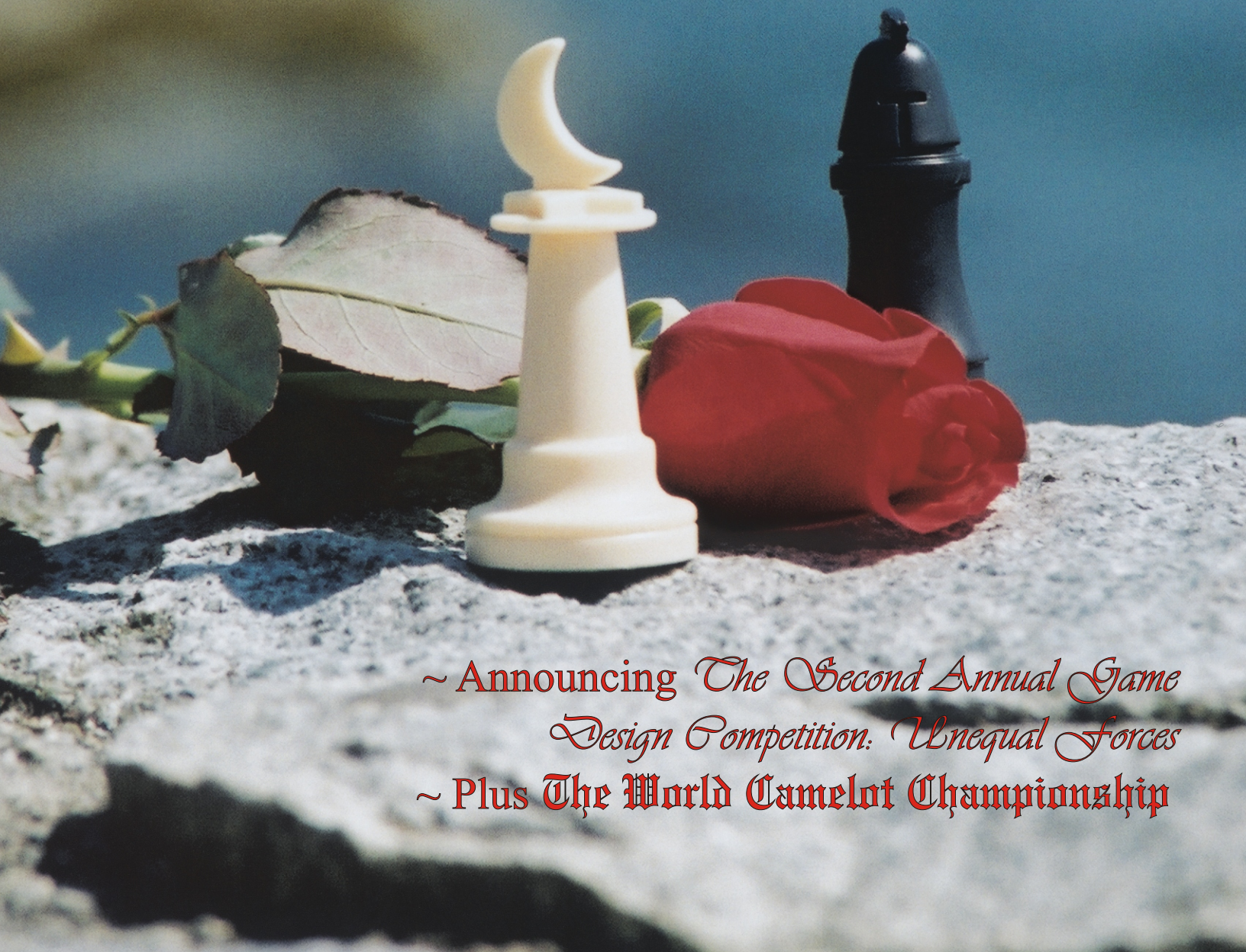


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Abstract Games

... for the competitive thinker



~ Announcing *The Second Annual Game
Design Competition: Unequal Forces*
~ Plus *The World Camelot Championship*

Front Cover

The image shows a white Wizard and black Champion from the game Omega Chess, which was invented in 1998 by Daniel Macdonald. Omega Chess is played on a 10x10 board with four additional squares, an extra square being diagonally connected to each corner. It is an extension of Orthodox Chess onto this larger board, with each side gaining two Wizards and two Champions. The Wizard has an elongated Knight's move, jumping to the opposite corner of a 4x2 rectangle. Fairy Chess players may recognize this as the Camel, a difficult piece to handle. However, the Wizard may also move one square diagonally, and this makes it much more flexible. Wizards, like Bishops, are restricted to squares of one color. The Champion is able to jump two squares in any direction, orthogonally or diagonally, and may also move one square orthogonally.

I heard about Omega Chess when it first came out, but I thought the extra corner squares and the unusual piece moves were a bit "gimmicky." I did not look at it closely at the time. Recently, however, I acquired a set primarily to play other games. The Wizard, with its crescent-moon top, brought to mind an Islamic cleric and would therefore stand in nicely for its Catholic equivalent, the Cardinal, in Grand Chess. As for the Marshal, the helmeted Champion is very, well... "martial." An Omega Chess set also does very well for Jetan. Obviously the King, Queen and Pawns would represent the Chief, Princess, and Panthans, respectively. Thereafter, a natural piece-equivalence scheme would be Knight-Thoat, Rook-Warrior, Bishop-Padwar, Champion-Dwar, and Wizard-Flier.

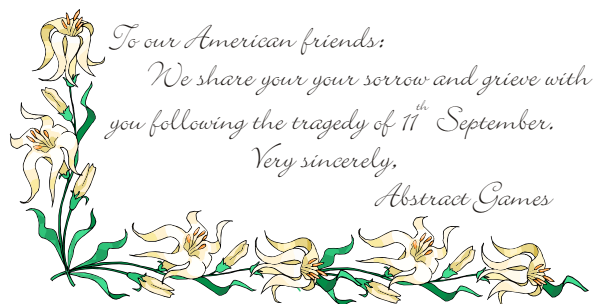
However, we did play some games of Omega Chess and were very pleasantly surprised by how good the game is. One needs to get used to the two new jumping pieces, but they seem to fit well into the game. They are worth less than a Rook, but perhaps a little more than a Knight on the larger board, and about the same as a Bishop. Comparisons with Grand Chess are impossible to avoid. I would say that Omega Chess typically has a slower, more strategic development than Grand Chess. The latter game has a collection of very powerful pieces, and its Rooks are mobile from the outset, meaning that development is fast and the openings are sharp.

