt Go was the only perfect game. Within a few years, however, I discovered the Oxford Shogi Club. The stupendous Shogi endgame makes it, for me, the greatest of all chess-type games. Shogi was a major reason for my living in Tokyo for nearly four years.

The experiences we have when young are sometimes special and unrepeatable, and this can be as true of games as it is of anything else.

More recently I took a long look at Lines of Action, one of the games from Sid Sackson's book. Lines of Action seems to lend itself well to analysis and strategic theorizing, and by dint of many hours of hard work, I think I became quite good at it. I overdid it, though, and I haven't been able to play Lines of Action for a while. I'm taking a rest from Onyx right now in case the same happens.

I feel I need another special game to look into more deeply. There is a thrill in working out a game's strategy from scratch without the aid of books or expert players. Realm, Dvonn, Hive, Pagoda, and Zhadu are attractive options, as are several of the games from the game design competitions—Three Crowns, perhaps. On the other hand, Super Halma in this issue looks very interesting . . . .

At last we return to Bashne in this issue! It has been said that Emergo is the most cleanly realized column checkers game. However, Bashne has a history and a body of expert players (in Russia) who hold regular tournaments and do some deep strategic analysis. I think it is good to give readers a glimpse of this activity.

Also in this issue we have the winners of the Simultaneous Movement Game Design Competition and are announcing the next game design competition. The two games selected this time strike me as children's games rather than serious abstracts, but perhaps it is inherently difficult to build strategy into a game with simultaneous movement. Perhaps the four games we described in *AG14* represent the limit of what is possible. The theme of next year's competition is not unduly restrictive and is known to have produced some very fine games with great depth.

Kerby

Notation

A standardized notation is used for all games when possible. In diagrams, squares are named using an algebraic system. Starting from the bottom left of the diagram, columns are identified by the letters a, b, c ... and rows by the numbers 1, 2, 3 .... A colon ":" is used to indicate captures. A threat to win, or check, is indicated by a "+" sign after the move.

Moves in Chess variants are indicated by the initial letters of the name of the piece moving together with the destination square. ("N" is used for knights, and sometimes the "P" for pawn is omitted.) Sometimes the start square is indicated to avoid ambiguity. Captures are noted with "x."

With Shogi variants we will follow the traditional Japanese way of identifying squares. From the top right, *rows* are a, b, c ... , *columns* are 1, 2, 3 .... If the value of a piece changes at the end of a move, we will use "=" and the new value; a plain "=" at the end of a move indicates a piece choosing not to promote. "+" is used for promotion in the Shogi variants (and Checkers variants). "x" indicates capture, and "x!" capture by *igui* in Chu Shogi.

Letters

Abstract Games *welcomes your views. We wish to reflect accurately the concerns and interests of the readership. Letters may be subject to editing for clarity and brevity.*

I really like the game design competitions! It is very challenging and fun to create (play and test) a game under the theme you are setting. It is also amazing what great results and exciting games the competition produces! Often it takes a while until a game is working well in all aspects. Therefore I would prefer it if you could announce the competition earlier (if you still intend to continue). I also would like to propose a theme for the next competition: To design an abstract strategy game for four players (partnership?) or, even more challenging, a game for three players that does not allow two players working together against one.

Jochen Drechsler, Germany

Among many comments about *AG* articles, I have to say that Unlur has been a great surprise for me. Indeed, to my taste the unequal forces principle was not very appealing, but since I am strongly interested in finding a Hex-like game to be played with a hexagonal board, I greatly enjoyed discovering Unlur, which seems really the best and most original solution to the problem. I should like to read other articles about the game in future *AG* issues.

Patrick Mouchet, France

Some friends I chat with online live in a 2D universe. They tell me that they find games played on 2D boards very hard to manage, and would like suggestions for games to play on a 1D board. Do you have any suggestions for my friends, besides Backgammon? Could this possibly be the theme of a game design competition?

Bram Cohen, USA

One of the most interesting aspects of your magazine has been the Game Design Competition. It has provided a forum for both players and designers alike to launch new games. Unfortunately, as the years have gone by, you seem to have drifted further away from the original idea. This year the theme was simultaneous movement and the year before that was unequal forces. Both these concepts conflict with the definition of abstract strategy game: a game of equal forces with alternating moves that involves no random elements or hidden information. Each time you made mention that there were few games of these types and were hoping for some unusual entries. Obviously the intent was one of novelty rather than finding an abstract game of deep, involving strategy. I hope that with next year's competition you return to a theme more in line with true abstract gaming.

Jason McGruther, USA

Do you think the multi-player abstract games (Hare & Tortoise, Mississippi, Billabong, Peaceful Resistance, or even Halma) are appropriately considered abstract strategy games? Some people are pretty adamant that these games have to be for two players only, so that you have an immediate chance to respond to your opponent's last move. The multi-player games seem mostly to be racing type games—perhaps the only format that could accommodate three or more with no random movement. And the games seem to be more tactical than strategic. The basic strategy in all these games is to stay close to the pack, not too far ahead or behind, until it's time to make the mad dash to the finish, and, therefore, tactically, you make the move that maximizes your chances to make the first mad dash. These are worthy, engaging games, but do you think they qualify as abstracts?

Dennis Coryell, USA

I've found some information on Pagode (or "Pagoda" in English). The description in *AG13* is pretty good. Only two remarks:
1. The top row is GRBGRBGRB, the next row RBGRBGRBG, and the next BGRBGRBGR—according to the German leaflet that contains the rules (1st. edition, 1973) This "official" orientation of the board is used in all historical games. There are two historical games from 1973 and one from the mid-1980's. All are nicely commented.
2. The rules leaflet says: "Um die Farbe kann, um den ersten Zug muß gelost werden." (Translation: "The color can be decided by casting lots, the first move must be decided by lots.") In other words, the original rules state that indeed it does not matter which color moves first. In fact, two historical games were begun by Green and one by Red.

Ralf Gering, Germany

Regarding Pagoda, in the English rules of the F. X. Schmid game the game is called "Pagoda," not "Pagode," so in a sense both titles are correct. What's in a name?

David Pritchard, UK

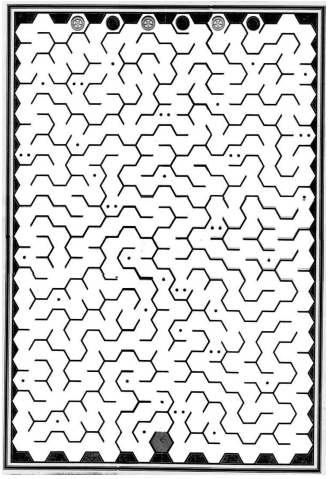
Neil Bloomfield's original Trax rules (*AG14*) were designed for 8x8 Trax, which is now rarely played. The "no draws" rule coincided with the removal of limitations on the game's parameters. Since players could no longer draw Trax by running out of space, we figured we should go the whole way and make "winning" for both colors a win for the active player. In point of fact, only one or two out of thousands of tournament games played since then have involved that kind of a win.

My personal view is that head-to-head strategy games that can never be drawn are superior to those that can. Contrived draws are the bane of tournament chess, and cricket matches, where declarations add to the opportunities for manipulating outcomes even further.

As for unlimited Trax play being a mathematical impossibility, certain types of repetitive play, including best play, provide the proof that the game does have the potential to reach the outer limits of the universe—and beyond! Best play examples from turn one are unavailable thus far, but very likely to be discovered at some future date.

David Smith, New Zealand

I am a Berkeley Ph.D. candidate, writing on James Joyce's Ulysses. While writing one of his chapters, Joyce played a board game called Labyrinth. I have obtained a copy of the board, which I enclose.



I have not been able to find or figure out myself the rules to this game, and I would like to ask for help. The reason it is important is because Joyce discerned six errors of judgment it was possible to make while playing this game with his daughter. Do you have any ideas? Any help would be much appreciated.

Charles M. Tung, USA

Enclosed is my check for a two-year subscription this time, since you seem to be in business to stay (and you will, if there is any justice in the world) and since you are, more than any other game magazine I know, worth it.

Wayne Saunders, USA

It seems to me that *Abstract Games* provides a natural focal point for e-mail gamers. I wonder if there is some way you can set up the exchange of information. You may respond that there are already plenty of avenues available for e-mail gamers, but the fit seems natural, and it becomes another benefit of being a subscriber.

I noted that in one editorial you commented that strategy board games went into decline with the introduction of PC games, but it may be the Internet would see a revival. Seems to me that this comment is spot on—without the Internet, I'd not have seen your magazine.

Neil Bloomfield, Australia

We think about doing other things with AG *now and then, such as tournaments, contact lists, etc., but the Internet already does this very well. And just the magazine keeps us busy enough! – Ed.*

I am so glad to find an article on Realm. My Dad bought it somewhere in the Detroit area as a Christmas present for me back when I was in high school. I quickly got much better at it than anyone I could convince to play, and it eventually got put on a shelf. I wish I still had it, but having the instructions is just as good. Thanks for the article!

Kevin Kinnell, USA

I received my first magazine and I read it with great pleasure. I was a fan of a French magazine, J*eux et strategie*, which disappeared about 15 years ago. I was very sad of that; this sadness is now finished. Thanks for your very interesting job.

Bernard Wack, France

Thanks very much for featuring Tantrix in your latest edition. Your comments are all very fair. No doubt at all that the Mind Game was inspired by Trax (I was an enthusiastic salesman of Trax in my Mind Games shops). The rule changes from The Mind Game to Tantrix in 1991 were marketing inspired "improvements" due to customer feedback, and they took the game *away* rather than *closer* to Trax: Tantrix has more luck then the Mind Game, more colors, and more players.

Naturally to an abstract game player these changes won't necessarily sound like improvements! However, surprisingly, among the very best Tantrix players, skill still dominates. Tantrix players who reach a certain rank at the online web site can qualify as "Masters." Currently there are about 80, and it is useful to look at the statistics of Master-on-Master games. The best player in the world has won 69% of all games he played (446 so far) against other Master players, whereas Player #2 has won 62%, and Player #3 has won 58%.

It is perhaps unfortunate that Trax and Tantrix have similar names. Thinking back to the dinner party where my ex-wife first suggested the name, I am surprised that we didn't worry about the perceived similarity back then. It is hard to believe, but I don't think we were even aware in the beginning. Perhaps I thought that Trax was completely off the market, and we had no idea if Tantrix would be successful. Of course, the games appeal to completely different personality types.

Mike McManaway, New Zealand

Reference was made to your *AG14* editorial comments at the Spielfrieks online discussion forum and as a fan of German board games I thought I'd make a few comments.

I found it interesting, especially as a non-subscriber to your magazine and also because I am not an abstract gaming fan, that you feel the theme of some German games ruins what would be an otherwise abstract game. I'm not writing to argue with you, but rather I thought how our two hobbies are very similar and yet how they cater for different gaming tastes (to the point where people may be involved in one, to the exclusion of the other).

I agree that some German games are actually abstract with a thin veneer of theme, but I differ from you in that I consider the theme to be very important to my enjoyment of the game. Take Clans, for example, the game you talk about in the editorial. I doubt I would play the game if it were purely abstract. I also know that many in my hobby feel the same way, even though some in my gaming group also enjoy abstract strategy games. The majority of gamers in the group who have tried abstract games either feel they are too dry or, like me, require a theme to enhance their experience. I think we connect with a theme and require it to draw us into the game. I suppose it's like role players who enjoy using the gaming system and live for level progression and fighting, contrasted with those who prefer character development and a good storyline. Essentially they are playing the same game, but each group requires different things to fuel their enjoyment. For me a thinly themed game like Clans works because I can see how roaming peoples might form into villages and to me it is more interesting to move these clans around a "map" than it would be to slide stones or other abstract markers around a regular grid: it fuels my imagination. I do however see how Clans, specifically, loses some clarity by having this theme because the boundaries on the board are not well identified. This is more a failing of this particular game, and generally adding a theme, when done properly, does not cause a loss of clarity.

So what am I saying? Well, I can see why the majority of abstract/German gamers prefer to play games within their genre. Even though the games may be similar in each genre, it is what we want from a game that is different. In saying this, I expect that some gamers would find they enjoy games from "the other side" and if they can look past the theme/or lack of it there are a lot more games waiting to be discovered.

On the topic of Settlers of Catan, although it is the game most people cite as bringing them to German games, it appeals most to those who have only ever played the mainstream games like Monopoly. If you are from an abstract gaming background, there are better German games to get your teeth into. Games like Alcatraz, En-Garde!, Fresh Fish, Flower Power, The Gaudi Game, Hive, Isis & Osiris, Kahuna, Marrakesh, Muscat, Quo Vadis, Ra, Really Clever Pipe Game, Siesta, Space Walk (Mancala-like), Ta Yü, Through the Desert (Go-like), Torres, etc.

You can find a list of abstract, and abstract themed games here: http://www.boardgamegeek.com/search.php3?categoryid=9. Maybe some abstract gamers will enjoy some of the above.

By the way, I hope you don't mind if I point out a few spelling errors in the editorial: "Knitzia" should be "Knizia," "Faiduti" should be "Faidutti," "Elfenlands" should be "Elfenland."

Ivan Hanley, Northern Ireland

Correction

In the Hi-Jack article in AG14: nine lines from the bottom of the second column on p. 17, "e1" should be "d1." Readers interested in Hi-Jack may contact Barrie Evans at 21 Woodview Crescent, Hildenborough,Kent TN11 9HD, UK. e-mail: barrie_evans@onetel.net.uk. – Ed.

Game Review

Fire and Ice

Designed by Jens-Peter Schliemann

Fire and Ice is a new three-in-a-row game with pleasant depth. It is part of the new Masterpiece games series from Out of the Box Publishing, best known for Apples to Apples and other inexpensive, simple games. The series marks their entry into the decorative board game market where Gigamic has been so successful with Quarto, Pylos, Quixo, and others. As well as elegant mechanics, these games all have a rich aesthetic: deep color schemes, solid playing pieces, and a strong tactile experience. Fire and Ice deserves a place in this category; the price is the same, and it meets the aesthetic criteria. It has a solid wood board with some heft to it, felt lined bins for the pegs, and a nice finish on the pegs. I would have chosen darker colors for the pegs, but perhaps the game's theme suggested something brighter.

The board has an interesting symmetry: seven raised islands arranged in a triangular version of a pentagram, and then each island has seven holes in that same triangular pattern. You control an island by placing three pegs in a row, and you win the game by controlling three islands in a row. The best thing about the game's design is its movement mechanic: when you move a peg, add one of your opponent's pegs in its place. This means your opponent decides where your pegs are added to the board, not you. It also leads to a less direct attack: moving pegs around on a single island only increases your opponent's strength there. You must attack from outside.

Strategy borrows from Tic Tac Toe; a double threat on an island guarantees control of that island. A double threat of controlled islands (two sets of two islands in a row) gives a huge advantage because you can sacrifice one of your target islands to secure the other.

Because of the board pattern, draws are impossible. A full island must be controlled by one player or the other. Therefore, a full board must be won by one player or the other. The pattern also means that both players always need the same island to finish, so a good defense is also a good offense.

I have played about ten times so far, and it is still interesting and open to exploration. It played reasonably well also with my ten-year-old nephew, but it is not really a children's game—wait until they outgrow Connect Four. Fire and Ice is a solid addition to any collection of abstract games.

– Don Kirkby

Octiles

Designed by Dale Walton

First there was Trax, with square tiles and the two possible path combinations on opposing sides of each tile. Then there was Tantrix, with hexagonal tiles, three or four colors, and a separate tile for each possible combination. Now comes Octiles, with octagonal tiles. The designer has kept the complexity manageable, making all paths the same color, and has changed the goal to that of Halma or Chinese Checkers: exchange positions with your opponent. Also different is the fact that octagons cannot tessellate the plane—they leave square holes that are filled by "stepping stones."

The tiles start out face down. On each turn you take one tile and use it to replace a tile on the board. Then you choose a path for your man to follow from one stepping stone to another. The path can take you across a single tile, across the whole board, or anywhere in between; it could even loop around to where you started. Then your opponent takes the tile you just replaced and uses it to make his move, and so on.

The game's strategy involves building two paths with the same tiles: one to use immediately for short hops, and one to build up for another piece's nice, long run. You must also try to avoid leaving good paths behind for your opponent to use. (The worst thing is to make an amazing sprint across most of the board only to have your opponent immediately jump on the same path and switch places with you.)

I really enjoyed the first few games I played, making "whoosh" and "beep beep" noises as I zipped along the paths, but thereafter games slowed down as players tried to look at every possible combination in the midgame. The use of a Chess clock (or egg timer!) would solve this problem..

The designers have put in lots of effort, and they include a second game, with different winning conditions, as well as a solitaire. The game has the same attractive look as all the games in the Masterpiece series, but the design has a couple of minor playability flaws—the inner tiles are held in place by the stepping stones, but the outer ones kept getting knocked loose; we also knocked the men off the stepping stones several times. Despite these issues, Octiles is an interesting and original game.

– Don Kirkby

Cityscape

Designed by Sjaak Griffioen

Cityscape is an appealing game in which players compete to develop a certain city skyline. It is a fun family game rather than a deep game of strategy.

Two to four players are building skyscrapers on 16 city blocks, and each player has secret goals to accomplish. (How many of the buildings you can see in one row, or how many buildings have the same height in another, for example.) Each sits on a different side of the city, and can see four rows of buildings.

At the start, each player selects a goal for each row of buildings and records them. This is done in an elegant fashion using dice on a rack. Players then take turns adding a piece to any of the 16 skyscrapers. When the last piece is placed, the players reveal their goals and calculate their scores.