One concern I had with Omega Chess is that the ending of Rook and King vs. King is now drawn because the defending King can take refuge in one of the corner squares. Nevertheless, I suspect that the larger board and greater number of pieces mean that it is still inherently much less drawish than the orthodox game. Interestingly, *because of* the extra corner squares, the ending of two Knights and King vs. King is now a *win* for the attacking player!

Buy an Omega Chess set to play Grand Chess or Jetan—at US\$19.95 the cost is very reasonable, and the large Staunton pieces are very nice—but also give Omega Chess a try. You may find yourself returning to it. Check the website at <http://www.omegachess.com/>, or write to Somac Inc., 207 Huron Street, Stratford, Ontario, Canada N5A 5S9. —KH

Contents

1. **Editorial**
2. **Letters and Game Notes**
4. **Game and Book Reviews**
7. **Alice Chess – Part 1**
by Peter Coast
9. **Reflections on Vernon Rylands Parton**
Inventor of Alice Chess
by Peter Parton
10. **Between Heaven and Hell**
Inspired by Alice Chess
by L. Lynn Smith
11. **The Game of Congo**
by Michel Boutin
12. **Salta – The Humanistic Game**
by Ralf Gering
14. **Twixt Tactics – Part 2**
by David Bush
17. **Hex Strategy – Part 4: Computer Hex**
by Cameron Browne
21. **Hexdame – A nice combination**
by Fred Kok
22. **Zèrtz – Strategy Guide Part 3**
by Stephen Tavener
23. **Moving on from Fox and Geese**
by John Beasley
25. **8x8 Game Design Competition**
Four More Games
by Kerry Handscomb
27. **The Grand Chess Corner**
by Tony Gardner
28. **Chu Shogi ...the game of lions**
by R. Wayne Schmittberger
29. **It's Only Natural**
by Connie Handscomb
29. **Index**



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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

Another year has passed, quickly it seems, and *Abstract Games* is still going strong. We are still making incremental improvements to the magazine, but it seems to have settled into a fairly standard size and layout. Once again, we offer our sincere thanks to all our subscribers and advertisers for their support.

Many games have passed through our hands over the past couple of years. A number of the best have been written about in these pages. Unfortunately there are too many games and too little time, and I have to make some hard choices about what games I can actually play regularly.

Onyx is probably my favorite new game of the last two years. Realm, which will be covered in the next issue, is another game that I like very much. Other games that I am still playing are Twixt, Grand Chess, and my old favorites Wari and Epaminondas. Also, I have entered the Camelot World Championship, advertised in this issue. (If you have never played Camelot before, now is the time to learn—this competition is open to anyone.) One of these days I am going to find time to give Trax the attention it deserves.

This is obviously a very personal list of favorite games, and mine seems to change fairly regularly as new games rotate in and old games are given a rest for a while. It brings me to the question of what we look for in a game, and why choose one game to play over another? What does make a game good enough to play time after time?

I would appreciate some reader feedback to these questions. For myself, a game has to have, above all, interesting tactics and strategy, but also I like originality and simplicity. There is also a certain quality that is very difficult to define that makes some games beautiful.

We are still running articles about

games from the 8x8 Game Design Competition, and there are four more games in this issue. Three Crowns is one game that I have returned to a number of times, as is Mozaic. The latter makes a fine beach game and is Connie's favorite from the competition. This series will be completed with yet more good games in the next issue, and thereafter we should be into the games from the next competition.

In the first competition the limitation was board size and shape. This time we have decided to make the constraint that the games must be played with unequal forces. Examples of these among traditional games are the Fox and Geese and Tafl families of games. I am sure this will challenge the ingenuity of game inventors, who may use any size and shape of board they like this time, as long as it is a regular tessellation of either triangles, squares or hexagons. How about a connection game with unequal objectives?

This issue contains three games dating from around the end of the nineteenth century: Salta, Congo and Transvaal. This period saw the introduction of a great number of original games, some of which persist to this day, such as Halma and Reversi. It was a golden age for board games. In the next issue we will have three games from the 1970's and early 1980's, perhaps another golden age. Thereafter, computer games began to overtake this particular market segment. Ironically, I think the rise of the Internet may lead us into another golden age for abstract games. Does anybody concur?

At last in this issue we return to Twixt and Hex. Apologies are due to the patient players of these games. People are still responding to the Jetan article in *AG6*, and I know that some readers are playing ten-game matches. We will definitely be printing some follow-up articles on Jetan in future issues. In the meantime: *May your throat be tireless and your sword arm strong!*

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.



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 covers. It is like being in a park or on a beach and enjoying a good game with good friends: very relaxing, calming covers. Before your magazine came out I was content with drawing boards on large pieces of paper and using pennies and washers as pieces. Now that I've seen your covers, I appreciate not only the game playing itself, but the ambiance of a well-crafted board, the artistry of a nice board in front of you.

Douglas Zander, USA

Yes, Breakthrough combines simplicity and elegance, but it lacks originality. That is, to me, a real problem. That's why I consider Magnetron to be the real best game: you can't use strategies learned elsewhere. Breakthrough is a variant, Magnetron is a game!

Vincent Everaert, France

We recently had a discussion about the complexity of Twixt compared to other games like Hex or Go. We found that the complexity of two games is often not easy to compare because complexity can be of different kinds and difficult to describe. A particular game can be characterized quite well by the kind of complexity it has. It is not easy to find a starting point for the discussion about complexity. To open up the discussion, I would like to share my first thoughts about a possible framework for the characterization of complexity in abstract games:

A) Quantitative approach

1. The number of playing spaces;
2. The number of pieces;
3. The number of possible positions;
4. The number of different kinds of moves (drop, jump, capture, etc.);
5. The number of possible moves in particular (common) positions.

B) Qualitative approach

1. The number of moves a good player can look ahead—in some games it is very hard to look ahead because one move changes so much that it is hard to visualize (Reversi, LOA)—in other games the moves are rather simple or involve many forced moves so that you can (and must) look far ahead (Checkers);
2. The number of reasonable moves in

particular (common) positions—in most games you have many moves available but only very few are reasonable enough (from a general understanding of the game) to be considered;

3. The stability (of the position and the game development)—if you are ahead, does that mean that you have a clear win, or can the game swing easily?—does the board position change much?—can one move greatly change the position (LOA)?—is it easy to judge whether a move is reasonable or not?

4. Number of goals and concepts to aim for—how many strategies are there to choose from and how different are they?—number of battlefields—influence of battles and moves on other battles.

If you have any ideas about complexity please share them with us!

Jochen Drechsler, Germany

Why Do Barsoomians Gamble?

I have received much correspondence regarding the use of gambling within the game of Jetan—mostly enthusiastic, although others have questioned the necessity. I will try to express the reasoning behind the decision to utilize gambling within Jetan.

Readers of Edgar Rice Burrough's novels of Mars will be familiar with the fact that most of the warriors enjoy gambling games. Perhaps all soldiers enjoy gambling, so why not Barsoomians? There is one factor that prevents Barsoomians from playing games of strategy without some extra element: *Barsoomians are all telepathic.* This telepathy can take many forms, depending not only upon race but also the individual. All Barsoomians can 'sense' their opponents. (The exception is John Carter and his son, Carthoris; they can 'sense' but they cannot be 'sensed'.)

With much practice and concentration a normal Barsoomian can develop the ability to 'block' others, but this talent is rare. So, most Barsoomians seek their enjoyment in games that offer some element of chance. This could be the reason that the Manatorians played their Jetan games as live combat. The individual skills of the combatants offer that desired extra element.

In Chapter Two of *The Chessmen of Mars* we are introduced to Jetan by John Carter, who is playing a game against his wife, Dejah Thoris. This is the first explanation of the rules. One has to wonder if Carter remained gallant and avoided reading the thoughts of his love during their competitions.

Later, we are introduced to the Manatorian form of the game. This not only is fought by living pieces but has a different designation for the Flier piece: it is called *Odwar*. This is used for dramatic effect to reveal the identity of the story's hero to a possible friend. This would not be necessary if our hero's thoughts were 'open' to others.

Telepathy would also prevent negotiations during a game. When two opponents began a particular game, they would both have the belief that they could win. But as the game progresses, they would reach a point where they would realize that one had the advantage. So all internal game betting would have to be established before the game began. Examples might be side bets for the first to capture or force the other to use the Princess Escape.

Since the majority of Terrans are not 'cursed' with telepathy, ongoing game negotiations can add another level to the game of Jetan. There is also the possibility that observers of a game can place bets on their favorite players or on the use of particular captures and tactics.

My fellow Jetan players have developed a tradition of taunting with each move. This was to reflect the Barsoomian talent of telepathy. Each move, the player makes a 'true' statement. This can take many forms. It can be a comment on the opponent's tactics, a challenge to stop a possible attack or a general comment about the play of the game. These taunts can be fun and add great enjoyment to the game.

Another area of discussion has been the evaluation of the pieces. I chose relatively low values, designed primarily for quick calculation. Players handicap their games by the selection of the move interpretation of each piece, rather than the adjustment of the piece's value.

The values were also chosen to reflect a ten-game tournament. As the earlier games will usually end in Chief Draws, those lost ten points add up. With each player starting a tournament with 100 points, the more aggressive player will show after only a few games. As the tournament reaches its fifth or sixth game, one or both players will be fielding a truncated force and the opportunity for a win increases. Remember, it is not the particular value of the piece that counts but the overall loss that influences the game. Keeping the values low forces the players to play a very tight game.

As long as both players agree, they can utilize whatever move interpretations, piece values, or gambling techniques they

like. My goal was only to present a useable mnemonic for move interpretations, a fairly simple piece-evaluation system, and several forms of gambling.

I wish to thank all those who have written to me. Their interest and insight has added much to the enjoyment of this game. I hope they continue playing Jetan.

L. Lynn Smith, USA

Readers may like to check the Jetan websites: <http://users.ev1.net/~llsmith/Jetan/Jetan.htm> and <http://www.geocities.com/jetantower/index.html>. – Ed.

Camelot

It was with great enjoyment that I read Paul Yearout's article on Camelot endgame play in *AG7*. Not only do I applaud loudly, as founder of the World Camelot Federation (WCF) whenever Camelot gets any of the notoriety it so richly deserves but Paul's analysis has resulted in a change to the WCF Rules of Camelot!

Here is some Camelot rules' history. In the 1888 rules of Chivalry (the forerunner of Camelot) and the 1930 Camelot rules, an unlimited number of "Castle Moves" (moving from one of your opponent's two castle squares to the other) was allowed. In 1931 the rules were changed to allow only two Castle Moves per game. In all future editions (1955, 1958, 1961, 1968, 1985) this rule change was continued. Prior to the establishment by the WCF of a rule that made stalemate a loss for the stalemated player it was unstated whether the game was a draw or a loss for the stalemated player. On that question all editions of the Parker Brothers rules had been silent. So prior to the establishment of the stalemate rule, if a player had only one piece, and it was in the opponent's Castle, and he was limited to only two Castle Moves by the rules, then he was stalemated after two moves and the game's result was unknown, since no rule covered stalemate. Additionally, it was thought that one piece could prevent one opposing piece from reaching Castle.

One corollary issue, of course, was the question of whether the game is over as soon as one side has been reduced to one piece or no pieces. On that question some editions (1888, 1930 ver. 1) of the rules were silent, some editions (1985) said that the player with one piece immediately loses, and some editions (1930 ver. 2; 1931 vers. 1, 2, 3; 1955; 1958; 1961) noted exceptions. The most relevant case is where a player is outmanned in the ending but by sacrificing one of his two remaining pieces he can capture, on his next move, all, or all but one, of his opponent's pieces,

and thus draw.