There is a bit of strategy. Building high buildings right in front of an opponent blocks his view so he will not be able to see many buildings. The pieces come in five different sizes, and the large ones tend to go first because they make the biggest difference in a race to build the tallest building. If you go straight for your goals, your opponents may guess what you are trying to do and thwart you more easily. Thwarting an opponent is the best part of the game, after all. To avoid that, you must be more subtle; throw in some random moves and work on several goals at the same time.

As with all the games in the Masterpiece series, this one is nicely made. It has the simplest design of the series: really no more than a set of building blocks and a board to build on. I said it

was a good family game. However, for serious game players the hidden goals really reduce the amount of strategy you can plan. In essence, your opponent does random things, and you try to recover. To have a good game with younger players, just ignore defense and focus on your goals. I rate Cityscape an interesting diversion because of its appeal for the whole family.

– Don Kirkby

Fire and Ice, Octiles, and Cityscape are each US$29.99, and published by Out of the Box Publishing, Inc., PO Box 14317, Madison, WI 53708, USA. E-mail: sales@otb-games.com, website: http://www.otb-games.com/index.html.

Book Review

The Philosophers' Game

Ann E. Moyer
The University of Michigan Press, 2001

Rithmomachia, or the Philosophers' Game, has been covered by many game writers, including R. C. Bell in *Discovering Old Board Games*, H. J. R. Murray in *A History of Board Games Other Than Chess*, and David Parlett in *The Oxford History of Board Games*. Finally, here is a book entirely devoted to this venerable old game. Moyer covers its origins, history, meaning, and uses. In addition, she includes a complete reprint of *The Most Noble, Auncient, and Learned Playe* of 1563 byRalph Lever and William Fulke, which presents a later version of the game.

Rithmomachia is played on a 16x8 checkered board. There are two armies of pieces, consisting of rounds, triangles, and squares. The different shapes have different movement capabilities, and each piece has a number. In addition, there is one pyramidal piece on each side, consisting of a pile of pieces with different numbers. Pieces are captured from the opponent as configurations of pieces are created on the board in certain arithmetical relationships. The objective is to capture the opposing pyramid. In advanced versions of the game pieces are also captured according to the formation on the board of arithmetic, geometric, or harmonic sequences, and the objective can likewise be strengthened by requiring that such sequences must occur in captured pieces.

It is clear that Rithmomachia has similarities to Chess, although the number game is certainly much more complex. In fact, in the medieval world of Rithmomachia's ascendancy only the highly educated would have had the necessary arithmetical skills to play it. In consequence, it never spread beyond the universities, and eventually was totally eclipsed by Chess, the game of the people.

Rithmomachia appears to have originated in the cathedral schools of eleventh-century Germany. The earliest known manuscript containing the rules of the game is that of Asilo of Wuerzburg, which dates from around 1030. Subsequently, the game spread throughout European centers of learning. There is ample evidence to show that Rithmomachia was used specifically as an educational tool to help students master the arithmetic component of the quadrivium, the standard curriculum of medieval universities. It is probable that the game was devised precisely for this purpose.

Medieval arithmetic of the quadrivium was based on Boethius' book *Arithmetic*, written early in the sixth century. *Arithmetic* was largely a translation into Latin of the book *Arithmetike eisagoge* by Nicomachus, which was written in Greek about 400 years previously. The inspiration of Nicomachus was the numerical mysticism of Pythagoras. According to Pythagoras, the world consists of number, with more complex structures being built up mathematically from simpler units. The Pythagorean mysticism of ancient times was therefore transmitted to the medieval world through Boethius' book. The evidence suggests that Rithmomachia was played wherever Boethian mathematics was studied. The modern reader should bear this in mind and appreciate that originally the pieces in the game of Rithmomachia had significance far beyond their simple numerical values for the medieval scholars who played the game.

The liberal arts goals of the quadrivium were diluted beginning in the twelfth century as Aristotelian ideals of logic and analysis gained sway and new subjects arose. Nevertheless, none of the newly translated Arabic and Greek texts superseded those of Boethius, and Rithmomachia survived.

It was only during the Renaissance that overwhelming pressures for practical applications of mathematics finally made Boethius' *Arithmetic* obsolete. Increasingly, also, university professors became subject specialists, whose lecturing mode of instruction reduced the applicability of Rithmomachia as a teaching tool. The game fell into decline, having lost its curricula importance, and Chess, as mentioned, arose to fill the gap. The last significant written mention of Rithmomachia is by Robert Burton in 1621. Rithmomachia was played, therefore, for a period lasting more than 600 years.

Inspired by the remarkable longevity of the game and Moyer's fascinating account, we made up a set to give it a try. Now, there were many different variations of the rules throughout the game's long history, and therefore we felt justified in picking and choosing among these to make a relatively uncomplicated, logically coherent modern version. I would advise anyone else trying the game to do the same.

Rithmomachia is certainly a very interesting exercise to play. Tactics and strategy are dependent on the numerical relationships between the pieces, and in our limited play testing we found it difficult to get beyond the necessary calculations. According to Moyer, these relationships between the pieces would likely be memorized by medieval players rather than calculated "on the spot," and at that level, once the arithmetic has become second nature, I can imagine that tactical and strategical considerations could take over—we had intimations that Rithmomachia has great potential for strategic interest.

Whatever the playability of the game for modern players, Rithmomachia took abstract game playing to a level never seen before or since: it was a centerpiece of instruction at the highest levels of learning for centuries. It exceeded even the importance of Chess in the educational system of the former Soviet Union. Rithmomachia is unique in the history of gaming. If this subject interests you, I would strongly recommend this book. — KH

Solution to Surakarta Problem from *AG14*

1.e5:b2 *(the crucial point)* d5:b2 *(White is still two pieces ahead, but has a bad position)*, 2.b5:b2 b1c2, 3.b6:c2 *(any capture would be good)* a2:b2, 4.c2:b2 a1a2 *(of course, a1b2 is just as hopeless)*, 5.b2:a2. Black wins by one point. If e5:d5? b2:d5, 2.b6c5 d5:c5, 3.b5:c5, b1c2, 4.c5:c2 a2:c2. White wins by two points. 1.e5:b2 is thus worth three points. No correct solutions were received accompanied by another problem.

Grand Chess Problem Solution

1.Qh6 h4, 2.Qxh4+ i5, 3.Qh6+ Kj5, 4.Cg2+ i4, 5.Ch4++

Interview

Mark Alan Osterhaus,
Founder of Out of the Box Publishing
on success in the game industry

by Clark D. Rodeffer

AG: How did you get started in gaming?
MAO: I grew up in the 1950's and 1960's when war gaming was very popular. I had a couple of brothers and we had many games. I can never remember a time when I wasn't gaming, and back then there were a lot to choose from. Gaming was a culturally popular activity. As I got older I became a fan of Risk and the 3M games, and that precipitated a kind of collecting bug. I really like the way 3M packaged their games; they were smart games that were at a different level than other games available at the time. The problem was that I could never afford them. I was only able to pick up a few at that time. After college I started collecting the 3M titles, picking them up at garage sales. Collecting is like going back to something in your childhood that you wanted but couldn't have, so that's really how I started: wanting as a child, and finally fulfilling those desires as an adult.
AG: So how did that lead to launching Out of the Box Publishing?
MAO: My wife and I game, our kids have always been gamers, and I've been involved in the gaming market my whole life. When we weren't working, we would play games or search out good games. About ten or fifteen years ago, it was hard to find contemporary games that would keep our interest, so we kept playing the classics like Acquire. However, I worked after college with no intention to be in this business. I went from college to work in a bike company (I used to be a bike racer), and I was hired by one of the founders. Next I was part of marketing for a distribution company, and I liked doing that. Then my career went from there to computer design and drafting with a software company. I finally got really tired of working for bigger companies and wanted to work on my own, so I started freelance marketing, business consulting, and graphic arts in about 1995. At that point I felt I wanted to get into game publishing, and in 1997 I rounded up a team of people. One thing I'm really proud of is that we're entirely self-funded. The only money we could scrape up was the first production to get off the ground. Through a lot of sacrifice and good sales, we were able to get the next product totally financed in-house. I'm really proud of that aspect of our company.
AG: That says two things: it says that the company is operating itself as a business and making good decisions, but it's also saying that the products are good enough that people want them.
MAO: I appreciate your saying that. The business plan has a lot to do with the things we do, but our concept starts and ends with product. We believe that whatever happens, if you don't have good products, you won't survive. So we put a lot of effort into our products. We're not going to get one hundred percent all of the time, but we try to have something for everybody.
AG: A lot of game enthusiasts get the hankering for design. They dream about publishing, but it's not so easy. People try their hands and get mixed results. How does a game progress from prototype to publication?
MAO: There's a joke that goes around, "How do you make a small fortune in the game business? You start with a large fortune." Anyway, let's take Apples to Apples as an example. It's huge, and it continues to grow. Every day we're flooded with people who are so pleased to find something they can play with their friends and family. It makes them laugh, and they can play with their kids. When that game came to us, it was designed as what I would call a "Trivial Pursuit" type game. The guy who built it had this box, a board, and all these cards, and the game had an incredible amount of mechanics to it. It had all this stuff going on. We were still a very small company at the time, so we agreed to look at this game. We were playing the game, and I thought it was a really neat idea, but after forty minutes we were still constantly looking at the rules and trying to figure out what was going on. We had five or six people there, feeling lots of pressure, going around the board. All of us were concerned we were doing something wrong and not playing by the rules. Finally, I said, "Matt, you know, I have a suggestion on this." He almost broke down into tears and said, "You know, I've been working on it for three years. Nobody will look at my game. Nobody." He had made these really impressive prototypes that must have cost a lot of money, and he had sent them to many companies. But nobody responded, and nobody sent them back. He was so depressed about it, and he said, "You are the first people to take a look at it. You can suggest anything you want!" So I said, "Look, can I take the board out of the game?" He said, "Fine," so I took the board out of the game, along with all the extraneous cards and markers. When it was all done I said, "You've got this box of orange cards and this box of apple cards, so let's try playing this way. . . ." And we started playing. And pretty soon we were laughing so hard and having such a great time, I was thinking, "Man, I want to make this game! It's not like anything I've ever seen before; it's just raw fun. I don't feel like I'm going to lose. I have no problem following the rules." That's what spurred us on.
AG: How does your strategy as a small game publisher differ from that of a large company?
MAO: When the American game business basically collapsed into Hasbro, their business strategy was to kill off the small sales number games and brand the few remaining widely popular games with licenses, effectively turning them into collectibles. As a result, Hasbro stymied innovation in gaming. They weren't interested in promoting gaming, as such; they wanted to license key properties in the entertainment field—the most popular TV shows, etc. On the retail end of things, the main American venues for games are the "big four" (Wal-Mart, K-mart, Toys-R-Us and Target). Unfortunately, they have taken the game market down to where it's not really an issue what's inside the box: it's what's on the surface of the box that matters. The big four don't care if it's a good game that sits in a slot on their shelf. They only care about what moves a maximum number of units in that spot. What better way to do that than have the latest Star Wars game, Survivor game, or Who Wants to be a Millionaire game? Licensing moves product. Hasbro's strategy has been to license, and they're bidding up the licenses on whatever the next popular game will be.

By contrast, our vision is to become the next great American game company, dedicated to bringing new innovations and new ideas back into gaming. We're not primarily interested in online gaming or licensing. Our position is that games are still a legitimate form of entertainment. I look at our company as an entertainment company, but we have to adapt in order to compete with passive entertainment such as spectator sports, music, movies, and television. Financial competition is also tough. To reduce overhead, we intentionally started out as a virtual company. We have a warehouse in Wisconsin, but that's the only physical entity we have. Everybody works out of home offices. In the morning, we log on, and everyone's there. We do everything (graphics, design, order taking, distribution) from start to finish without putting ink on paper. Our web site is the hardest working

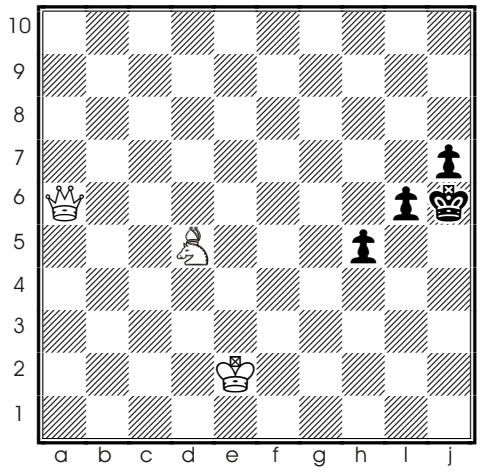
member of our team. It's always current, and is designed to answer as many of our customers' questions as possible. That way, we can spend our time on other things instead of answering administrative questions. We sell to distributors, retailers, and directly to customers in the United States, but not the discount chains. We also sell through our partners in Canada and Australia, but everything we do in Europe is through publishers over there. We're running with ten people, and the way we're structured we can turn on a dime. A bigger company can't operate as quickly or efficiently as we can.

AG: What keeps gaming from being, as you say, a legitimate form of entertainment?

MAO: A lot of Americans have a real fear of games, and I've narrowed it down to a couple of things. One is they think the game is going to be boring, especially a game that might take two or three hours to play. Second, over the past twenty years, popular trivia and charade games have devolved into making people feel dumb or inadequate in front of their friends. Third, many games are so competitive that it feels bad to lose. We've found that most people don't want to feel stupid, they don't want to be bored for hours, and they don't want to feel bad for losing. Our games take those factors into consideration. Don't forget, gaming is all about having fun. We want to give our customers delightful diversions to life, a legitimate means to escape the world just for a little bit. Another thing we're doing is making games more affordable. We're taking fundamentally simple big box games that would have sold for US$35, redesigning them without changing any of the play value, and repackaging the basic components into the most efficient box possible. This way, someone can buy a relatively substantial game for US$10 to US$20 in a package small enough to carry in a purse or briefcase. We want to be known for bringing out true games that are made for the sake of the game, as opposed to for the sake of some license. We don't want people to have to wait long periods between turns. We also don't want people to have to spend hours figuring out how to play. With our games, you open it up and play. Right out of the box.

In previous issues we have reviewed the OTB games Bosworth and Shipwrecked. The latter is a favorite bidding and bluffing game for small groups. This issue contains reviews of three more OTB games—Fire and Ice, in particular, is an excellent, original alignment game. – Ed.

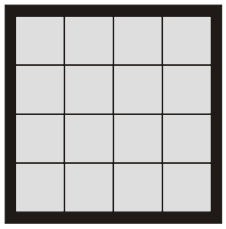
Grand Chess Problem by L. Lynn Smith



White to play and mate in 5. (Solution on p. 5.)

4x4 Games...

...an investigation



by Michael Schoessow

Abstract board games may be divided into categories based upon the types of boards they are played on. The two most common types are gridded boards where the pieces occupy spaces, and gridded boards where the pieces rest on intersections. In either case, the boards may be further categorized by the shape of the spaces—the two most common are square and hexagonal. Most games are played on boards with between 40 and 400 spaces. Design-wise, smaller boards limit the possibilities for game depth, while larger boards tend to add additional complexity or length to games. Nevertheless, small boards at least can hold other attractions, including the elegance of minimalism and simplicity. The challenge in designing a game on a small board lies in preserving this elegance without unduly compromising depth, drama, or decisiveness. The smallest size grid for which there exists a significant quantity of good games is the 4x4-space square board, and there have been a surprising number of 4x4 games published over the years. In this article I will be examining game design issues as they relate to the 4x4 board, and to small boards in general. I will also mention some favorite 4x4 games and, at the end of the article, provide a list of 4x4 games.

There are five important aspects of abstract games. These are, depth, clarity, drama, decisiveness, and replayability. The most misunderstood of these is depth. People may be inclined to think that depth is simply a measure of the length of the strategy tree, i.e., the decision tree when looking at all future moves. This is not true, however; there are plenty of games with deep, hard-to-visualize decision trees that nobody would consider to be particularly deep because it is not easy to plan ahead or predict opponent's moves without detailed analysis. Rather, the key to depth is being able to see *clearly* many steps down the decision tree, which allows long term planning and facilitates strategic play. This point was made most elegantly by Robert Abbott (2003/1975).

Relating to depth is clarity. Games displaying good clarity are characterized by quick and easy visual analysis of the current situation. Games with poor clarity invariably are not considered deep. Examples of abstract games possessing good depth and clarity are Chess and Go. Most great games have good depth and clarity. Drama relates to excitement and tension, while decisiveness is a measure of the possibility for one player to seize and hold an advantage based on inspired play (Thompson, 2003).

When designing 4x4 games, clarity and decisiveness are not difficult to achieve. However, depth, drama, and replayabilty are more problematic on a 4x4 board than they are on a larger board, and ironically these three traits can become compromised by too much clarity or decisiveness in a carelessly designed game. There is a *balance* consideration here.

There are a number of problems that must be overcome or addressed when designing any abstract game, but some of these are exacerbated in the case of small boards. There are also issues that are unique to small-board games. I identify seven particularly problematic issues: The Approach Problem, The Balance Issue,

Inadequate Piece Quantity, Strategy Tree Length, The Start Problem, Replayability, and Maintaining Drama.

The Approach Problem arises when all or most of the pieces are identical in power in a capture game. This can lead to a condition in which a piece cannot position itself for attack without itself being attacked first. With larger boards this is not always a problem because pieces can guard each other, breaking the symmetry, but the scope for this type of positional play is very limited on a 4x4 board. One way to address this is to introduce hidden information, as in Plateau. That game also allows captured pieces to be reintroduced, blunting the effects of capture. Another scheme is to break the symmetry by employing diverse piece types with differing capabilities, but in this case care must be taken not to unduly compromise clarity. In a game of my own design, called Catalyst, I utilize mutable pieces with low initial mobility but with movement capabilities that may be enhanced via stacking. In Catalyst each player also owns one special "catalyst" piece that functions to "activate" other pieces' attacking powers only along its own rank and file squares. This limitation on attacking effectively solves the Approach Problem and the Start Problem, while the mutable piece capabilities increase depth. Note that The Approach Problem does not exist for games in which captures do not occur, such as the many pattern and territory games, including Quarto, Matrix, and The L-Game.

The Balance Issue and The Start Problem exist with almost all games, but are most difficult to avoid on small boards; it is difficult (some would assert impossible) and greatly limiting to design a game that is perfectly balanced between the players, and in which the starting player has no advantage. When there are a large number of pieces and a large board, the amount of imbalance is often small and may be reasonably endured, but with a 4x4 board it can be unacceptably high because of the lack of real estate. Small piece quantities can contribute to the problem because he loss of one piece out of four creates a larger imbalance than the loss of one piece out of 16 or 20.

The Start Problem is related to the Balance Issue since there is usually a first-player advantage, and it is often relatively worse on a small board simply because of the fewer pieces and the more limited move options. There is another aspect to the Start Problem with 4x4 boards: a starting configuration and movement rules that allow the first player to capture an enemy piece and establish a dominant position on the first move of the game is clearly unfair, which significantly limits the set of acceptable movement rules. The way to address the problem in capture games is to limit the decisiveness of first and second moves, once again through the employment of mutable pieces, poor initial mobility, inspired starting configuration, or by specifying a non-conventional winning configuration. An excellent example of a game in which decisive moves are initially precluded is Chess—short-range pawns must, for the most part, be moved first, and for every move there is a reasonable counter. By the time the more powerful pieces are accessible, the opponent has had an opportunity to anticipate and prepare. Decisive initial movement is either blocked or disallowed. This is a good trait in any game in my opinion, but it is an essential trait in small-board games, whether they be capture games, territory games, pattern games, or any other type.

One of the greatest challenges when designing a 4x4 game is to assure that the depth is sufficient to capture and hold the interest of serious players. Great depth often goes a long way toward ensuring good replayability. There are many ways to add depth to a small-board game. Probably the most obvious is to add complexity, although too much complexity can compromise clarity, with a resulting *decrease* in depth. Randomizing elements can be useful too, but as with complexity, one must be judicious in application or depth will suffer rather than improve. Two excellent examples of games that utilize a bit of randomness to improve depth are Knockabout and Warp 6 (although these are not 4x4). Random elements can also improve replayability.

A general way to improve depth is to increase the number of degrees of freedom in the game moves in a way that does not unduly compromise clarity. Some options that are appropriate in 4x4 games include, mutable pieces (Catalyst, Plateau, Gobblet, Rubik's Eclipse), use of the vertical dimension (Match 4, Score 4, Sogo, Starplex), use of a large number of pieces (Foursight, Starplex), and use of a wrap-around board. The use of stacking pieces allows a large number of pieces to be accommodated on the small board, and if the height of a stack establishes "power," in terms of movement, attack capability, or positional significance, then good clarity can be maintained. In the case of a wrap-around board, the clarity and increased depth depend upon the movement rules; orthogonal wrap-around movement is quite easy to visualize, but diagonal wrap-around movement is non-intuitive for most people and greatly compromises clarity.

Drama in a game is preserved as long as the winner is in doubt. This is more difficult to maintain in small-board games, but with good depth and good balance it usually takes care of itself. The main difference is that drama cannot be maintained for as long in a small-board game, and the proper way to deal with this is to insure that the game tends to end shortly after one player achieves an overwhelming advantage. For example, an endgame should not be drawn out as players continue to shift one or two pieces without new or additional decisive advantage. As a group, 4x4 games tend to have shorter periods of dramatic play than larger games, and it is important to insure that they rapidly converge and end after that period has passed.

I have been investigating 4x4 games for some time, and I now know of 47 of them, most of which I have rules for. My favorites are Plateau, Ithaka, Quarto, and Catalyst. The other 43 games are listed below, and ones that I do not have rules for are indicated with asterisks. I am interested in finding rules for those and in hearing of other games. Anyone interested in exploring 4x4 games can e-mail me, and I will be happy to send my complete list including authors, publishers, and sources. I can be contacted at mjs@pobox.com. ■

List of 4x4 games

4x4 Combinatorial Regio, Aera, *Catena, Chessence, Colorium, *Conga, Dao, Dino-Dodg'em, Edges, *Farook, *Form Fours, Four-Field Kono, Foursight, *Gembel, Gobblet, Hibryd 1, Ithaka, Jul-Gonu, Krieg, L-Game, *Lucky 13, *Match 4, Matrix, Moxie Plus Plus, Orthokon, Proton, Q-Turn, Quatri, *Quick Cross, Rubik's Eclipse, *Score Four, Slides of Action, Slimetrail, *Sogo, Spotter, Sequence, Square Dance, Starplex, Tic Tac Check, *Tot-Ten, *Tramp, Void.

References

Abbott, R. *Under The Strategy Tree.* Retrieved July 15, 2003 from http://www.logicmazes.com/games/tree.html. (Original work published in *Games & Puzzles*, Issue 36, May 1975).

Thompson, M. J. *Defining The Abstract*. Retrieved July 15, 2003 from http://www.thegamesjournal.com/articles/DefiningtheAbstract.shtml.

Note that Cityscape, reviewed on page 4, is another 4x4 game for the list. – Ed.

Super Halma: The Quest for the Best Two-Handed Version

by Andrew B. Perkis

Ever since Super Chinese Checkers was developed in the 1970's, the door has been open for applying super jumps to Halma. Indeed, Super Halma gets a mention in R. Wayne Schmittberger's *New Rules for Classic Games* (1992) and an even earlier mention by Machatcheck (1990/1972). While the game has clearly been given a trial by players here and there (and there is some evidence that there was a small community of players in East Germany even as early as the 1980's), it seems never to have really got off the ground.

In his book Schmittberger observes that the play in Halma is more "complicated" than in Chinese Checkers "because pieces can move in eight directions instead of six" (pp. 87-88). It seems reasonable to believe in turn that Super Halma should be of even greater depth and complexity than Super Chinese Checkers. Nevertheless, the task of finding the most playable version, with the right fine-print rules, is an exacting one. To make this clear, we will start at a look at standard Halma itself.

Halma

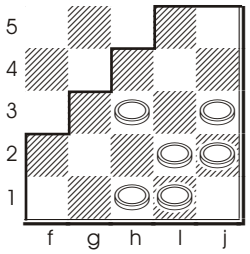
Despite the enduring regard in which Halma is held by game players as the classic game of its type, Halma has received scant attention from serious players, at least in terms of organized competitive play. In part this may be due to the low proportion of occupied squares (38) on the large board of 256 cells. The result is a lower interaction between opposing forces than might be the case if the game had a different format. The start can be slow, and later play that involves enemy stragglers and the attempt to block them (a salient aspect of play in the smaller versions) only puts in a limited appearance. The one "advantage" of the large board is that the game's distinctive novelty—jumps over both friendly and enemy pieces—can be performed far more dramatically than on a smaller board.

The two smaller "grasshopper" versions of the game (8x8 with 10 pieces per side, and 10x10 with 15 pieces per side), also Victorian, were more or less successful attempts to make play more interesting at the cost of losing the prospect of constructing the very long ladders that are the hallmark of the standard game. Since these play significantly better than the 16x16 version, we can treat the issue of the right format for regular Halma as closed. Another issue, however, that of spoiling, has been exercising minds much more recently.

In the late 19th. century it would not have appeared immediately significant that a player could simply leave pieces in his home camp indefinitely, in order to block his opponent's progress—surely no one would dare to be that unsporting!—but in latter days several attempts have been made to prevent a player thus spoiling the game.

The best known anti-spoiling rule was formulated by David Parlett as follows: "[A] a player wins when all the opposing base points are occupied, at least one of them by a piece of his own colour" (Parlett, 1999, p. 133). This is the most logical interpretation of the more ambiguously stated rule: "A corner camp is considered full even if one or more pieces in it belong to the player who started there" (Probably attributable to Sid Sackson, 1991, although Klutz Press could not confirm this).

Focusing on the rule as formulated by Parlett, we can see that it has a degree of effectiveness. If both players set out to win, and, at a latter stage one of them sees the game slipping away, then that player cannot bail himself out by leaving a piece or two in his home camp. Against a predetermined spoiling strategy, however, this rule is not effective, since a player can position pieces in his own camp in such a way that certain squares in it cannot be reached by the opposing player. The diagram shows White's camp with pieces left in it in the form of the most basic fortress. Black cannot make progress since the corner cannot be reached either by a step or jump move. Even today, some commentators describe such a strategy as "devious" or "pathetic," but this misses the point. It should rather be considered pathetic if I won the first game in a match but failed to avail myself of the opportunity to win by maintaining my early lead.



The intention behind these rules seems to be that a player should be regarded as having won a game if he has advanced towards his goal as much as possible, given the presence of enemy pieces.

Most other suggested rules for anti-spoiling in Halma share a common approach—to force a player to clear out his camp. One rule set, current in Germany for more than half a century, demands that a player makes only exiting moves once the enemy camp has been cleared. Another rule is that any piece in a player's home camp must make progress towards the enemy camp whenever this is possible by jumping over an enemy piece (*Zillions of Games,* Version 2.0).

Whatever the merits of these various rules for Halma, I felt that an anti-spoiling rule along these lines would not be suitable for Super Halma. One of the ways in which introducing "super" moves makes a more interesting game is in increasing options. (There is another way that the game is made more interesting that is perhaps even more significant that I shall come to later.) There seems little to be gained by adding an anti-spoiling rule that *restricts* options. *Spoiling* was the only option I wanted to restrict.

Super Halma

As already mentioned, the low proportion of occupied squares in standard 16x16 Halma means that the interaction of opposing

forces is both delayed and retarded throughout the game. Super Halma also works surprisingly badly in this format. In the standard game itself some interest occurs via blocking along the main diagonal pathways between the two camps; in Super Halma even this interest is lessened.

It can be demonstrated that the interaction of pieces is affected considerably, not just by the board area but by its dimensions, too. This is illustrated by an extreme case: change the dimensions of standard Halma from 16x16 to 8x32. Now the opposing forces have such an impact on each other that neither player has the slightest chance of traversing the board! (Somewhere between these two, about 12x21, are versions that would work quite well, although game would be protracted.)

On any rectangular board, a rough guide to indicate the number of pieces per side that could perhaps produce a playable game would be one less than twice the number of squares along a shorter side, so that a player is unable to form a solid barrier two ranks deep across the board. On this basis, it can be asserted that the highest playable proportion of pieces to squares will be found on square boards. On the other hand, rectangular boards have a funneling effect that increases the blocking opportunities.

After much experimentation, the two formats that I felt were worthy of further testing were 8x11 with 15 pieces per player and 10x10 with 19 pieces per player, from now on referred to simply as 10x10 Super Halma. My tentative conclusion regarding 8x11 is that the funneling effect is too great. The game has a puzzle-like interest, and it enabled me to be clearer about the requirements of an anti-spoiling rule in these versions where the density of pieces is higher. Suffice it to say, for now, that the issue of whether or not one player can block off the progress of another is too dominant in the rectangular version, and not easy to solve.

10x10 Super Halma has several points of interest that depend not just upon super movement, but also on the higher density of pieces it allows. Interestingly, the use of this format with normal Halma rules produces a more or less unplayable game. This is because a player can construct a two-rank or two-file deep side-to-side barrier with which—even though it may be incomplete—he can slowly advance. In Super Halma, however, this strategy allows the opponent too many opportunities to make progress by jumping over the barrier while it is under construction.

An interesting diversion is the following conjecture about this version. Since the number of pieces is so neat (2x10 – 1 = 19), and they fit around the corner so conveniently, exactly as in standard Halma, it seems feasible that the standard game may have existed in this format at some point during its evolution. Although the exact origins of Halma are shrouded in transatlantic fog, it is generally accepted that in 1883 Howard Monks returned to the U.S. from England and that during the visit he had either devised Halma or developed it from a pre-existing game. Since I am in the middle of research concerning the genesis of Halma, I prefer, at this stage, not to make any guesses as to whether or not Monks *did* pick up on an earlier game, and, if so, how much of an inventive leap his input gave.

However, suppose that one were to start from scratch, experimenting with the basic idea of Halma, using a 10x10 board. At first you might try it with each side having 20 pieces arranged on their two home ranks. Of course, no progress can be made. A logical next step would be to remove one piece per side, to make a totally impenetrable side-to-side band impossible, and to shift the home camps to opposite corners, to make *forming* such a band more difficult. Hey presto! Nineteen pieces fit neatly around the corner, and the arrangement begins to feel right.

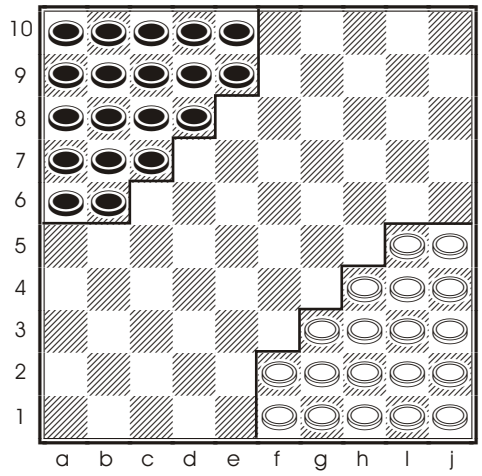
Now, as Monks sails back to the U.S. with the game of Halma having reached this stage, we can sail further into the realms of my conjecture. According to this reconstruction, having returned from his vacation, Monks would have had little time to experiment further. He may have found that each player could form and advance with a side-to-side barrier, making the game unattractive and inconclusive. Now, it is just about conceivable that if he had had more time to develop the game he could have solved this problem by introducing super jumps—and thus he would have arrived at the game I am presenting here!

Instead, the game was transposed to the 16x16 board, on which longer ladders can be constructed (but on which, from scratch, 21 pieces per side would be a more logical choice). Thus, enchained hops over pieces of either color, the number one novel feature of the game, later described by Bruce Whitehill as "the first American classic strategy game" (Whitehill, 1992), could be more attractively shown off. Not only that, but all the unused space of the otherwise empty corners could be utilized in alternative versions for three or four players.

To return to where we got to: the rules of 10x10 Super Halma, *without the necessary small print rules*, can be stated quite briefly, as follows. The small print rules I propose are given afterwards.

Rules of 10x10 Super Halma

Super Halma is a game for two players. The board and starting position is shown below. Each player starts off with 19 pieces in his "home camp," the boundary of which is marked by a bold line. A 10 x 10 International Checkers board and pieces is ideal. Colored masking tape can be used to mark off the two home camps.



Board with pieces in starting positions

White plays first, and thereafter the players take turns to move. There is no passing, and only one friendly piece may be moved per turn of play. Moves are of two types: step moves and jump moves. A player may not make a move that combines a step and a jump.

Step move. A piece may be moved one space in any direction, orthogonally or diagonally, into an empty space.

Jump move. A piece may jump over any other piece any number of empty spaces away, either orthogonally or diagonally, provided it can land the same number of empty spaces beyond it in a straight line. The shortest such jump (in which the number of intervening spaces is zero) is the standard jump of normal Halma. Multiple jumps may be made, but to continue jumping is optional.

As in Halma, no captures are made, and pieces cannot move onto occupied squares. However, pieces may enter and exit both camps without restriction. A player wins by occupying all the squares of the enemy camp.

Small print rules for 10x10 Super Halma

Winning conditions

1. A player wins when, after making a move, the position is such that *all* of the following are satisfied:

(a) None of his pieces could be moved, *in a single turn*, closer to the corner of the enemy camp;

(b) None of his pieces that are outside the enemy camp could be moved, *in a single turn*, closer to a vacant square within it;

(c) None of his pieces that are outside the enemy camp would require more than three step moves to reach that camp if the intervening squares were empty.

(Note that "closeness" here is measured by the number of step moves that would be required to get from one square to another if the intervening squares were vacant.)

2. If these conditions are met, the win is still not valid if all the attacking player's pieces are connected into one group (via step-move adjacencies) and yet there is still a vacant and accessible square in the enemy camp. "Accessible" here means not protected by an enemy fortress.

(The " normal" win, when a player occupies all the squares of the enemy camp, is an example of a win under these conditions.)

Trapped pieces

● If a player traps an enemy piece, outside of the two home areas, such that he can indefinitely deprive it of movement, he may immediately, or at any point subsequently, while the piece is still trapped, claim a draw.

● The player whose piece is trapped may offer a draw, and, if the surrounding player rejects this, he must immediately release the trapped piece.

● Note that to trap a piece it must be surrounded by the trapping player's pieces (probably, but not necessarily, in conjunction with the edge of the board). Also, all the backstop pieces must belong to the trapping player.

● An even more unlikely, but possible, situation would occur if a group of two or more pieces were deprived of movement. If this did occur the rules concerning the trapped pieces would be applied to the case of the trapped group.

● Trapping a piece in one's own camp does not merit a draw, as persisting with such a trap would result in a loss. On the other hand, trapping a piece in the enemy camp is akin to winning unless the opposing player can reciprocate with a similar trap. Either player may claim a draw if such mutual traps have persisted for three moves or more.

Repetition and draws

● A player may claim a draw if the current position has occurred for at least the third time with the same player to move. Players may also agree draws in rare situations where neither believes he can progress further (see below).

The case of held back pieces

● It can happen that a player can prevent an enemy piece advancing, sufficiently to stop his opponent winning, while not actually depriving that piece of movement. If both players were satisfied that the blockade could be maintained, then they would presumably agree to a draw. Although I have formulated a rule to cover this, I do not wish to publish it at present, as I believe this kind of position belongs to a larger group of fairly rare situations in which the competing players would do best to develop their own protocol. In this case, the players would be happy to agree to a draw or one of them would make a move that would reopen possibilities of play.