Another corollary issue is whether a player with one piece, having reduced his opponent to no pieces, wins the game. It seems clear that the object of the game is to Castle two pieces, and therefore, a player with only one piece cannot win.

The WCF, by vote, took the position that the clearest and best interpretation is simply to say that the first player to castle two of his pieces wins the game. That solves both issues, covers all situations, and allows the players to play the game out either to a win (where a player castles two pieces) or to a draw (where both players have fewer than two pieces left).

In 2000 it was felt by most WCF Members that the limitation of two Castle Moves was arbitrary and unnecessary, so the WCF voted to allow an unlimited number of Castle Moves.

Once the WCF stalemate rule took effect, and stalemate became a loss for the stalemated player, part of the rationale for the unlimited Castle Moves rule change disappeared. Now comes the finding, as demonstrated, quite impressively, by Paul Yearout in the above-mentioned article, that one piece cannot prevent one opposing piece from reaching Castle, if the defending side is limited to a finite number of Castle Moves (say, two, as in the 1931 Rules). As a result, the WCF membership has just recently voted, mandating the revocation of the unlimited Castle Moves rule change, and a return to the 1931 version of the rule allowing only two Castle Moves per game. Thank you, Paul Yearout and *Abstract Games* magazine!

Now, to another matter! This is to announce the 2002 Camelot World Championship. This event is to be held during 2001 and 2002, by over-the-board play, postal mail play, and email play. There are no prizes; this will be strictly for fun. If any reader is interested in participating, please let me know by mail or email. I also would like to hear ideas on what kind of format might be the best to use. I suppose that the choice between two-game matches, knockouts, eliminations, round robins, Swiss events, or anything else depends upon the number of players involved. I encourage all readers to mention this to others. One small bit of news coverage on this event would do more to further Camelot than all my efforts over the past two years.

Michael Nolan

President, World Camelot Federation,
5160 Hertford, Troy, MI 48098, USA
email: mwn_mqn@msn.com

Hexagonal Chess

After reviewing numerous hexagonal chess variants I have found Dave McCooley's variant to be the clear winner. Glinski's set-up has space behind the Pawns, and I am a firm believer in maintaining no space behind the Pawns in any variant that tries to stay close to Orthodox Chess. Another result of Glinski's Pawn set-up is his center Pawns are too close. Furthermore, I could not understand why Glinski made his Pawns capture orthogonally.

Recently, Dave McCooley provided me with a nice dissertation comparing the diagonal Pawn capture with Glinski's orthogonal Pawn capture. I found this discussion quite convincing. McCooley Pawn chains behave more like orthodox chains. Some people have made an issue of the fact that Rooks can penetrate McCooley Pawn chains. I have never known this to be an issue, let alone a spoiler, and I have played dozens if not hundreds of McCooley games. The Glinski Pawn capture actually allows too much mutual protection, and there are Pawn chain characteristics that seem very unnatural from an Orthodox perspective.

Tim O'Lena, USA

Mini-Reviews

Blink

Blink is another game from the makers of Bosworth and Shipwrecked. It is played with an attractive deck of cards, each of which contains a certain color, shape and number of symbols. The objective is to get rid of all your cards first by matching either color, shape, or number. The players do not take turns. It is fast, furious and fun, but the antithesis of a brain game—if you start thinking about what you're doing, you're bound to lose. – KH

Out of the Box Publishing, Inc., PO Box 14217, Madison, WI 53714, USA; website: <http://www.otb-games.com>.

The Triangle Game

This game is unusual in that it is designed for three players. The board consists of a triangle divided up into smaller triangles, in the shape known as a Sierpinski Gasket. Players compete to finish the game with most pieces in their own home territory. The game has the advantage that it is what the inventor calls a "self-balancing game," in that it is relatively easy for a trailing player to catch up. – KH

Pair-of-Dice Games, 110 Boston Ave., Somerville, MA 02144, USA; website: <http://www.pair-of-dice.com>.

Game Reviews



Dvonn

Designed by Kris Burm

Dvonn is the fourth game in Project Gipf, the ambitious, multi-game undertaking of Kris Burm. Dvonn may be my favorite of the four games. We have tried it out in three sessions so far, amounting to over a dozen games. I still lose most of my games against Malcolm. I don't know why I'm losing. More to the point, Malcolm doesn't know why he's winning. However, almost every game seems to point to a new tactic, and I think we are getting a vague feeling for the strategy. Dvonn may well be a more strategic game than Gipf, Tamsk, or Zertz, and perhaps that is why I like it.

Like the other Project Gipf games, Dvonn is played on a grid of hexagons; unlike the others, the board consists of 49 hexagons in an elongated shape. Each player has 23 pieces and there are three special, red Dvonn pieces. The first stage of the game consists in placing pieces on the board so that finally every space is covered. The second stage of the game involves stacking up the pieces on the board, and it is a little reminiscent of Sid Sackson's Focus. A stack of pieces is controlled by the color of the piece on top; it cannot be split up, must move exactly the number of spaces as there are pieces in the stack, and must finish its move on an existing stack rather than an empty space. A stack cannot move if it is surrounded on all sides by other pieces, which means that at the start of the game only pieces around the edges of the board can move. The point of the game is that every piece must remain connected to a Dvonn piece. As soon as a move is made that breaks the connection of one or more pieces to a Dvonn piece, these pieces are removed from the board. The game ends when neither player has any more moves. At that time, each player combines the remaining stacks he controls into one large stack, and the player with the tallest combination stack wins, no matter what the color composition of the individual pieces in the stacks.

The most obvious strategic element is the placement of the three Dvonn pieces at the beginning of the first phase of the game. The character of the game changes, depending on whether the Dvonn pieces are close together or widely spaced, or on the edge or in the middle. Thereafter, players place their pieces in the first phase so as to maximize their chances of controlling Dvonn pieces—the ability in the second phase of the game to reposition a stack containing a Dvonn piece, and thereby potentially eliminate a large number of pieces, can be devastating. The tactics of jostling for position to control Dvonn pieces can be quite complex. Nevertheless, players must ensure that their pieces are fairly well spread, with enough pieces around the edge of the board to give plenty of movement options.