Note on small print rules

There is a paradoxical element in devising effective, non-interfering anti-spoiling rules: if the rules are effective they will never be used. Indeed, if the above winning conditions were applied to standard Halma, they would almost never come into play between two informed and genuine opponents.

Is it any surprise then, given that formulating an effective ruling that does not affect strategies it is not targeted at is such an exacting task, that Halma players have, thus far, either been content with rules that are ineffective or "opt out" by preventing the spoiling situation arising—even at the cost of altering the character of the game to some extent? Who wants to expend all that mental energy on a rule that will never be used?

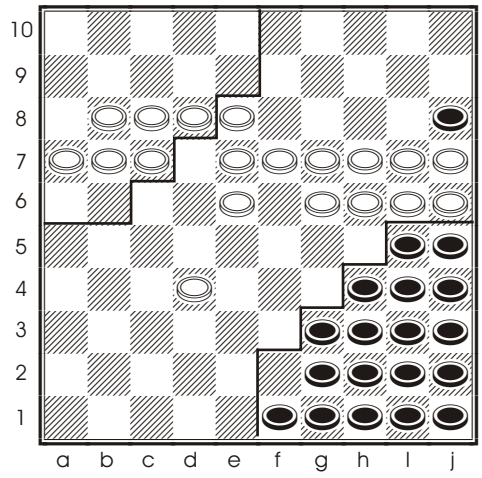
As will be seen, other small print rules, also, are likely to come into play either never or rarely. Nevertheless, these rules do have a subtle and creative influence on play in Super Halma in a way that comparable rules could not do in standard Halma. This is mainly due to the interest conferred by extra blocking possibilities.

Before continuing with explanatory diagrams, there are two other anti-spoiling proposals, in each case intended to be applied to standard Halma, but worth glancing at. Unlike those mentioned above, these have not been explored, but they do have the charm of simplicity.

● In 2002 David Ploog made the following proposal: "A player wins if he cannot move any of his stones closer to the enemy corner and if all his stones left his base."

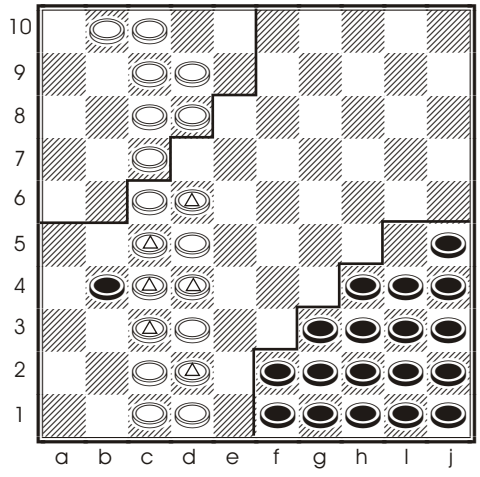
● In our correspondence earlier this year Dan Troyka proposed that a player should simply forfeit the game if he has not cleared out his camp within a prescribed number of moves (probably 50 or thereabouts in standard Halma).

Putting the application of these ideas to standard Halma aside (except to say that they both look promising), let me demonstrate what I see as their shortcomings when applied to Super Halma.



Position A

The crux of the matter concerns how, or whether, we are to distinguish between Position A, above, and Position B, below. In both, Black cannot make further progress since his straggling piece can be held back permanently. After a lot of testing, I have concluded that if a player attempts from the outset to build a side-to-side barrier—and advance it with the precise intention of preventing his opponent winning—then, against reasonably competent play, the most he will achieve will be a position comparable to Position A (rather than position B). In Position A, David Ploog's proposal seems appropriate. Black cannot advance further due to the blocking pieces and should be awarded the win.



Position B

Position B, however, is very different. The black piece that is held back forms, together with the white pieces that curb its progress, a mixed group of contiguous pieces that are *totally detached from the main black group*. Since Black could easily have prevented such a position from occurring (if White had directed his play towards this from the start), then this cannot be justified as a Black win. Note, however, that under Ploog's proposal Black would have a win here even if only the marked white pieces were placed as they are. As will be seen below, there are occasions when a position like this will emerge as a possible saving resource, rather than from a spoiling attempt. This corroborates the justice in not allowing a win here.

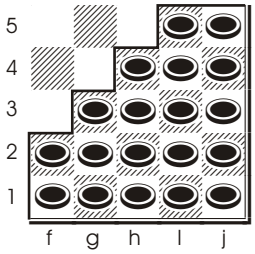
(Note the relevance of Condition 1(c) in the anti-spoiling rules. If the straggling piece is at three or fewer step moves distance from the enemy camp—as in Position A—then it and the pieces detaining it cannot possibly form a group detached from the main body of black pieces.)

Finally, regarding a 50-move type of rule, it is evident that this would neither prevent these positions occurring, nor be of any aid in judging their values.

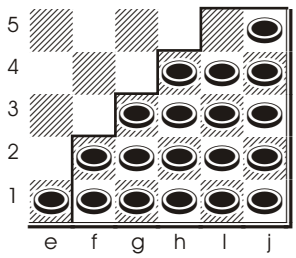
Clarifications

For the purposes of clarification, here are some positions with their values plus any relevant comments.

1. Standard win.

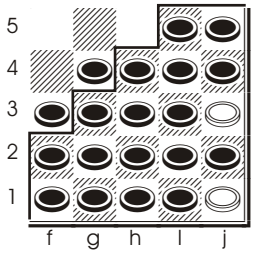


2.

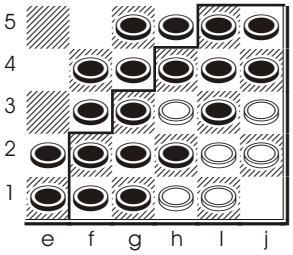


The position above shows a flaw in David Ploog's attractively simple formulation, according to which this is a win for Black. Condition 1(b) comes into play here. Black must get the last piece into the enemy camp to win. (This takes away nothing of the promise of Ploog's proposal with regard to standard 16x16 Halma. If a short supplement prevented a player claiming a win, as here, then his rule becomes, as he intended, sufficient for competitive play outside of organized competitions. The chance of anything coming up that it does not cover is very small.)

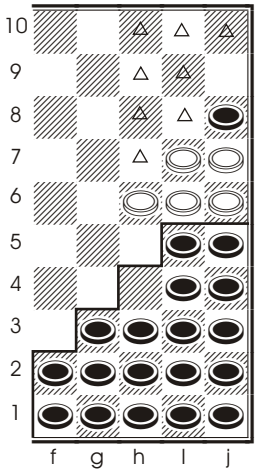
3. Win with mixed pieces.



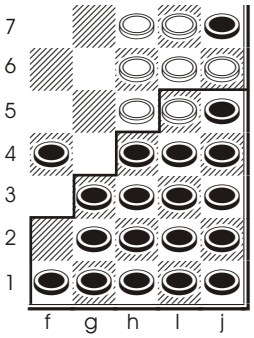
4. Standard win against "holey fortress."



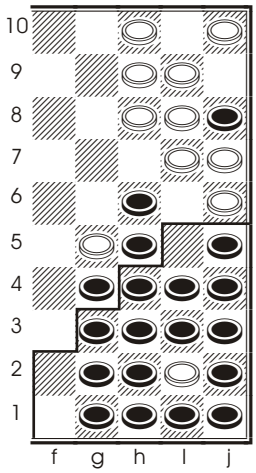
5. The position below is not a win since the since the piece at i5 can move closer to the corner. This seems to be an unnecessary technicality. However, add white pieces to the marked squares and it makes a difference; White to play could draw.



6. The position below is not yet a win as the piece at f4 can move towards f2. Once at f2, a winning position has been reached. As with the previous example, similar positions are possible where these extra moves could be critical. Again, this would be if White were chasing a draw by means of trapping a black straggler.



7. Finally here is an example of one type of impasse among the many that could possibly occur.



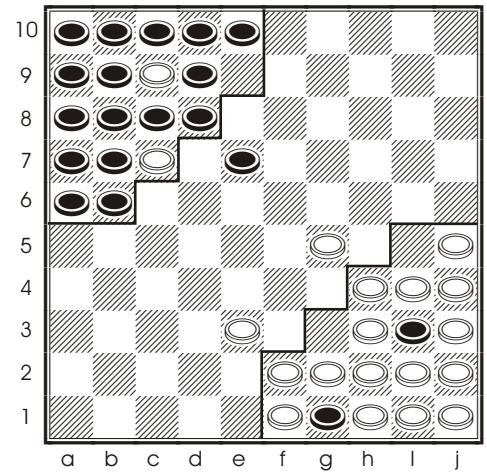
White, having a piece trapped in his home camp, can no longer win and has pursued a draw by trapping. By playing h9j9 he can effectively draw even though the piece on j8 is not technically trapped. If Black were ever to move the backstop at h6, White would play g5h6 and claim a draw. With regard to this and all similar impasse situations, it seems much better to rely on the intelligence of players than on specific rulings that could be added to the rule set at this stage.

Having seen these dynamics, one might ask, "Isn't there a simpler way?" My first response to this would be that equivalent rules are also required in any truly thorough rule set for Halma itself. It may well be that a competitive form of Halma, and 8x8 or 10x10 Grasshopper would be suitable candidates, has never got off the ground precisely because no one has ever taken the trouble to promote any particular complete rule set sufficiently. On the other hand, people have enjoyed playing Halma for nearly 120 years, and for the vast majority of recreational players no fine print rules have been necessary. Similarly, one can enjoy Super Halma, outside of organized competitions, without any reference to most of these rules.

A short note on play

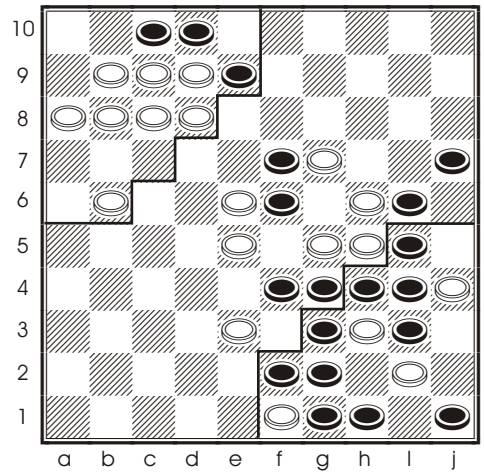
I define an "open" game in Super Halma to be a game in which, from the first, players allow opportunities for mutual invasion of their camps. A typical example would be a game that began thus: 1.i3g5 c9e7, 2.g1e3 e9e5e1g1i3, 3.i5e5e9c9 c7e9e5e1g1, 4.g3i5e5e9c7, reaching the position below.

If a game continues in this fashion, each player might be in danger of having a piece trapped in his home camp. This can be an extremely interesting phase of the game. Although it is easy in itself to avoid being thus trapped, there is a fine balance between playing safe and making quick progress. Also, one may take



calculated risks in one's own camp while engaged in threatening a piece or group of pieces in the enemy camp. This sudden death element is the most salient and exciting additional feature that super movement and a more crowded board bring to the game.

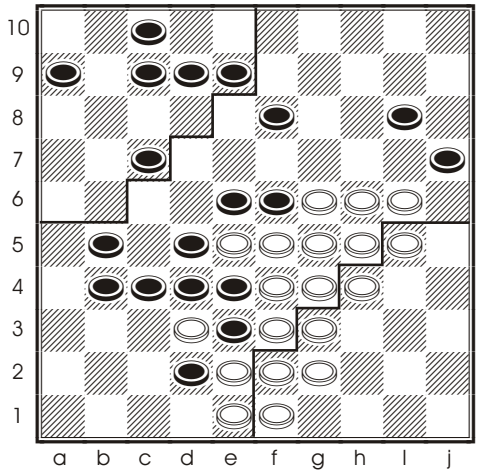
Curiously, aggressively played open games give a greater likelihood of draws, either by both players trapping a piece in the enemy's camp or by repetition of position in such trapping situations. Nevertheless, with a little experience, it does not seem to be too difficult to avoid draws of this kind. On the other hand, as a potential saving resource for a player in trouble, the threat of a draw can even add an exciting finale to the game. In the example below, White (myself in a game against Dan Troyka) seems to have a hopeless position.



The piece at i2 looks like it is inevitably going to be trapped, whereas the black piece at c10 is about to escape. 1.e6g6e8 might give White some slight chance of holding back, or even of trapping, a black piece, but an even better chance is 1.h3j5h7, which threatens i2h3, escaping. Now 1....f7f5h3 looks good since it prevents White usefully placing a piece at e8. However, the next White move both restores this possibility and threatens to escape via i2h3: 2.h5f5f7! After 2....j7h5j3, 3.f7e8 puts pressure on those backward black pieces. Although it turns out that, with best play, Black can worm his way through—as is usual in these types of positions—he does need to exercise a degree of care to do so.

Closed games—where one or both players advance pieces in a more airtight way—tend to be more placid through the early and middle game, but are almost bound to end with a decisive result rather than a draw. Games of great theoretical interest result when only one of the players advances in such a methodically solid way.

For example, in the following position Black is, albeit patchily, more advanced, but White, to play, will be able to progress towards the enemy camp more directly. It is not easy to ascertain who has the better position.



It is mostly in terms of strategic depth that 10x10 Super Halma should provoke enduring interest—though simply *seeing* the immediate possibilities is a pretty good first step towards playing well. The central 16 squares, and those close to them, are important. Being able to advance swiftly through these and/or hold up your opponent's progress is likely to be a key issue through the game. Inevitably players need to take less central routes, too. Various blockings can take place on different patches of the board, and players may sacrifice (in the sense of allowing a piece or two to penetrate into their home camp) in order to block elsewhere.

A final word is necessary about draws. The anti-spoiling ruling is not intended to eradicate all draws. The nature of 10x10 Super Halma is that draws are a possibility, though unlikely to occur more than seldom. To my mind, there is only a "drawing problem" if (a) a drawing strategy exists that cannot be countered, or (b) a sizeable portion of well-played games end in a draw. Neither of these is the case here. Rather, it could be said that the game is enhanced by the inherent possibility of draws occurring. ■

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Andrew wishes to thank Dan Troyka, David Pritchard, and David Ploog for vital help with research, with extra thanks to Dan for his part in some enjoyable yet meticulous play testing.

Recently I discussed the notion of "race game" with Larry Back, inventor of Onyx, Three Crowns, and 77. Should Halma be classed as a race game, and then should Backgammon, et al *be designated "race track games?" (See the notes about Bantu on the inside front cover.) What do the readers think? – Ed.*

Havannah

Basic Tactics Part 1

by Christian Freeling

Tactics must serve strategy, yet some intuitive *a priori* understanding of strategy is needed to explain tactics. Havannah is a "first player to connect wins" game, so speed, the number of stones needed to complete a winning structure, is obviously an important issue. The counting involved, however, is far from straightforward. As an extreme example, consider White's position after his first move. He needs only five more stones to complete a ring; Black still needs six. The drawback of this blatantly obvious strategy, should White adopt it, is that Black can allow him four stones and then frustrate the attempt for another two moves by placing just one stone. So counting alone is not enough: a player should take the *solidity* of an intended connection into account. A solid future connection—one that, though not yet complete, can no longer be broken by the opponent—is called a *frame*. It is the most important strategic concept in Havannah.

A frame, by definition, cannot be broken by the opponent. Implicitly, if the opponent tries, he will actually *speed up* the connection! Read my lips: *The only way to counter an opponent's frame is having a faster frame yourself!* Attacking a frame without winning tempo for one's own frame in the process, amounts to suicide. This holds for any frame. Apart from that, fork and ring frames have different properties and complementary applications.

The Fork Frame

The minimum number of stones to complete a fork is twelve, but the five stones at the bottom of Diagram 1 already constitute a frame.

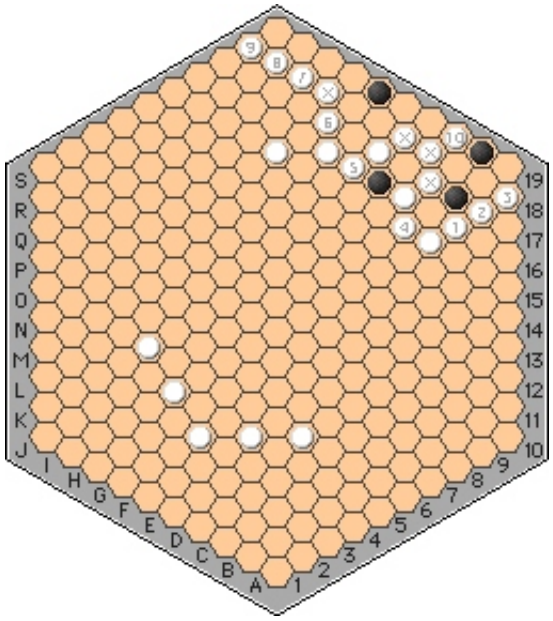


Diagram 1

The intended connection hovers above three different sides that Black cannot prevent it from reaching, and the "'loose" connections are in fact solid because every stone has two alternative cells to connect to the next one. This is called a *kite* connection, and the pair of cells involved have a relation called *miai* in Go: should Black take one, White can take the other.

Black's only defense against White's frame would be to have a faster frame, but just how fast should that be? At the top, with Black presumably working on his own frame, White has started "filling in" the same 5-stone position. Black cannot defend the main threat, because it is a frame, *but he must defend against sub-threats if they are faster than the main threat*. So after White 1 to 4, Black must answer three successive ring threats (marked "x"—these are free moves for White), and after White 6, Black must answer another one. Using these threats, White effectively needs ten moves to complete a fork—so to win Black should have a frame that completes in 9 moves or less.

The method shown may not even be the best. Although I have found different ways leading to ten, I have failed at nine, but I may have missed it. I have tried to connect the right and top-right side via the corner, introducing a bridge threat into the equation, without improving the final result. Beat me at it if you like.

It should be clear from this that a frame is the most important strategic goal, and that connections can *speed up* by employing sub-threats that are faster than the frame itself. Now why did I take a fork frame? Because the minimum number of stones to complete a fork is twelve, but five stones may already constitute a frame. A fork, especially if placed high, that is, near the center, frames fast! This is very different from a ring frame.

The Ring Frame

The minimum number of stones to complete a ring is six, *but paradoxically six stones are not enough to constitute a frame!* Where a fork frame takes less than half the number of stones of the smallest fork, the ring frame requires *more* than the actual number of stones of the smallest ring. Have a look at Diagram 2.

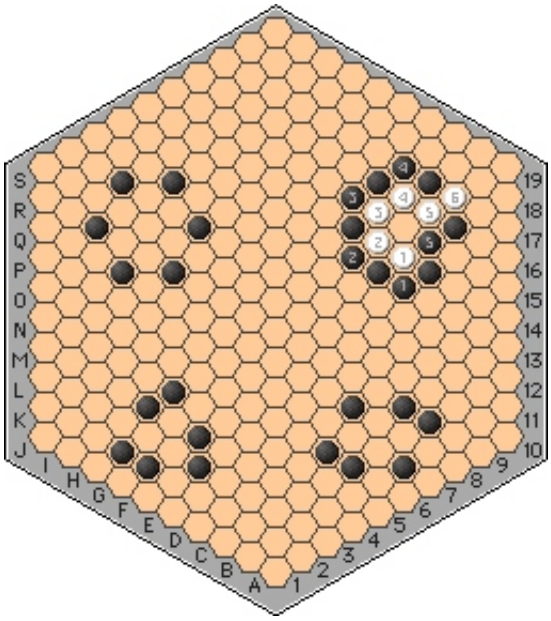


Diagram 2

Three attempts are shown to frame a ring with six stones. The top-left one can be broken from the inside, as shown top-right. After White 5 Black must defend against the White ring threat, and White can break out. This type of combination is called a *mill* and you will encounter it regularly, though usually more hidden than in this example.

The other two may be crushed from the outside, with three and four stones, respectively. In the latter case, the order of play matters: start at top and bottom (e9 and b6), and Black will get his ring after all!

The ring is a tactical rather than a strategic weapon and as such *complementary* to the fork. Its threats are very real, but as a rule they can be parried at the last moment at the cost of losing a tempo (or an intended connection). Games, therefore, are seldom decided by framing a ring.

The Bridge

The ring, curling inward, and the fork, reaching outward, are complementary. The bridge operates in between as the oil in the machinery. Contrary to sides, corners are exclusive, so bridges are less common than forks or rings to begin with. Yet they can make the difference between win and loss in any game!

Obviously you cannot have a bridge frame without having the two intended corners first. Yet starting out by taking two corners is too obvious a plan to be effective.

Bridge threats usually evolve from the outcome of corner disputes where players try to deny the opponent access to adjacent sides, and one or the other comes away with the corner in the process. Even then, the actual corner often has not been occupied at the first possible chance: denying the side is often the main aim.

Corners also play an important role in a phenomenon unique to Havannah, called a *running game*. The game I am going to cover one issue from now, after introducing some more examples of Havannah's basic tactics in the next one, features one of the most interesting running games ever, with the bridge in a central role. ■

Simultaneous Movement Game Design Competition

by Kerry Handscomb

The results are in for the Simultaneous Movement Game Design Competition. The winner is Assembly Line, a simple, fun, fast game with a very nice play mechanism. Congratulations to its designer, Stephen Glenn of the USA! The runner-up, Missile Match, by Scott Balaban, also of the USA, is a simple, ingenious alignment game that uses dominoes in an original way.

None of the games described in the last issue came out on top, although they received a number of votes between them. The actual winners, while both very good games, were I felt a little light on strategy, and perhaps more suitable for children. This may be a characteristic of the genre as a whole, although, my personal opinion is that Niebelungenlied, for example, had more to offer in terms of opportunities for bluffing and planning.

In any case, it was an interesting competition. We will probably be describing several more of the games in the next issue. Next year's theme is games in which pieces are shared by the players—more on that later. In the meantime, here are the winning games:

Assembly Line

Assembly Line is a game for two players, who each control nine workers on an assembly line. As the products roll by, players will get a chance to score at certain points in the game, based on what product they are working on at that moment.

The equipment required is as follows: 9 poker chips each of two different colors; 6 product tokens each of three different colors; a bag for holding the product tokens until they are played; pencil and paper for scoring.

First form the assembly line by randomly distributing the poker chips in a line across the table. It might be easiest to put the chips in a bag and draw one at a time to create the line; the first chip drawn is the beginning of the line; the last chip drawn is the end of the line. Each player owns one of the poker chip colors. All the product tokens are placed in the bag.

Play proceeds in two phases: (1) Determine movement; (2) Either advance assembly line or score.

Movement. Each player simultaneously reveals 1, 2, or 3 fingers from his hand. If the two numbers are different, advance the assembly line the sum of both numbers. If the two numbers are the same, the assembly line breaks down and scoring happens.

Advance assembly line. If there are any product tokens on the assembly line already, advance them forward toward the end of the line the appropriate number. If they go past the last chip, they are out of the game and not used any longer. After you advance the existing tokens, draw tokens out of the bag, one at a time, and place them on the assembly line behind the existing tokens. Tokens should be placed from front to back. The number of tokens drawn is equal to the number of spaces advanced. Of course, once the bag is empty, no more tokens are placed on the assembly line. All remaining tokens advance as normal.

Scoring. If both players play the same number, the assembly line breaks down and the players score. The tokens do not advance! Each product token scores 1, 2, or 3 points depending on its color—for example, Red = 3 points, Blue = 2 points, and Green = 1 point. Each player earns the total point value of product tokens resting on his color poker chips.

For an example of play, assume the current position is as follows:

One player reveals two fingers; the other reveals three. The tokens advance five spaces, and then five more tokens are drawn from the bag in the order G (first), G, G, R, B (last). The resulting position will be as follows:

If both players next reveal the same number, the assembly line will break down, and the players will score as follows:

White	3x3 + 2x2 + 1x1 = 14 points
Grey	1x3 + 1x2 + 4x1 = 9 points.

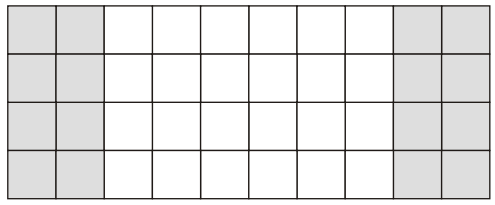
The machine cannot break down two times in a row. If doubles show up after a scoring round, the player's try again until the assembly line moves.

The game will end immediately as soon as the last token moves off the assembly line. Whichever player has scored the most points at this time wins.

A variant can be played with a yellow product token added to the bag. A yellow token represents a defective product. When the assembly line breaks down, the player who owns the chip with the yellow token standing on it will lose 5 points.

Missile Match

Missile Match is a novel alignment game for two players. It can be played perfectly well by using the center four columns of a standard 8x8 chess board, although players may want to construct a special board, as shown.



Board for Missile Match

A double-six set of dominoes is required. Ideally, the dominoes should be roughly the right size to cover two squares on the board. Lastly, 30 checkers are required, 15 each of two colors. Place all of the dominoes face down, and keep them next to the game board. This will be the "missile yard."

Each player draws four missiles from the missile yard, and keeps them hidden from his opponent. The players will use these missiles to claim squares on the board.

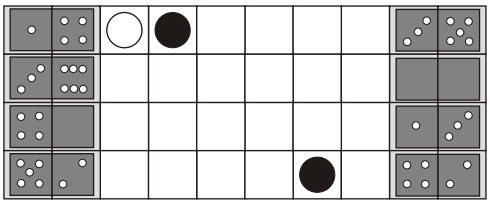
Players strategically place the four missiles face down on the board, one in each column, so that they cover the eight squares of the missile silo. The missiles are oriented so one number is facing the player, and the other is facing the opponent.

The number closest to the player is the "travel distance." This determines how far the missile will travel toward the opponent. If a missile has a travel distance of 4, for example, it is aiming for the square on the same column a distance of 4 squares away from the player. The number away from the player is the "missile power." Missiles with a single blank must use the blank for the missile power. The double blank missile is a unique piece (see below). When players have placed all of their missiles down, the battle begins. Players flip all of the missiles face up at the same time, and calculate the round.

Step 1 – Calculate all missiles without blanks. Use the checkers to claim squares missiles are aimed at. If two missiles are aimed at the same square, the missile with the higher missile power wins the square. If they both have the same missile power, the square remains unclaimed. Nothing happens if players hit an existing checker using a missile without a blank.

Step 2 – Calculate single blank missiles. After all the double-number missiles are used, players can now see if any marks get erased. Use the travel distance to see what square is targeted, and if an opponent's checker is there, it gets removed from the board. Nothing happens if a blank targets a friendly checker or an empty square.

Step 3 – Calculate the double blank missile. If a player has used the double blank, he can choose *any* opponent's checker in that column to remove.



Example of play. The players are starting from a blank board and have just revealed the missiles shown. In the top row, both White (left) and Black (right) mark two squares. In the second row, Black uses his double blank to remove the White mark that would go on White's third square. In the third row the mark that would go on Black's third square is removed by White's blank. In the bottom row both players compete for White's fifth square, but it is won by Black because of his greater missile power.

At the end of the turn, if a player has four squares in a straight line, horizontally, vertically, or diagonally, then he wins. Otherwise, players remove the used missiles into a discard pile, and draw another four missiles to continue. If players both get four squares in a straight line at the same time, play continues until only one player has four in a straight line.

Once the missile yard has only four remaining missiles to draw, re-shuffle all 28 missiles together and refresh the missile yard. The game continues until one player gets four in a row. ■

2004 Game Design Competition: Shared Pieces

Abstract Games magazine, together with About Board Games is sponsoring the Fourth Annual Game Design competition, this year with the theme of Shared Pieces. The goal is simple: design a great two-player game with shared pieces using pieces most people are likely to have around the house. Prizes will be awarded to the top two games, as chosen by a panel of judges from around the world. First prize is a trophy and a one-year subscription to *Abstract Games*. The top two finishers will be submitted to a variety of game publishing companies for their consideration. In addition, the top two games will be published on About Board Games and in *Abstract Games*. Additional entries may also be published in the same outlets. About Board Games and *Abstract Games* retain non-exclusive rights to publish any entry in the contest.

Official Rules

1. Games must be designed for play on an easy-to-replicate game board, using checkers, Go stones, Chess pieces, Poker chips, dice, or other items likely to be found in the average gamer's collection. (Examples of easy-to-replicate boards include any board that is based on squares, equilateral triangles or regular hexagons.)
2. Games must be designed for two players. Additional players are allowed, but cannot be mandatory.
3. Games must include shared pieces. That is, no player will have pieces that are his exclusive right to move. Examples of games with shared pieces in which the right to move a piece(s) depends on location on the board are Mancala and Martian Chess. An example of a game in which pieces are shared but the players have different objectives is Phutball. Other examples of games with shared pieces are Zèrtz and Trax. The definition of game with shared pieces is therefore quite broad. About Board Games and *Abstract Games* reserve the right to disqualify games which fail to follow the spirit of the theme.
4. Entries will be judged by a panel selected by About Board Games and *Abstract Games*.
5. Winners will be determined using the same system employed by the International Gamers Awards to determine the winners of the IGA's. For more information visit this page: http://boardgames.about.com/library/bl-process.htm.
6. Game rules must be no longer than 1000 words plus necessary diagrams.
7. Any games submitted to previous game design competitions sponsored by *Abstract Games* and About Board Games are ineligible and may not be resubmitted.
8. Entries must be received by e-mail (plain text, please—no attachments other than .jpg image files will be opened) at boardgames.guide@about.com. Entries will be accepted beginning December 1, 2003, but no entries will be accepted later than December 31, 2003, at noon Eastern US time. Any entries received after that time, regardless of reason, will not be considered. Entries must include the designer's name, e-mail address, and postal address. A maximum of two games per designer will be permitted. If illustrations are required to explain the rules, please post the illustrations to a website and include the URL with your entry, or attach them to your submission as .jpg image files. No entries will be accepted by postal mail.

If you have any questions, please e-mail them to boardgames.guide@about.com.

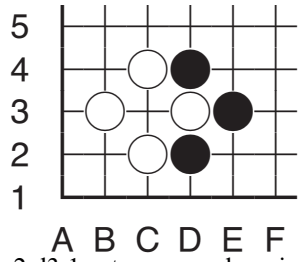
Loopy Games

by Paul Yearout

With few gestures to the contrary (*AG5*, p. 5), Go has suffered grievously in the pages of *Abstract Games*: Cathedral strong elements of Go (*AG3*, inside front cover); liberties and eyes are baggage to be discarded (*AG5*, p. 6); Gonnect is thrice superior to Go (*AG6*, p. 18); *ko* is a contradiction (*AG12*, p. 22).

The latter is particularly mysterious, the *ko* rule neither gainsaying other rules nor introduhas cing inconsistencies. Such references to *ko* suggest lack of appreciation for the perceptiveness of an ancient rule-maker and for slight terminological ambiguity, topics worthy of some explication.

Ko is a name of the diagramed shape.



It allows 1.c3:1, 2.d3:1, a two-move loop in the game tree which, once entered upon, can continue endlessly. Elementary introductions to Go misleadingly state that the rule of *ko* forbids entering that loop. That is, 2.d3:1 cannot follow 1.c3:1. The actual rule is much broader, banning loops of any size: "It is illegal to play in such a way as to recreate a *previous* board position from the game, with the same player to play." (Official American Go Association Rules of Go, 1991, italics added).

Referring to the above diagram as "typical," a comment on the rule continues, "Rarely, multiple *ko*'s or other repetitive situations will arise; the principle for handling them is always the same: the players must avoid repeating the full-board position." No "other repetitive position" has ever been shown to me. A simple one turns up in the unlikeliest of Go variants: the 2x2 board.

Considering symmetries, Black has but one move, shown above left, with two responses for White: 1.a1, 2.a2, 3.b2:1, a win for Black, or 1.a1, 2.b2, with the appearance of *seki*. Imposing a no-pass rule (or just continuing, as is possible in Go) 3.a2, 4.b1:2, 5.a1, 6.a2:1, shown above right. Now, 7.a1:3 is illegal, as the position of move 1 would reappear, all without *ko* shapes or alternating captures. (Putting move 5 at a2 rather than a1 avoids the loop, the single black stone having rotated to a2. Twice more around the park, *mutatis mutandis*, reveals an astonishing 25-move loop in the tree of this insignificant game.)

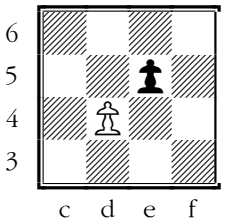
Short-sightedly restricting the *ko* rule to the two-move loop, as does Gonnect (*AG 6*, p. 17) or banning many points from immediate reentry, as does Alak (*AG13*, p. 10) invites longer loops of multiple *ko*'s. That is most easily shown in Alak, one-dimensionality shearing away four of the *ko* shape's seven stones:

1.a, 2.l, 3.g, 4.b, 5.k, 6.f restores this position within the rules, revealing to the authors the declared invisibility of loops in six moves. A longer board with additional *ko*'s acting as rest stops between other go-arounds could yield loops so large that return to a previous position might go unnoticed.

The same configuration, with the usual *ko* shape, transfers intact to Gonnect, where the wider board allows a great variety of such formations. These two games, choosing different inferior versions of the rule of *ko*, are punished with incompleteness of their rules. Orbit (*AG12*, p. 22) carries the *ko* rule even further, avoiding loops by forbidding movement to some points even though no captures had been made from them.

Excessive loopiness is not, in itself, a detriment, being, indeed, a characteristic of many games. Chess has sixteen initial two-move loops (each side moves a knight out and back) that can be much enlarged as the knights tour the center of the board before returning home. Chess provides for a draw after three trips around a loop, most frequently perpetual check. And the fifty-move rule may well forestall very long loops in some blockaded positions.

Variants of standard Chess usually carry along the three-fold repetition draw. Dynamo Chess (Pritchard, p. 98) adds short-loop prohibition as well.



The Pawn at d4 can move to e5, pushing that Pawn to f6. Black's reversing that move would restore the original position, a procedure expressly forbidden and sometimes called the *ko* rule. Other loops, such as perpetual check, might still occur, too.

Where loops can arise easily, they may be discouraged without being completely forbidden, as in Go. Heaven and Hell (*AG8*, p. 10) makes triple repetition a loss, encouraging exit from a loop, while Xiang Qi (Pritchard, p. 346) somewhat vaguely requires the attacking player to vary the move, without specifying how long one may stay in the loop.

Lines of Action has many hundreds of initial two-move loops (e.g., 1.b1h1, a2c2, 2.h1b1 c2a2) and multitudes of longer ones, belying their claimed rarity (*AG3*, p. 2) and strongly supporting the case for a loop-handling rule in that game, preferably the chessic draw, as Arrausi suggests, rather than the ban of a *ko* rule. ■

Reference

Pritchard, D. B. (1994). *The encyclopedia of chess variants*. Godalming, UK: Games & Puzzles Publications.

We never meant any disrespect to the venerable old game of Go. I had always thought of it as one of the very few "perfect" games, which arise naturally—as there as triangles and squares, so there is the game of Go. Hex is another game in this category. Perhaps they are played elsewhere in the universe where there are aliens that share the human propensity for intellectual competition. (This isn't my idea, but I forget who first made the suggestion.) The next game, Snort, is a Go-like territorial game that is certainly not loopy! –Ed.