The second phase of the game begins with a scramble to obtain stacks with Dvonn pieces. If a stack is threatening to move to a particular space, it is not necessary for defense to be able to gain control of this stack—all you have to do is add another piece to it, and when your opponent adds one of his pieces in turn to regain control, the stack is larger and is aiming at a different space. Moreover, the extra pieces on this stack may indeed render it completely immobile, either because it would have to move off the board or because there are now no occupied spaces for it to move

to. A large, immobile stack is a good target. Towards the end of the game movement options tend to decrease dramatically, and careful calculations may be necessary to ensure your stacks remain in contact with Dvonn pieces.

The game is fun and interesting because of the unusual tactics and strategy. There are clearly different levels of sophistication at which the game can be played. We have to get Malcolm to figure out what he's doing right! – KH

Dvonn is published by Rio Grande Games, 123 Main Street, Rio Grande, NM 78901, USA;
website: <http://www.riograndegames.com/>

Indochine

Designed by Prince Joli Kansil

When I was a child, I loved solitaire, or patience as we called it in England. I collected books with solitaire games and spent many hours practicing and honing my skills in the best of the games. Quickly I discovered that almost all the games worth playing were of the two-deck variety. Spider, I found, to be easily the most absorbing. In my busy life now there is little time for solitaire games. Nevertheless, solitaire remains my favorite form of puzzle since the games are endlessly variable and you never know at the outset whether there is a solution. Every now and then I still deal a hand of Spider on the computer.

It was therefore with great pleasure that I received a copy of Indochine by Prince Joli Kansil, because now I could justify playing a solitaire game as I was reviewing it for this magazine. It is a lovely game, with a beautiful box and pieces made from tropical hardwood. The pieces are the size and shape of Mah Jong tiles. Apparently the game was developed during travels around Southeast Asia. It retains the flavor of that area, and one can imagine languid tropical evenings and the click of wooden tiles.

Indochine is a development of the popular solitaire game Klondike, with a number of new elements that greatly enhance the skill required to play the game. To start with, there are two extra suits, Wheels and Anchors, which are colored green. In addition, there are three jokers, one for each suit color, which may take the value of any card (or rather, "tile") in that color. This makes a total of 81 tiles. (The game also includes a wooden bar against which the pieces can be stacked.) A large part of the additional skill consists in knowing what to do with the jokers. First, you must choose which tile the joker will represent. Then, when that particular tile becomes available later in the game, it is replaced for the joker, and the player is allowed a "liberty"—in other words, any tile may be selected from the discard pile to go to the front of the discard pile, thereby to be available for immediate use. Another skill element is that an empty space in the layout may be filled with a column headed by a king if there are no aces in the layout, with a queen or king if there is one ace in the layout, with a jack, queen or king if there are two aces, and so on. Therefore, it may be advantageous to leave aces in the layout rather than immediately playing them to the foundations.

There is a scoring system, so that a player scores for each tile played to the foundations and is penalized for remaining face-down tiles in the layout at the end of the game. However, I did not bother with scoring, merely playing the game a number of times to see if it would come out. I was rewarded with a successful conclusion after about half a dozen games.

Indochine is clearly one of the very best solitaire games. I

still prefer my old favorite, Spider, as a game, but I think I would continue to choose to play Indochine because of the beautiful playing equipment. I feel the same way about Mah Jong—it is not really my type of game, but I would still like to play it now and then for the tactile and visual pleasure of handling the tiles. – KH

Indochine is published by Xanadu Leisure, Box 10-Q, Honolulu, Hawaii 96816, USA; US\$60 plus US\$7 for shipping by air.

Gobblet

Designed by Thierry Denoual

We reviewed Dao in *AG6*, a game played on a 4x4 board with the main objective of getting four pieces in a row. Well, just to demonstrate that this board size and game genre is far from exhausted, here is another good game played on a 4x4 board with the same objective.

The unique feature of Gobblet is that the two players each have three sets of four interlocking pieces, like Russian dolls. The first piece played from a set must be the largest, and then the slightly smaller piece becomes available, and so on. Instead of playing a piece from off the board to a vacant square, you may move one of your pieces already on the board to another space. When repositioning a piece already on the board, it may be placed over a smaller piece, of either color. As a special case, you may also place a piece from off the board over an enemy piece provided this enemy piece is part of a line of three.

The interlocking pieces lead to some interesting tactics and strategy. Clearly the player has an advantage who has more enemy pieces trapped under his own. Therefore, I suspect that between experienced players the main strategy may be one of entrapment, rather than going immediately for a line of four. Lines of three may be used as tactical threats to accomplish this goal. Nevertheless, it pays to be careful when forming lines of three, especially early in the game, as the opponent thereby has more movement options. One problem with this type of game is the high percentage of draws. However, none of our games were drawn, and according to the inventor draws are quite rare.

Gobblet is attractively packaged with a nice wooden box and playing pieces. If you are an aficionado of the small alignment games, then Gobblet is well worth investigating. – KH

Gobblet is published by Blue Orange Games Co., 12 Echo Lane, Mill Valley, CA 94941, USA; website: <http://www.lvd-france.com>.

“After centuries of evolution the game of chess has apparently reached a stage at which further variation is unthinkable. We assume that it would be bound to result in some deterioration—that the rules are as they are because they have been found by generations of players to be the most satisfactory. Capablanca disagreed over orthodox chess being ideal for great players of his class, and proposed a larger scale game....

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V.R. Parton, “Variations on Chess,” *New Scientist*, Vol. 26, #445.

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Book Review



Gardner's Workout: *Training the Mind and Entertaining the Spirit*

Martin Gardner, A.K. Peters Ltd., Natick, MA, 2001

Martin Gardner is well known to lovers of games and recreational mathematics for his long-standing "Mathematical Games" column in *Scientific American*, as well as his numerous books on recreational mathematics. In this book A.K. Peters has reprinted 41 of Gardner's articles that have never before appeared in book form. It is a good selection.