Snort

...a variety of abstract farming

by Ralf Gering

The game of Snort was first described by the English mathematician John Horton Conway in 1976 in his book *On Numbers and Games*. Although Conway claimed the game was invented by a certain **S**imon **Nort**on, the name may allude to its rules, which are explained by Conway as follows:
"On alternate weeks Farmer Black is in the bull market buying black bulls, and in the intervening weeks Farmer White will be found buying white cows. They jointly rent a certain farm and intend to put each herd in a separate field. Of course they mustn't put bulls and cows in adjoining fields [Otherwise they would angrily **snort** at each other. – R.G.]. *That farmer loses who is unable to find a suitable open field for his latest purchase"* (Conway, 1976).

A game with almost identical rules was published by Gabriel Publishing in 1978 and named British Square (Troyka, 2002). Snort also was independently reinvented in December 2001 as Cats & Dogs by Chris Huntoon (Neto, 2002).

Comparison with other Games

The strategy of Snort has much in common with those of other territorial games such as Go, Orbit, and Wong's Game. In Snort "territory" stands for vacant squares, which can no longer be occupied by the opponent, only by the player who "controls" them. The player who at the end of the game owns more territory wins.

The analysis of Go and Orbit is complicated considerably by the possibility of capturing stones. Snort, however, has extremely simple rules, so that it is particularly suited for explaining fundamental principles of abstract games in a comprehensible way. "Making territory," the object of the game, is not clouded by competing goals, such as "capturing enemy pieces." Snort has the advantage of simplicity.

At first glance Col (Conway, 1976) and its orthogonal variant called Dominono (Gardner, 2001, Molnar, 2002) resemble Snort closely. Again, the object is to be the last player able to complete a move. Contrary to Snort, it is not permitted to place your own piece on a square that is adjacent to another friendly piece. Played on a rectangular grid, the object is *not* to make a domino with your own pieces. As in Snort, the second player can force a win by using a mirroring strategy, if the game is played on a rectangular board with even-numbered sides. Even on odd-numbered boards the second player in Dominono has a decisive advantage. The first player can break the symmetry by playing on the center square, but this would be disadvantageous because it would reduce his potential moves by four squares, instead of only by three or by two if he had played at the edge or in the corners. The symmetry-breaking move causes defeat.

Point Scoring

The size of a victory can be measured in Snort by counting the number of moves that can be made by the winner after the last move of the loser. A comparable point-scoring system is possible in any of the following two types of games:
(a) The winner is the last player able to move, on condition the winner will eventually also run out of moves. Examples of this type of game are Konane (traditional, Hawaii), Amazons (W. Zamkauskas), and Forge (M. Howe). These are "slow" games, in that players try to protract the end of the game by creating a reserve of moves, i.e. "territory."
(b) A certain goal area has to be reached to succeed. Examples are Salta (C. Büttgenbach), Alapo (J. Tranelis), and Octi (D. Green). These are "fast" games, in that speed is the deciding factor.

Balancing the Game

As shown in the following table, Snort, played on a rectangular (*mxn*) board, suffers from a big first-move advantage.

m/n	1	2	3	4	5
1	+1	+2	+3	+1	+2
2	+2	–1	+2	–1	+2
3	+3	+2	+2	+2	+2
4	+1	–1	+2	–1	+1
5	+2	+2	+2	+1	+2

Table 1: Result of perfect play on an mxn *rectangular grid. (e.g., +2 means that the first player wins by two points.)*

Four solutions can be considered:
(a) *Komi.* This is the traditional Japanese way to compensate for the initial advantage in moving first in a game of Go. A generalized definition is that the disadvantaged player receives a number of points before the game starts which are taken into account after the game has ended. For instance, 4.5 *komi* for the second player means that the second player gets four additional points and wins in case of an equal score (so no draws are possible).
(b) *Pie Rule.* This is well known from connection games such as Hex or Trellis. In case of a first move advantage, the second player usually decides after the first piece played which color he takes for the remaining game. In case of a second move advantage, the first player decides after the first turn of both players whether he wants to swap sides or not.
(c) *Unfair rules to make the game fair*. The most advanced rules of Renju combine this method with a modified pie rule.
(d) *Match play.* Two games are played, in which each player starts once. The results of both games are totaled.

Except the 'unfair rules method' all solutions can be applied to Snort.

Board Geometry

The next section discusses basic techniques of good play on a square grid. However, the following problems arise on such a board:

(a) On an even-order board (say 8x8), the second player can mirror the first player's moves and thereby assure himself of eventual victory.

(b) On an odd-order board the first player can occupy the center square for his opening move. After that, the first player can copy the second player's moves for the rest of the game, and by this move-stealing strategy eventually win by one point.

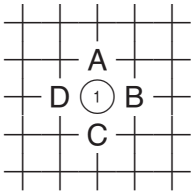
To thwart these destructive strategies, it is necessary to use odd-order boards which have a first player's advantage of at least two points, and then either the second player must receive at least 1.5 points of *komi*, or the pie rule must be applied, or a match of two games must be played. The larger the advantage of playing first, the easier it is for the second player (!) to spoil his opponent's move-stealing strategy, if he gets an appropriate compensation.

In my experience, a board of 11x11 squares is large enough to produce a challenging game.

Snort Strategy Step by Step

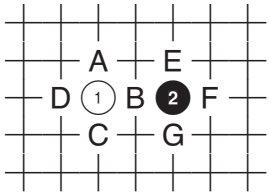
Note: Japanese Go terms that can be applied to Snort are given in brackets, and Snort play is shown on intersections rather than in squares, emphasizing the close relationship between the two games.

Concept 1: Influence ("atsumi*")*



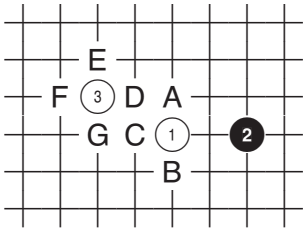
The white stone (played somewhere in the middle of the board) exerts influence in four directions: A, B, C, and D. No black stone may ever be placed on these squares.

Concept 2: Erasing Influence ("atsumi-keshi*")*

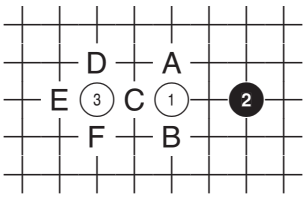


The black stone at 2 neutralizes one quarter of White's influence, while creating Black influence at E, F and G. B has now become a neutral point ("*dame*"), which can never be occupied by either player.

Concept 3: Extending Influence ("hiraki*")*

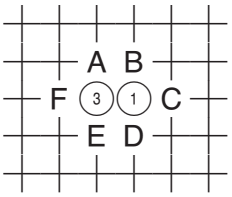


White extends his stone at 1 by jumping by the small knight's move ("*kogeima*"). Now he holds influence from A to G.



Or White can jump to 3. This is the one-point jump ("*ikken-tobi*"). White has influence from A to F.

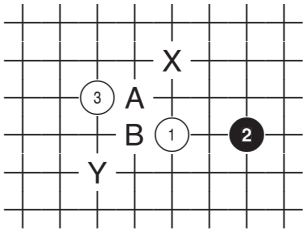
Concept 4: Overconcentration ("kori-katachi*")*



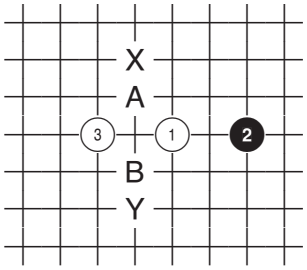
2 elsewhere

White 1 and 3 create bad shape. White has only six squares of influence, none of which could be turned into territory in the next move. This is inefficient play.

Concept 5: Points of Exchange ("miai*")*

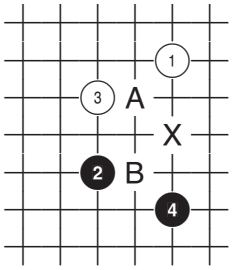


If Black plays at X, then White places a stone at Y, which turns B into his territory, because Black can neither play at nor neutralize this square. Vice versa, Black at Y is followed by White at X, thus securing territory at A. X and Y are said to be "*miai.*" (For a mathematical definition of "*miai*" see Nowakowski, 1996, pp. 247-248.)

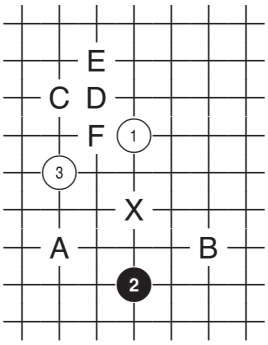


Again, X and Y are "*miai*". Either A or B will eventually become White's territory.

Concept 6: Multi-purpose Moves



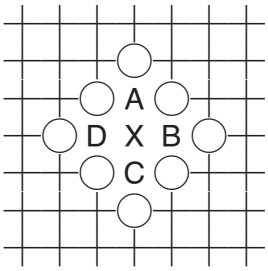
After Black 4 X has become an important square. Any player, who succeeds in placing a stone there makes one point of territory, either at A or at B, while at the same time preventing his opponent from gaining a point.



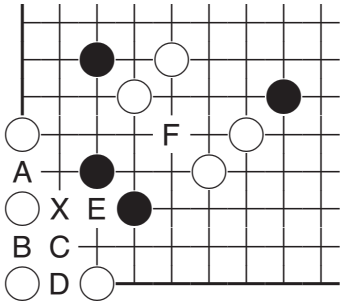
Black at X makes A and B *miai*, while forcing White to play at C, D or E, if White wants to secure territory at F with his small knight's move to 3.

Concept 7: Counting the Value of a Move

As in Go endgames, it is important to determine the value of a move in relation to *sente* and *gote*. *Sente* is described as the "right" to choose where to play next; the other player must reply to such a move directly if he does not want to lose too much. *Gote*, the opposite of *sente*, is to play second in a local situation or to have the last move in an encounter.



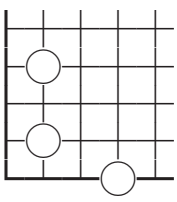
The white stones form a large territorial framework (*"moyo"*). A white stone at X creates four points of actual territory (A-D), while a Black invasion at X (*"naka-de"*) reduces White's potential territory to zero. Thus X is worth four points in *gote*.



White at X is combining attack and defense. It is worth five points in *sente* (A-E). Black must probably defend at F. If it is Black's turn, he should play at C or X. ■

Snort Problem

What is the best move for White (*"tesuji"*) in this local situation? (Solution on p. 26.)



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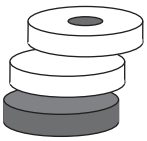
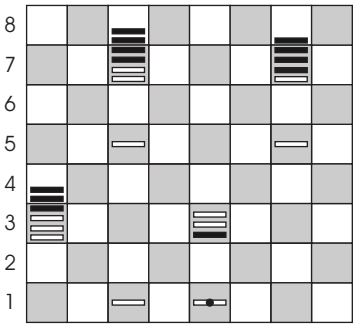
Bashne Problems

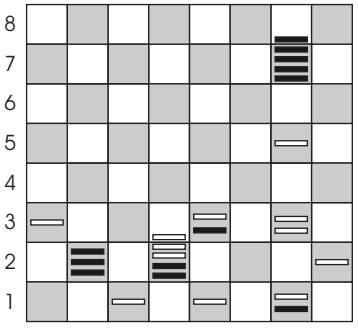
by Anatholy Zbarj



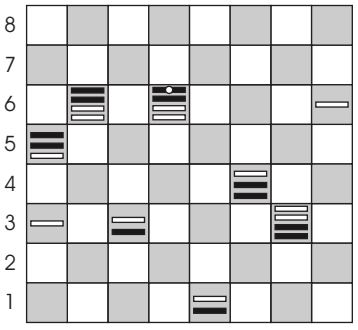


White to play and win in each.

Problem 1



Problem 2



Solutions on p. 28.

Problem 3

Pottery figurines playing Liubo. Han dynasty, 206 BCE - 220 CE. Unearthed at Lingbao, Henan. From Henan Museum, Zhengzhou.

We Played Liubo Last Night!

....A Mysterious Game

by Jean-Louis Cazaux

e-mail: jean-louis.cazaux@laposte.net
http://www.chez.com/cazaux/

Board games, like animal species or human languages, can become extinct. Examples of board games which have disappeared and whose origins remain obscure are numerous. Among them, the Chinese game Liubo is one of the most intriguing. This game was played in ancient China, at least as early as the Zhanguo era of the 4th. century BCE and maybe as early as the 7th. century BCE. Liubo is mentioned in the *Analects* of Confucius, who lived around 500 BCE. Apparently it was very popular during the Han dynasties (207 BCE-220 CE), when the best players were well respected and belonged to an organization. The game later vanished, probably outshone by the Chinese adaptation of Nard (a Backgammon ancestor) coming from India and Persia when the Tang rulers (618-907 CE) reopened the Silk Road. The very last reference dates from the Song time (before 1162 CE), where it was referred to simply as an "old game."

Archaeological evidence is not scarce, and there are quite a few literary references. The *Gu bo jing* (*The Book of the Old Stick Game*) from the Later Han times (23-220 CE) described the rules. Unfortunately this work is lost, and its content is only known from later references. The original rules are nowhere else described. Especially intriguing is the board, whose pattern is found in other artifacts, such as the famous "TLV" mirrors, for example. The board's cultural significance is fairly well explained and understood, but it still resists delivering any clue on how it could have been used for play! Interested readers are invited to refer to the excellent reconstruction in Röllicke (1999), which I used as support for this article. Many other theories have been advanced to explain what kind of game Liubo was. Murray (2002/1951) does not refer to it directly by name, but seems to evoke it with "Luk tsut k'i," or the Six- Men Game, which he presents as an alignment game much like Morris. For many, Liubo is the forerunner of Xiangqi, the Chinese Chess. Today, most authors and specialists, for example, Lhôte (1994), Parlett (1999), and Li (1998), believe, with reason, that Liubo was probably a chance game, a sort of race game with captures.

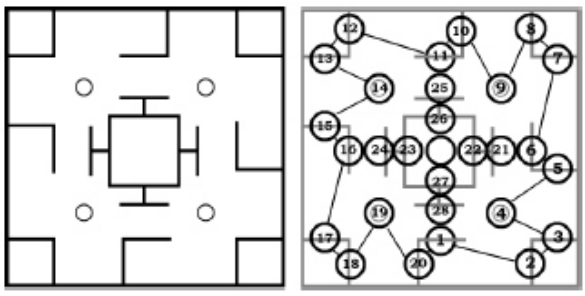
The Liubo board and its classical "TLV" pattern, which is also found on Han bronze mirrors.

Following on from the fundamental work done by scholars, orientalists, and archaeologists, this article presents merely the viewpoint of a game player. The purpose is simple: game playing. I propose a speculative reconstruction of the rules in the same spirit as those done for the Egyptian and Mesopotamian games of Antiquity. Although the resulting rules are entirely artificial, my hope was that they would lead to some interesting observations. My first step was to make a board and the necessary pieces and sticks. Then, every point of the rules was carefully play tested. Surprisingly, the results delighted my partners and me.

Equipment

The board is characterized by the "TLV" pattern that is also found on bronze mirrors from the Han dynasty. The "V's" can be recognized in the four corners of the board. The "L's" are the hooks in the middles of the sides. Their orientation seems to suggest counter-clock wise movement, as for many other race games, such as Indian Pachisi, Korean Yut, and so on. The "V's" and "L's" are distributed on the periphery and cut the periphery into 12 segments (*qudao*). These segments have been related to the *shenggou* cosmological system and the foundations of the Chinese calendar. To this system also belong the North-South and East-West axes of the board. The "T's" surround the large central square, and they could be used to indicate supplementary stations. The *Fangyan* from Yang Xiong (53 BCE-18 CE) confirms that stones were moved on angles and line segments over the board. In addition to the line segments, there are four small circles. Finally, the central area is reminiscent of Earth encircled by the sky with its constellations. This was most probably a goal to be reached.

All this allows at least 28 numbered stations distributed around the center of the board, plus an extra station in the central square. The number 28 has great astronomical resonance as it is the basis of the lunar calendar and is the number of Ancient Chinese zodiacal constellations. The board was also used for divination, as is the case for many other race games in other civilizations. A wooden slip was excavated in a tomb at Yinwan in 1993 presenting a Liubo-like diagram along with a chart of characters addressing several oracles. A full explanation of the divining process has been recently proposed in Zeng (1999). Although there is no reason for the moving sequence to be identical for both the game and the divination, Zeng does shed some light on the allowed positions and the paths between them, leading to our proposal of this race scheme.



An attempt to see a circuit in the Liubo pattern.

The game material was comprised of two sets of stones, or *qi*—six white and six black—made from ivory, bone, bronze, or jade, and six split bamboo sticks presenting flat and beveled faces. Sometimes the material includes one or two complex 18-sided dice as an alternative to the bamboo rods; 20 additional pieces, the *zhishi qi*, or "fish"; and several counting tickets. The tickets could have been rewards earned during the game. The role of the fish is less clear—perhaps they were records of capture, or maybe they were used in another dice game entirely. I have chosen to ignore them in the first attempt to reconstruct the game.

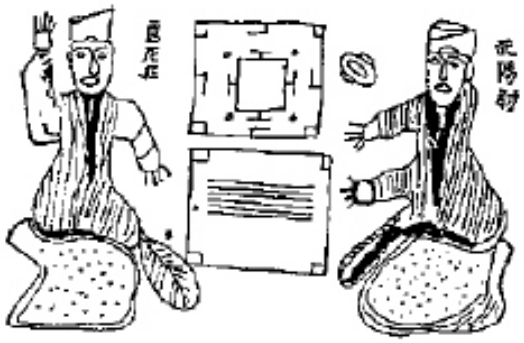
It is clear that movement was not determined by a haphazard throw of all six sticks. Instead, the sticks were arranged in a manner reminiscent of the famous hexagrams of the Tao philosophy and the *Yijin*g, or *Book of Changes*. These hexagrams, made of six continuous or broken lines, representing the *yang* and the *yin* principles, respectively, are a key component of Chinese astrology.

Suggested Rules

1. The game is for two players. One player takes the white stones, and the other takes the black stones. Each player starts with his six stones in front of him, the board being empty.
2. The stones are moved according to the throw of the six sticks, in which flat sides represent *yang* and convex sides represent *yin*. The sticks are thrown and read as two separate groups of three.
3. One counts 3 points per *yang*, 2 points per *yin,* and subtracts 5. An equivalent way is to count 1 more point than the number of *yang* shown. Therefore, the point count for a group of three sticks varies from 1 (all *yin*) to 4 (all *yang*).
4. It is compulsory to move two stones at every turn, one for each stick group. It is not allowed to move the same stone twice, except if this stone is the last controlled by its owner.
5. All stones enter the board on the same point (referenced with a "1" on the diagram above). The stones move counterclockwise around the board. The first count includes the starting "1" point. Stones can pass each other.
6. A stone that lands exactly on one of the first two cardinal points, "6" or "11," can, on the next turn, move directly across the board towards the opposite cardinal point, rather than continuing to follow the counter-clockwise circuit: from "6" it can go to "16," and from "11" it can go to "1." The stones continue moving counter-clockwise after crossing the board. The route across the board, including the central square as a station, is only six steps, whereas the roundabout route is 10 steps, so these shortcuts reduce the distance by four steps.
7. If a stone lands on a station already occupied by the opponent, the enemy stone is withdrawn from the board and given back to its owner. He will have to re-enter it again.
8. Two or more stones from the same side can occupy the same station. However, both may then be taken at the same time if the opponent lands on them.
9. A stone that stops on the central station can be promoted to an *owl*, which is distinguished by standing it up. A player is only allowed one owl at a time, so subsequent pieces entering the central station will not be promoted while the first owl remains.
10. The owl can be moved by one or two groups of sticks. The two numbers should be played separately, and it is forbidden to move the owl back and forth. The owl can move clockwise or counterclockwise, or cross the board in any direction without having to land first on a cardinal point and can even turn at right angles when it crosses the center.
11. A stone taken by the owl is withdrawn from the game and kept as a prisoner by the taker.
12. If an opposing stone takes the owl, the owl owner loses the game immediately.
13. The owl owner also loses the game if, after his play, the opponent has five regular stones on the board and the opponent himself does not have an owl.
14. If the opposite owl takes an owl, the game is not lost. The owl is degraded, removed from the board, and given back to its owner, who will have to re-enter it as a mere stone.
15. When a stone completes its loop and lands on or passes first station ("1"), it stays on board and begins a new loop. At this time a prisoner is freed and given back to the player who completed the loop, who may reintroduce it to the board on a later turn.
16. A player makes an immediate extra throw after throwing a 1-1 or a 4-4, or after completing a full loop with a stone, or after promoting a stone into an owl.
17. A player wins by holding prisoner all six opposing stones. This is considered to be a "large" victory.

Comments

Rule #2: Assuming that the sticks should be read three by three, they form two trigrams. That could explain the role of the auxiliary surface, the *boxi*, often represented beside the board and between players. It could have been used to arrange in order the 2x3 sticks. The 2x3 sticks offer 2x8=16 possibilities. This would fit with the 18-sided die that is known to be an alternative to the sticks. The die has 16 numbered sides plus two special sides at its poles, engraved with ideograms for special functions. The numbered sides of the dice model the throw of the sticks, although the probabilities are not exactly the same in both processes.



Drawing showing two players at play.
The boxi *is seen beneath the Liubo board.*

Rule #3: This way of counting is completely hypothetical. I have tried to accommodate the 3 and 2 points system traditionally employed for the *Yijing* divination process. The possibilities range from 1 to 4, with 1 and 4 three times less probable than 2 and 3. For my rules to work, it is necessary to have 1 achievable.

Rule #4: Play testing has shown that it is not suitable that a single stone moves using both groups of sticks.

Rules #5 to 8: The principle of a single entrance is copied from Yut, the Korean race game, called Nyout by Culin (1991/1895), Murray (2002/1951), Bell (1979/1960), and their followers. It is my personal intuition that Yut could be connected with Liubo. I find intriguing their common astrological symbolism, their apparent role in divination, the fact that each player has the same number of pieces as sticks, and their geographical proximity. Also, the Yut board has exactly one central region surrounded by 28 positions that are exactly arranged as in this reconstruction. This may be a coincidence, and I am not saying that Liubo was the ancestor of Yut. It could just as well be the opposite, or both may have emerged from an older game.

Rule #9: This is inspired by a commentary by Hong Xingzu (living under the Song) on the "*Zhao hun*" poem in *Chuci*, which quoted the introduction of *Gubojing*: "When a stone gets in the water, it is stood up and is called an owl" (Fu, 1986). There are other interpretations of this passage, which do not corroborate the way the owl is obtained: an 18-sided die is used, and the owl promotion is obtained by pure chance. However, several special things occurred then in the "central water," like "eating fishes," which probably meant getting a reward. I consider this promotion mode as a valid possibility. In addition, it makes the play interesting because the control of the central square becomes essential. No text ever mentions more than one owl between the players, so this is an extrapolation for playability.

Rule #10: It is logical, and confirmed by play testing, for the owl could move more easily than regular stones in order to catch them.

Rule #11: This was inspired by many citations that led to an understanding that the powerful owl piece was eating the stones.

Rule #12: The owl is both powerful and fragile. There are several allusions again. For instance, in the *Han Feizi* it is said, "In order to win, he must kill the owl." This is an attractive feature of the game. The owl owner has an obvious advantage, but he is always under threat, and may have to decline a capture if he cannot place his owl in safety. Was the owl a model for the Chess king?

Rule #13: This is an attempt to accommodate recurring comments, like the following in the *Zhanguoce* (*Strategies of the Arguing Realms*): "If the owl is not able to defeat five opposite stones, clearly, then it has lost." Practically, that means that the owl owner, who is leading the game, must pay attention at the beginning of the game. The danger is over as soon as he has captured a few stones.

Rule #14: No text supports this rule, but it is necessary if one allows both players to possess an owl simultaneously. Such a capture cannot be the end of the game because it is rather easy to capture an owl with an owl. As a result, it turns out that the game is subject to very pleasant changes of fortune. The first player to promote to an owl does not have a guaranteed victory, for there is often the possibility for his opponent also to obtain an owl. The two owls never stay too long, and the second player has a real chance to seize the lead if he can capture the first owl.

Rule #15: This is a free interpretation of an obscure passage from Hong Xingzu's commentary, which refers to "two fishes returned back." My understanding is that captured stones could be freed if something was achieved. That thing could have been completing a full run: in the *Yiwen leiju* (557-641) it is said "stones must have gone over all ways on the board in order to succeed."

Rule #16: These conventions are the results of extensive play testing. They make the game more dynamic.

Rule #17: This is inspired again by the Hong Xingzu commentary: "If a party won six fishes, then that was the large victory." My interpretation is to make a direct connection between the fishes earned and the stones captured. Another support for this rule is logic. Indeed, the natural purpose of the game is to capture all the opposing stones in order to win.

Conclusion

To my knowledge, this set of rules constitutes the first published attempt of a full reconstruction of Liubo. The result is a game belonging to the vast category of race games, or, more adequately, *running-fight games,* as the goal strictly is not to win a race but to make captures along a track. The play is varied and not simple because there are several ways of winning or losing. I think this is plausible because had it been straightforward, the method of play would not have been lost. Of course, the whole thing is pure speculation, and the actual method of play may have been quite different. For example, the various proposed reconstructions for Senet, or the Royal Game of Ur, are quite different, although they are, all of them, based on solid arguments. Bell's reconstruction of Aztec Patolli (Bell, 1979/1960) appears now completely off track in light of what is known of the Bul family (Verbeeck, 1998).

A first observation, which surprised me, is that it is very natural and effortless to play on the Liubo board. I was expecting difficulties in memorizing the location of the different stations and possible paths, because, for years, I had been puzzled by the geometrical markings, unable to see any pattern for a game. Actually, everything becomes clear as soon as one starts to play. Doubting readers are strongly encouraged to reproduce my experiment and judge for themselves! Secondly, it has been shown that it is possible to take into account, more or less, most of the disparate clues that remain from literary sources.

Regardless of how closely these rules match the genuine rules, it can be confirmed that the Liubo material affords a very attractive and pleasant running-fight game. Last but not least, it has been a great satisfaction to see how modern players, completely unaware of Liubo's history and significance, have enjoyed this game. I can only wish that Liubo equipment is produced soon for the pleasure of board games lovers. ■

Two Immortals in a living Liubo play. Drawing on a tombstone.

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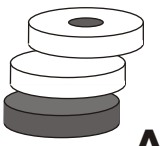


BASHNE

Analysis of a Variation

by Anatholy Zbarj

As in any intellectual game, Bashe has methods of opening the game leading to established positions. Very often both players strive for the same types of structures and compete for advantage. This is why it is advantageous to know theory.

The following open variation, leading to early fighting, is very popular in Bashne. *(See* AG3*, p.15 for the definition of "open" and "closed" variations. – Ed.)*:
1.c3d4 b6c5, 2.d4:b6 a7:c5, 3.e3d4 c5:e3, 4.f2:d4 b6c5, 5.d4:b6 c7:a5, 6.a3b4 a5:c3, 7.d2:b4 (Diagram 1). The opening is almost over. This position has appeared in many games.

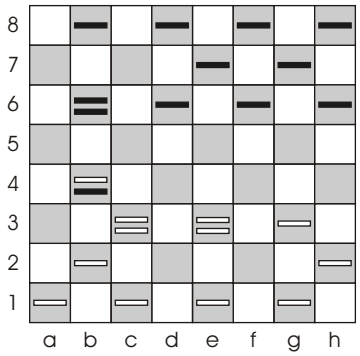


Diagram 1 – Position after 7.d2:b4

If Black proceeds logically and tries to free the black piece on b4, it allows White to seize the initiative. For example: 7....d6c5, 8.b4:d6 e7:c5, 9.c3b4 c5:a3, 10.e3d4 a3:c5:e3, 11.d4:f2 (Diagram 2).

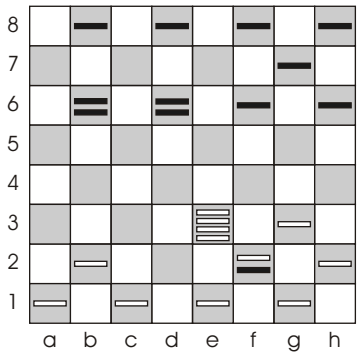


Diagram 2 – Position after 11.d4:f2

White has a powerful column of four on e3, which is poised to trap two or three black pieces. That is why, in actual games, the continuation from Diagram 1 is as follows: **7....f6e5, 8.g3f4 e5:g3, 9.h2:f4** (Diagram 3).

This position arose in the correspondence tournament games FBSLC-5 (1995) A. Zbarj (Kerch, Ukraine) – V. Cherepanov (Omsk, Russia) and FKSC-6 (1997) A. Zbarj – A Pakhomov (St. Petersburg, Russia).

From this position Black seems to gain an advantage after the following elementary combination: **9....d6e5!?, 10.f4:d6 e7:c5:a3, 11.c3:a5:c7:e5** (Diagram 4).

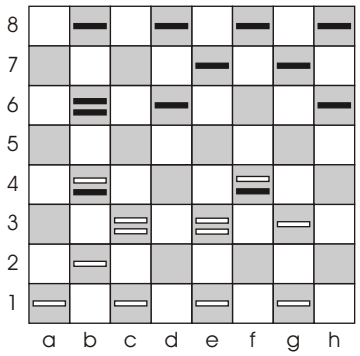


Diagram 3 – Position after 9.h2:f4

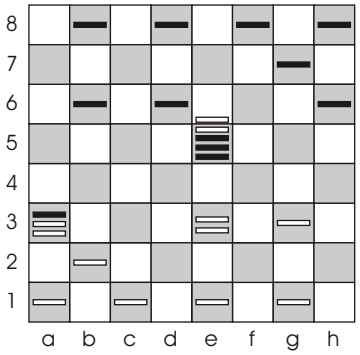


Diagram 4 – Position after 11.c3:a5:c7:e5

In the tournament game there followed: 11....d6:f4:h2. Black does not have any visible weaknesses. Black has two sets of two white prisoners at a3 and h2 and has a chance to free the three black pieces at e5. White's position seems hopeless. However, White has at his disposal the "quiet" move 12.b2c3!!, which solves all his problems. Black will now have problems keeping the two white prisoners at a3. In addition, White is threatening to free the two prisoners at h2 with e1-f2-g3. Anyway, to prevent the move 13.c3b4 *(followed by 13....a3:c5, 14.e3d4 c5:e3, 15.d4:f2 – Ed.)*, Black can try the disastrous 12....b6a5??. Both tournament games developed in this way: **11....d6:f4:h2, 12.b2c3!! b6a5??, 13.e5f6!! g7:e5, 14.c3d4! e5:c3, 15.e3d4 c3:e5, 16.c1d2 e5:c3, 17.d2:b4 a3:c5** (Diagram 5).

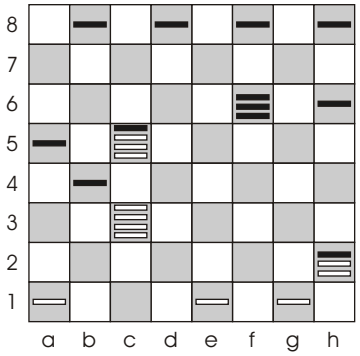


Diagram 5 – Position after 17....a3:c5

White is left with only four columns against Black's ten, but White's victory is not in doubt. The game with V. Cherepanov continued: **18.c3d4 c5:e3, 19.d4:f2 f6e5, 20.e3f4 e5:g3, 21.f2:h4 g3:e5, 22.f4:d6 e5:c7, 23.g1f2! c7:e5, 24.h4g5 h6:f4, 25.g5:e3 e5:g3, 26.f2:h4 h2:f4:d2, 27.e3:c1**.

In the game with V. Pakhomov White chose a different path to victory: **18.a1b2 b4:d2, 19.c3d4 c5:e3, 20.d4:f2 d2:f4,**

21.e3:g5:e7 f8:d6, 22.e7:c5, etc., and Black is lost.

It is more difficult to find the right solution for White in case Black moves **11....d6:f4:d2** from Diagram 4. Then, **12.e1:c3 b6a5**. Now White is unable to keep the three black prisoners unless he runs away with **13.e5d6?!** (Diagram 6).

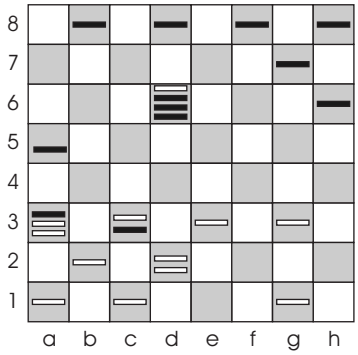


Diagram 6 – Position after 13.e5d6?!

Black must now use one tempo to liberate his three trapped pieces. This is very significant because it gives White time to organize a counterattack. Two continuations for Black seem to be most probable: **A. 13....d8e7** and **B. 13....d8c7**. In both variations the three black pieces are liberated, but in both variations White has time to dictate his own game.

Variation A: **13....d8e7?, 14.e3f4! e7:c5, 15.c3d4! c5:e3:g5, 16.g3f4 g5:e3, 17.d2:f4 d4:f2, 18.g1h2 f2:d4, 19.e3:c5:e7** (Diagram 7).

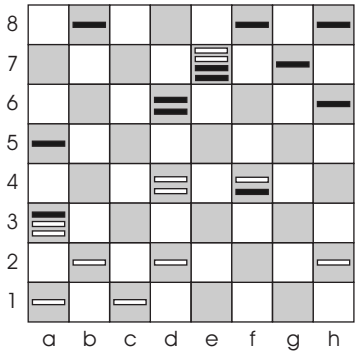


Diagram 7 – Position after 19.e3:c5:e7

White has the initiative, and consolidates it with the following sequence: **19....d6c5?, 20.d4:b6 f8:d6, 21.b6:d4 d6:f8, 22.d4c5 b8a7** (forced), **23.b2c3**. White will eventually win.

Variation B: **13....d8c7?, 14.e3d4! c7:e5, 15.d4:f6 d6:f4:h2, 16.d2e3 g7:e5, 17.c3b4!!** (Diagram 8).

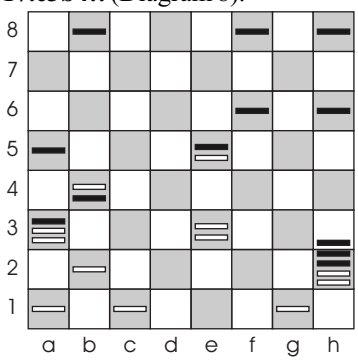


Diagram 8 – Position after 17.c3b4!!

White has few columns left, but continues to sacrifice, forcing the black columns into disadvantageous positions.

It is impossible for Black to win with **17....a5:c3** because after **18.b2:d4 b4:d2:f4, 19.e3:g5:e7** White gets a king and Black has insufficient force for a counterattack. The only possibility for Black from Diagram 8 is **17....a3:c5, 18.e3d4!**. Black has ten columns to White's five. Black now has two ways to capture:

Variation B1: **18....c5:e3, 19.d4:f2** allows White to create a powerful column of four in the center, and it is difficult to see how Black can fight it. A more difficult game for White follows from the second possibility.

Variation B2: **18....e5:c3, 19.d4:b6** (Diagram 9). It is necessary for White to play correctly, as any divergence from accurate play will lead to defeat.