Gardner's taste in mathematics is eclectic. He ranges from geometry, to logic, through games, paradoxes and computers. He even has some criticisms about the current state of mathematics education and the so-called "new new math." The Domino Game was one of many items that were completely new to me: On a square grid two players take turns to make a mark on a vacant square. One player uses X's, the other uses O's. (Though it can of course be played with checkers or other pieces.) The board starts off unmarked. The first player who forms a domino—marking two adjacent squares that share an edge—loses the game. Surprisingly, the game remains unsolved for some very small boards. Even/even boards are easily solved with symmetry arguments, but odd/odd and even/odd boards are much more difficult—4x7, for example, still remains unsolved.

There is a great deal in this book for both puzzle fans and game fans. It is highly recommended. —KH

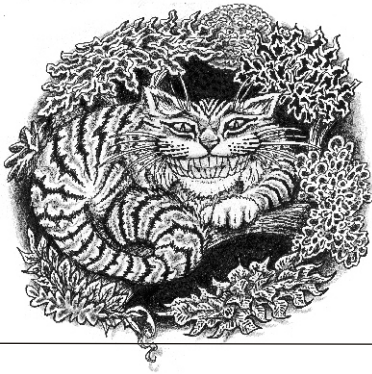
Chinese Chess

H.T. Lau, Charles E. Tuttle Co. Inc., Tokyo and Vermont, 1985

I have always liked to play Chinese Chess. The restriction of the king and mandarins to the fortress, the prohibition on two kings facing each other on an open file, and the move of the canon somehow make pleasing attacking combinations easier to find than in Shogi and Chess. It is a very nice game, although in my particular case it has tended to take a back seat to Shogi.

There are a number of books available in English on Chinese Chess. Recently, I acquired Lau's book. Quite frankly, it is the best I have seen, and I felt inspired to review it for this magazine. The book contains the usual chapters explaining the rules, and it also has some useful basic material on the opening and middle game. However, it has an extensive analysis of endgame combinations as well as a large selection of middle game and endgame problems. This in itself is excellent, but the real value of the book for me is that it contains the complete set of game scores from *The Secret Inside the Orange* and *The Plum-Blossom Meter*, two classic seventeenth-century works on Chinese Chess. The book would be worth its cost to me for this alone.

I do not know whether I will ever find time to actually study Chinese Chess, but if I do this is the first book I will turn to. The people at Tuttle are to be applauded for the service they have given to gamers in the West by printing in English material on Oriental games that is very difficult to obtain otherwise. —KH



Alice chess

PART 1

by Peter Coast
with artwork by Daniel Bauer

On my retirement five years ago I took up correspondence Chess again after a break of 20 years or so. I enjoy it, but there are disadvantages. One of the major ones is the huge expansion in opening theory in recent years, encouraged by the proliferation of databases. I became interested, therefore, in variants of Chess that do not (yet) have such a weight of scholarship associated with them. Fortunately there is an active correspondence community, so I joined in.

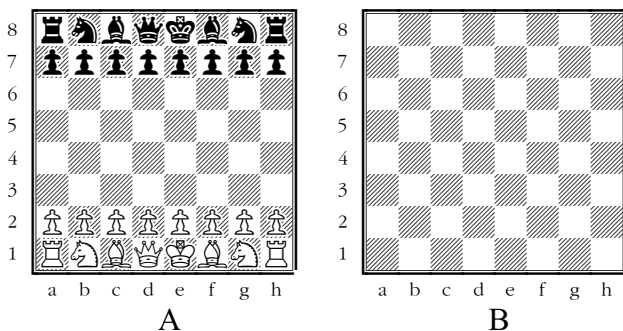
My favorite variants retain most of the basics of Chess—same board, same pieces, same objective—so as to capitalize on my 55 years of experience playing the game. Alice Chess falls into this category. Curiously enough, I first encountered it about 30 years ago in the pages of the *British Chess Magazine*: its invention was much earlier.

The basic idea is very simple. It is Chess played with two boards, one set up initially in the normal way and the other empty. The player to move may make a legal move on either board: the piece moved, however, disappears from the board it started on and reappears on the other board. The effects of this are rich and strange: the name refers to Lewis Carroll's Alice (c.f. *Alice through the Looking Glass*).

The formal rules are as follows:

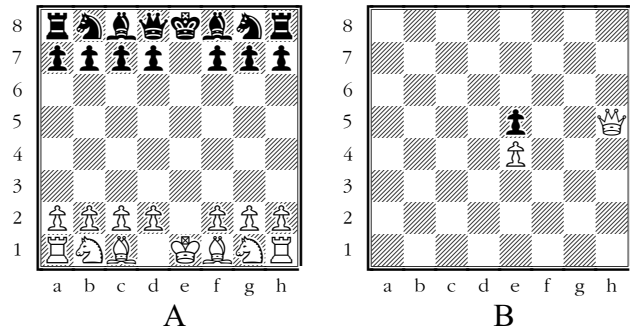
1. Two boards are used, called A and B. The pieces are initially set up on board A.
2. After a move on either board the moved piece is transferred to the corresponding square on the other board.
3. A move must be legal on the board on which it is played.
4. A move cannot be made if its destination square on the other board is occupied.
5. There is no *en passant* capture.

To see the effect of these rules, let us look at a simple opening variation.



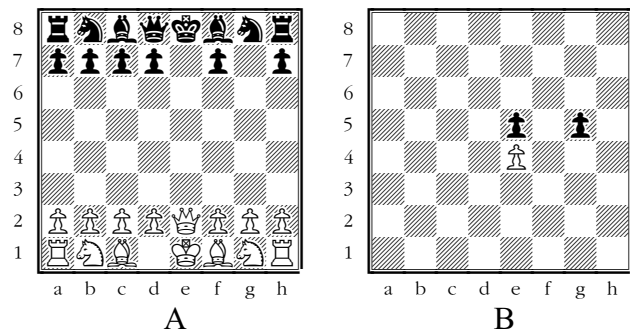
Opening position

1.e4(B) e5(B). A regular Chess player, as Black, would have no hesitation replying as above. It is customary to indicate the board on which the piece moved ends up. **2.Qh5(B)!**



Position after 2.Qh5(B)!

White now threatens 3.Qxe5(A) mate. How can black defend against this? He needs to protect the pawn by defending the e5 square on the A board. All his pieces, however, are already on the A board, and if he moves one of them, it ends up on the B board! Black cannot, therefore, defend the pawn directly. He can, however, block White's queen, so he tries: **2....g5(B)?** White now cannot take the e5 pawn, and 3.Qxg5(A)? loses to 3....Qxg5(B). Nevertheless, he has the very powerful move: **3.Qe2(A) mate!**

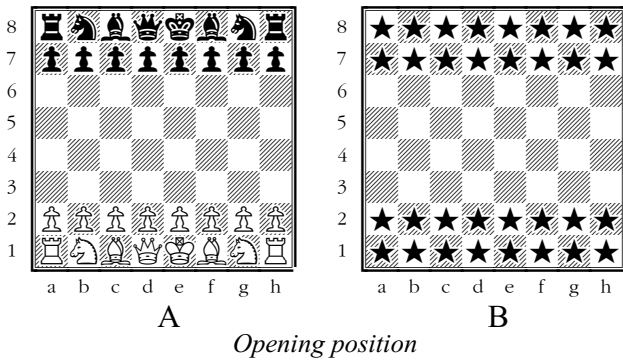


Position after 3.Qe2(A) mate

Black is in check on the A board, and his king has no legal move there. He cannot interpose anything because most of his pieces are already on the A board, and his pawn on e5 on the B board has no legal move!

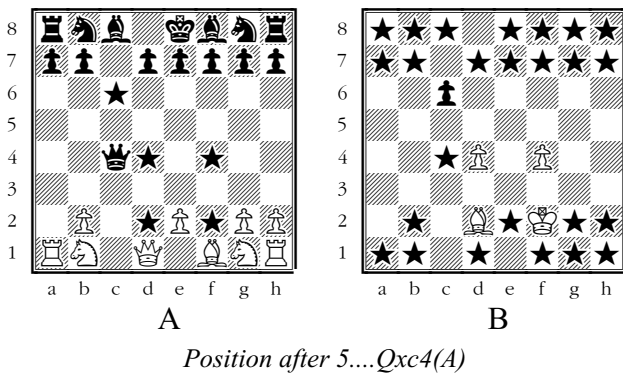
Now let us look at a more grown-up game. I am White in my first competition organized by The British Chess Variant Society*. Here, again, is the initial position.



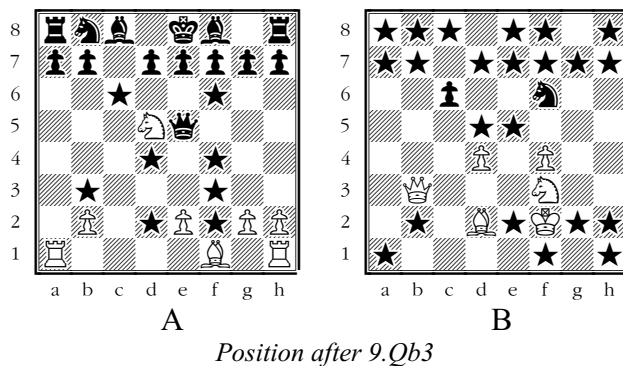


This is exactly the same as before, except that I have added markers (I use coins) to indicate the squares that are blocked because of the presence of a piece on the equivalent square on the other board. This helps considerably when working out the tactics.

1.c4 c6. It is customary, when recording Alice games, only to enter the board a piece ends up in when it is the A board. **2.d4 Qc7!** Black is threatening 3...Qa5(A) mate, and it is surprisingly difficult for White to do anything reasonable about it. For example, 3.Bd2 Qa5(A)+, 4.Bc3(A) QxB. Perhaps the best is 3.Qd2 Qa5(A)+, 4.Kd1, but then 4...Qa4+ wins the pawn on c4. I chose to give my king some air. **3.f4 Qa5(A)+, 4.Kf2 Qxa2+, 5.Bd2 Qxc4(A).**

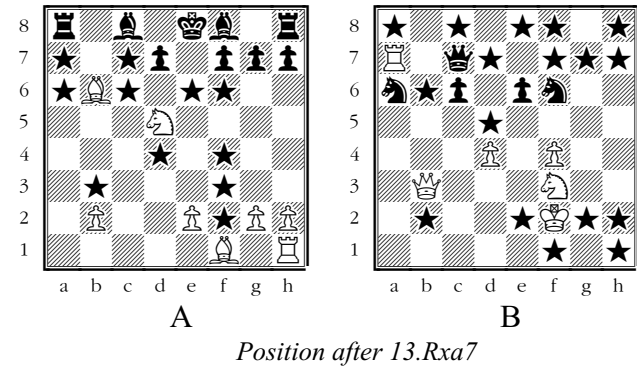


I am not doing too well: two pawns down in five moves! Fortunately, Black is not threatening too much at the moment, so I must rely on continuing my development. **6.Nf3 Nf6, 7.Nc3 Qc7.** This threatens 8...Qxf4(A). It is not much of a threat, however, and fails to improve Black's position. **8.Nd5(A) Qe5(A)?.** Black persists in making short-term threats with his queen, to the neglect of his development. **9.Qb3.**



White is beginning now to generate some counter-chances. **10.Rxa7,** for example, is possible. **9...Na6, 10.Bc3(A) Qc7,**

11.Ba5. I was planning **12.Nxe7** if the queen moves. Black's king would be in danger because it lacks flight squares. **11...b6, 12.Bxb6(A).** I can now repeat the above idea with **13.Ba5, 12...e6, 13.Rxa7.**



13...Qd6(A), 14.Qe3(A)+ e5(A), 15.Qxe5. This is obvious, but needs careful calculation to make sure Black does not have an effective counter-attack. **15...Ra2+, 16.Kg1(A)! Qxb6, 17.Qe4(A)+ Kd8, 18.Qe7mate.**

This game is a good illustration of the tactics of Alice Chess. It is also a good indication of the level of play: both players made serious errors. The truth is that games such as this have only recently been played seriously and there is not yet an expert community that understands how to play well. This, to me, is one of the attractions. ■

*The British Chess Variants society can be contacted via its Secretary, John Beasley, 7 St. James Road, Harpenden, Herts. AL5 4NX, UK.