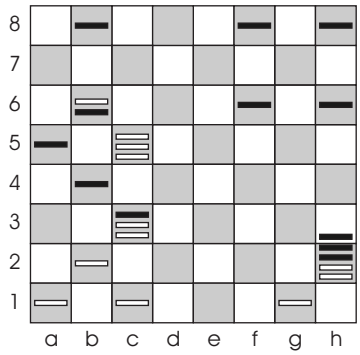


Diagram 9 – Position after 19.d4:b6

There is an interesting continuation: **19....b4:d6!?, 20.c5:e7:g5 h6:f4**. White loses with **21.g5:e3????** because it is followed by **21....a5:c7:e5:g3, 22.b2:d4** (Diagram 10).

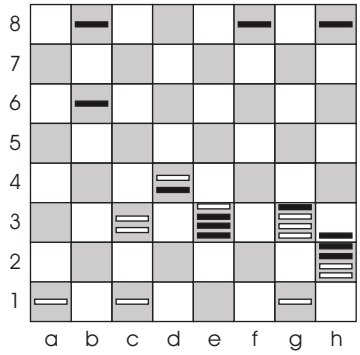
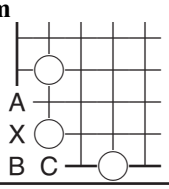


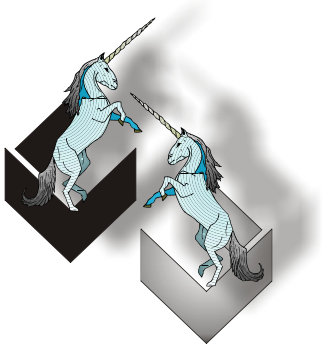
Diagram 10 – Position after 22.b2:d4

22....g3f2!, 23.d4c5? f2:d4:b2, 24.c1:a3 b6:d4, 25.c3:e5 e3d2 and Black will win. But White has a stronger continuation: **21.b2:d4!** (**21....f4:h6** is impossible because of **22.b6c7!**). **21....a5:c7:e5, 22.g5:e3 e5:g3**. We have the same position as Diagram 10, except that this time it is White's move rather than Black's. This difference allows White a winning continuation: **23.e3f4! g3:e5, 24.d4:f6 f4:d6, 25.e5:c7:a5**. A probable continuation for Black is **25....f8g7, 26.a5b6 g7:e5, 27.b6c7**. Black's position is hopeless. ■

Solution to Snort Problem

Descending to the edge at X, the one-two square, is best, because it enlarges White's territory by three points (A-C).





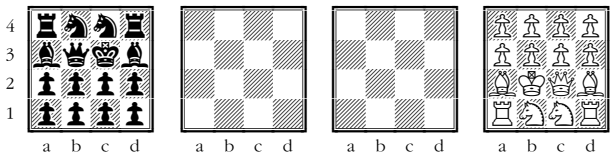
The History of 3D Chess: Part Six

The 4x4x4 Cube

by L. Lynn Smith

The 4x4x4 playing field is the oldest in 3D Chess. In 1771 Alexandre-Théophile Vandermonde applied the Knight's Tour to this configuration. But, although this particular playing field has been considered seminal in 3D Chess, it would be almost two centuries before someone developed a playable form. The basic reason for this was that though the field contains the same number of cells as the standard 8x8 field, their close proximity offered little room for both setup and development for standard Chess pieces.

In 1979 Enjoyable Hour Products offered one of the first games for this playing field. It consisted of the standard number of Chess pieces in the following start pattern:

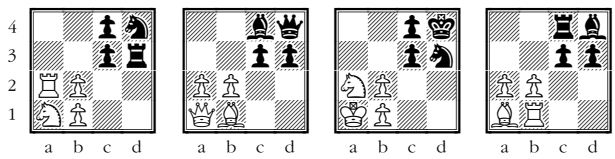


Level A ***Level B*** ***Level C*** ***Level D***

The Bishop slides diagonally; the Rook slides orthogonally. The Queen combines the power of both the Bishop and Rook. The King steps diagonally or orthgonally only upon its starting level. The Knight performs the classic 3D Hippogriff leap only to the next level. (The Hippogriff leap consists of an orthogonal step followed by a triagonal step.) The White Pawn steps one down orthogonally; the Black Pawn steps one up. Both capture diagonally upon their level, and freely promote upon reaching any cell of the opponent's starting level. At the time, this was considered one of the fastest forms of 3D Chess.

There followed many variations on this particular game. Some were developed into computer programs. The best known of these is Cubess by 3D Cubed Chess.

In 1999, after eleven years of development, Rick Hewson published the rules for Exchequer. It consisted of the standard number of Chess pieces in the following start pattern:



Level D ***Level C*** ***Level B*** ***Level A***

The Bishop slides diagonally; the Rook slides orthogonally. The Queen combines the powers of the Bishop and Rook. The King only steps orthogonally. The Knight only steps triagonally. The Pawn only steps orthogonally toward the far corner upon its level, both capturing and non-capturing moves. Upon reaching the cell of the far corner, a1 for Black and d4 for White, the Pawn promotes only to the Queen. Pawns do not change levels.

This game alters the players' perspective by having the pieces occupying opposing columns. Having the Knight forego its classic leap for a single triagonal step might be a disappointment for the average player, but it is a nice compromise for this restrictive playing field. It develops into a fast game because of the severely weakened King.

The following is a game played between Rick Hewson and Benjamin Good. The notation consists of the alpha-numeric designation of a cell upon its level followed by the level in parentheses. Commentary by Rick Hewson.

1.Pa2(c)-a3(c) Pd3(a)-d2(a), 2.Bb1(c)-a2(c) Rd3(d)-d1(d), 3.Ba2(c)xc4(c) Qd4(c)xc4(c), 4.Qa1(c)-c1(c) Nd3(b)-c2(c), 5.Pb2(c)xc2(c) Pc3(c)xc2(c), 6.Qc1(c)-b1(c) Pc2(c)-c1(c), 7.Qb1(c)-b3(c) Pc4(b)-b4(b), 8.Pb1(b)-c1(b) Bd4(a)-d2(c), 9.Ra2(d)-a2(c) Bd2(c)-d3(b, 10.Ra2(c)-c2(c) Qc4(c)-d4(c), 11.Ba1(a)xc1(c) Pd3(c)-c3(c) *(Black threatens White's Queen and Rook, but risks losing his Rook.)* 12.Qb3(c)xb4(b)+ *(White's Queen answers with check)* 12....Rc4(a)-c4(b) *(Black Rook to continue to threaten the white Queen and white Rook but may still lose the black Rook.)* 13.Qb4(b)-a4(c) Pc3(c)xc2(c) *(White's Queen backs off, and the black Pawn takes the white Rook.)* 14.Bc1(c)xd1(d) Bd3(b)xd1(d) *(White forces the exchange of black Rook for white Bishop.)* 15.Qa4(c)xd4(c)+ Kd4(b)xd4(c) *(White forces exchange of Queens.)* 16.Pb2(a)-b3(a) Pc3(d)-c2(d), 17.Pb2(d)xc2(d) Rc4(b)-a4(b), 18.Pb3(a)xc3(a) Bd1(d)xc2(d) *(Black makes a miscalculation, thinking he has a piece to stop the c3(a) Pawn.)* 19.Pb1(d)-b2(d) Bc2(d)-c4(b), 20.Pc3(a)-d3(a) Ra4(b)xa2(b)+ *(White forces Pawn promotion, while the black Rook takes a Knight and puts the King in check.)* 21.Ka1(b)-b1(b) Ka4(c)-a4(b), 22.Rb1(a)-b2(a) Bc4(b)-c3(a) *(Black tries to slow promotion of the white Pawn.)* 23.Rb2(a)-b3(a) *(White Rook supports the queening Pawn.)* 23....Bc3(a)-a1(a)+ *(Black Bishop checks King but is unable to mate, and Black continues to watch White queening the Pawn.)* 24.Kb1(b)-b1(a) Ra2(b)xa2(a) *(Rook takes white Pawn, allowing the Bishop to stay guarding the queening Pawn.)* 25.Pa3(c)-b3(c) *(White promotes another Pawn, thus Black has two queening Pawns to worry about.)* 25....Ba1(a)-a4(d) *(Bishop avoids King while continuing pressure on Pawn.)* 26.Rb3(a)-b4(a) Ra2(a)-a3(a), 27.Rb4(a)-b4(b)+ *(White Rook puts Black King in check.)* 27....Kd4(b)-d3(b) *(King moves to threaten upper queening Pawn.)* 28.Rb4(b)-a4(b) *(White Rook threatens black Bishop to prevent King from taking Pawn.)* 28.... Ba4(d)-a1(a) *(Black Bishop continues pressure on queening Pawn while avoiding white Rook.)* 29.Pb3(c)-b4(c) *(Black Rook protects Bishop from queening Pawn, while continuing to promote second pawn.)* 29....Ra3(a)xd3(a) *(Black Rook takes upper queening Pawn, but at the expense of losing a black Bishop.)* 30.Kb1(a)xa1(a) Pd2(a)-c2(a), 31.Pb4(c)-c4(c) Rd3(a)-d4(a), 32.Ra4(b)-a4(c) *(Rook supports the lower queening Pawn.)* 32....Kd3(b)-d3(c) *(Black King tries to stop queening Pawn.)* 33.Pc1(b)-c2(b) Pc3(b)xc2(b), 34.Pb2(c)xc2(b) Pc2(c)-c1(c),

35.Pc2(b)-c3(b) Pc1(c)-b1(c) *(White continues to threaten queening Pawn with Pawns.)* 36.Ka1(a)-a1(b) Pc4(d)-c3(d), 37.Na1(d)-b2(c) Nd4(d)-c3(c), 38.Pc3(b)-c4(b) Pc2(a)-b2(a) *(Black promotes Pawn weakly [moving to c1(a) would have been better], allowing white Knight to threaten black Rook and black queening Pawn while supporting the white queening Pawn. This move and Black's move 18, failing to notice the Pawn, proved to be game winning.)* 39.Nb2(c)-c3(b) Rd4(a)-d4(d) *(Black Rook avoids Knight while trying to stop Pawns.)* 40.Nc3(b)xb2(a) Nc3(c)-b2(b) *(Black makes final attempt to stop queening Pawn.)* 41.Nb2(a)-c3(b) Pb1(c)-a1(c)+, 42.Ra4(c)xa1(c) Nb2(b)xa1(c) *(Rook takes queening Pawn and Black Knight takes White Rook.)* 43.Pc4(c)-d4(c)+ Rd4(d)xd4(c) *(White Promotes to Queen and puts King in check—stopped by Rook.)* 44.Nc3(b)xd4(c) *(White Knight takes Black Rook so Black is unable to stop queening Pawn.)* 44....Kd3(c)xd4(c), 45.Ka1(b)xa1(c), Pc3(d)-c2(d) *(Black moves the Pawn as his only logical move, allowing White to capture last Black hope. White will obviously get a Queen, and Black will resign.)*

Afterword

The 4x4x4 cube was the first field that I made to play 3D Chess. For decades, I experimented with dozens of start patterns and move rules for each piece. Many were similar to previous attempts by other developers. Before the rise of computers, I tortured a lot of friends and relatives with my experimental games. I have always enjoyed this playing field; it offers an excellent platform for learning 3D Chess. ■

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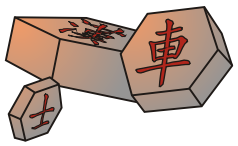
L. Lynn Smith wishes to add a special thanks to Dan Troyka and Rick Hewson, who tracked down a lot of the information for this article.

A very attractive set for playing Exchequer 3D Chess (and other 4x4x4 Chess games, for that matter) is available from Rick Hewson at http://www.3dchess.ca. Otherwise readers can e-mail Rick at threechesstic@yahoo or call on 1-888-563-3246 and ask for "3D Chess." – Ed.

Solutions to Bashne Problems

Problem 1: 1.g5f6 g7:e5, 2.e3d4 e5:c3, 3.d4:b2 c3:a1+, 4.c5b6 c7:a5, 5.e1h4 a5b4, 6.h4d8 b4c3, 7.d8a5 c3d2, 8.a5:e1 wins.
Problem 2: 1.g5f6 g7:e5, 2.d2c3 b2:d4:f2:h4, 3.g1f2 e3:g1+, 4.c3d4 e5:c3, 5.d4:b2 c3:a1+, 6.a3b4 wins.
Problem 3: 1.c3b4 a5:c3, 2.a3:c5:e7 d6:f8, 3.h6g7 f8:h6, 4.f4g5 h6:f4:h2, 5.e1f2 h2:f4, 6.f2:h4:f6:d8+:a5:e1:h4:f6:d8:a5:d2:g5 wins.

Janggi Addenda



by Malcolm Maynard

The following are some corrections, clarifications, and additions to my Janggi article in *AG12*.

Sequence of play. First, Han arranges his Horses and Elephants. Second, Cho arranges his Horses and Elephants. Finally, Cho moves first, with Han moving second, and then players alternating turns normally. This means that Cho does have a distinct advantage in openings, since he arranges his horses and elephants second and moves first.

Passing Turns. It was not mentioned in the article that in Janggi, players *can* pass their turn, unlike in other forms of Chess. The official rule of the Korean Janggi Association is that players may pass their turns at any time. However, since a player would normally pass a turn to avoid being forced into moving into a losing position, many players interpret the rule to allow a player to pass only to avoid checkmate or stalemate. For a player to indicate passing a move, simply take your General piece and flip it over. (Janggi pieces usually have the same designs on both sides.)

Position repetitions. As with Chess, you cannot have a repetitive board position, which would prolong a game indefinitely. Players can use the "three-move" rule of Chess to prevent an endless loop.

Bigjang *addendum.* If a player has 30 points or more and makes a *bigjang* move, he loses. This is an official rule that the Korean Janggi Association knows is faulty and is working to correct.

Komi. For *komi*, or handicap points, to determine *bigjang* draws in tournament play, Han is awarded 1.5 points, rather than Cho being penalized by 1.5 points. So, at the start of the game, Han has 73.5 points (pieces plus *komi*) and Cho has 72 points (pieces only).

Bakbo *conventions.* In *bakbo* (mating problems), Han is not necessarily one move from a guaranteed loss. This is, however, the most popular convention used for *bakbo* problems.

Display of board and pieces in diagrams. Han's pieces are normally shown as white ideograms on black pieces and Cho shown as black on white. Also, Janggi diagrams usually show Han at the bottom and Cho at the top. As with *bakbo*, this is the most popular convention and not an ironclad rule.

Movement of Generals and Ministers. To avoid confusion about the movement of Generals and Ministers, their movement should have been described as: *"The General/Minister can move* one point *along any orthogonal or diagonal line of its own fortress."*

"Speedier development" in set-up. To clarify "speedier development" arising from the initial arrangement of a player's Horses and Elephants: In Twin Ma (Horses) it simply means that both of a player's Horses can attack the other player's side of the board sooner; in Twin Sang (Elephants) both of a player's Elephants can attack the opponent's side of the board sooner.

Contacts. Mr. Kim KyoJin, author of the *Janggi Dosa* software, has changed his e-mail address to the following: janggidosa@yahoo.co.kr. Mr. Kim is currently working on a new version. If anyone wishes to contact me regarding Janggi, especially if you have access to Janggi books or material, please write to Malcolm Maynard, P.O. Box 18534, Delta, BC, Canada V4K 4V7; or e-mail malcolm@dccnet.com.

The Ability to Focus

I don't necessarily suffer from a serious lack of focus myself, but in comparison to the gamesters I have the privilege of knowing, I flounder when it comes to their sort of discipline. I am continually amazed at the singular devotion and dedication I witness when players have their attention directed to a game board before them. If I enter into a room and walk to stand before players intent on their moves, I become invisible as I wait for a simple greeting of recognition. I sense I have intruded on a sacred ritual as I receive a vague obligatory acknowledgment as the heads bob silently in unison and then return to the concentration of expert movements upon the board. Ah, yes, love is blind!

I have been known to search about in a park for My Beloved, who will have wandered off, only to find him with a companion on a far bench, a square board between them, oblivious to all else about them—including my calls. I have watched onlookers collect at festivals near my mate, curious to see what was drawing attention away from entertainers on stage. Bistro barristas have developed physical ailments from the strain of repetitively refilling empty cups during long durations of play. Empires could dissolve, civilizations crumble, but still the game plays on with its participants immune to the world's changes.

The thrills players experience seem to first overwhelm, then completely overtake them, and more mundane routines and practices are relentlessly superceded. While others concern themselves with the ordinary challenges of daily life, players remain innocent, their countenances exuberant and youthful, dispositions consistently optimistic. Surely they encounter dimensions of reality unknown to mere earthbound mortals as they delve ever deeper into their maneuvers. Those colorful pieces and shapes must be elixirs of well being, each an arcanum of agelessness.

The grail one seeks lies not in some mystical faraway land, but much closer. For those who experience surprise (or dismay) at their changing reflections with the passage of time, simply search your closets, loot your cupboards, raid your game chests—and focus! ~ Connie Handscomb

Chess is a form of intellectual productiveness; therein lies its peculiar charm. Intellectual productiveness is one of the greatest joys—if not the greatest one— of human existence. It is not everyone who can write a play, or build a bridge, or even make a good joke. But in chess everyone can, everyone must be intellectually productive, and so can share in this select delight. I have always a slight feeling of pity for the man who has no knowledge of chess, just as I would pity the man who has remained ignorant of love. Chess, like love, like music, has the power to make men happy. ~ Siegbert Tarrasch

Index

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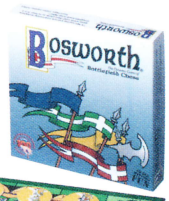

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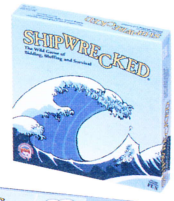

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