Peter Coast was born in 1938 in Glasgow. His first profession was mathematician, although he spent most of his career in the public service (Defense). He became obsessed with Chess at the age of 8, and had early tournament success, becoming Scottish Champion, British Universities' Champion and West of England Champion. Life became too busy, and he had to give up competitive Chess in 1970, although he has played correspondence Chess sporadically since then. His primary interest now is the classic variety of Chess variant, which retains many of the features of the traditional game. —Ed.



Reflections on
Vernon Rylands Parton

Inventor of Alice Chess by Peter Parton

Vernon Rylands Parton, my uncle, was born on 2 October, 1897 in Cannock, Staffordshire, England. One of his paternal great grandfathers was a yeoman farmer who had eloped with an heiress of the Manchester Rylands family, hence the middle name. Vern's father was a coal miner's son who became the headmaster of Cannock Grammar School and the proprietor of a small boarding school for youngsters from the middle of England, France, Germany and Spain—a sort of international school.

This is the environment in which Vern grew up. It is where Vern and his younger brother and their future wives all obtained their early education. I do not know where, or if, Vern received secondary stage schooling. However, he was an assistant at his father's school at some stage, ending up at Chester Teaching College, where he chose mathematics as his specialist subject.

Vern does not appear to have had an easy time at the college, as he was marked out as a swat and a bookworm, and definitely not a sportsman. Throughout his life Vern did not enjoy the best of health, suffering from what was then known as a "weak chest." One day Vern was thrown into the river at Chester. Complications ensued, and if his mother had not gone to Chester to nurse him back to health, he may not have survived.

Vern completed the course at Chester, and then back at his father's school he provided private tuition and no doubt helped out with the education of the day children, whose age range had extended far beyond the junior stage. The business card I possess from this time, about 1922, advertises private tuition in Latin, French, German, Shorthand, Typing, Book-keeping, Mathematics, English, etc., as well as preparation for the Preliminary Professional Examinations for the Civil Service. Vern's qualification is stated as "Certified Master (Chester Training College) 1st Class Archbishop's Certificate."

It appears that Vern was left in charge of the school in the 1920's, while his father, the principal and proprietor, returned to teaching in the state schools. The boarding school side, meanwhile, had closed down because of the war and was never reopened. Perhaps Vern might never have coped with life in a state school. He would only have felt at ease teaching small groups of children with ability and good behavior.

Vern was for a short time married to Jane Fletcher. Their personalities clashed, and neither would give way in an argument. Although he was a kindly person with a friendly disposition, Vern had a stubborn streak that would show itself on occasion. He could be cantankerous.

I saw Vern often until about 1950, frequently accompanying him to his favorite location, the town library, or to the tobacconist, he having become a smoker. He seemed very reluctant to go out on his own. He had a favorite uncle, who was blind, and Vern was content to escort him around.

Card games and board games were always an important feature when I appeared. These I enjoyed, although variations were introduced to the extent that I was never sure what the official rules of a game really were! I regret to say that Chess did not appeal to me. It was too slow and unexciting for my taste. I think Vern was glad to have someone to engage in a game. My memories of this time include Christmases when the family would gather around the large dining table to play and argue over games ranging from Lexicon to Pit to Monopoly.

Vern was a great believer in Esperanto, and I presume he had taught himself to read several other languages. I remember his German and Russian dictionaries. Then there were the Lewis Carroll stories: I have distinct memories of sitting on his knee and listening to these stories, and not a book in sight.

After World War II his parents moved to a smaller, more manageable home, and Vern went with them. By 1951 both parents had died, and Vern was on his own. He was hopelessly impractical; producing a pot of tea and buttered toast was the limit of his catering, so relatives had to move in to look after him.

He corresponded with Chess players in other countries. I do not know what variety of Chess was played; it may well have been the orthodox game, although I know he was dissatisfied with it as it had become too analyzed. From here on I saw him infrequently, but was aware he was up to something because frequent requests were made to produce Chess pieces of different designs.

Eventually, I was asked (repeatedly) to produce a multi-level board for playing multi-dimensional Chess. This was duly provided, and I was to become a guinea pig—an unenthusiastic one, I regret to say. I no longer have any memory of the game.

As the years passed away, so did his relatives and the few friends that he had. As Vern was not a good mixer, he became a recluse, and his only contacts were Chess correspondents and the newspapers—he was trying to interest the local press in his ideas.

Vern's situation in Cannock was not really satisfactory as his brother was supporting him financially. In about 1960 Vern was persuaded to move to Liverpool and settled in a terraced house near Penny Lane.

By now he was working on his booklets on Chess variations. Eventually nine publications were produced, the first coming in 1961, the last being published posthumously in 1975. I believe a set was donated to the Cambridge University Library and that the British Library should have these booklets. Vern never wanted to benefit financially from his work, but asked only for a contribution to charities for the blind.

His last years were spent in a residential home in Toxteth, Liverpool. He died on 31 December, 1974, aged 77 years. Emphysema was the cause.

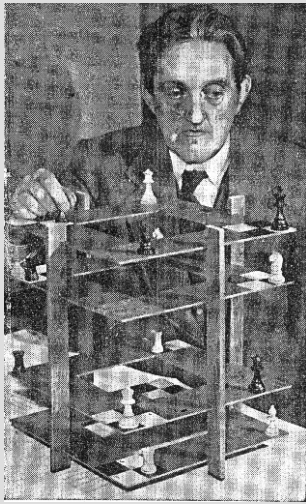
He was described by those who knew him as an oddball, as eccentric, stubborn, and as a man of wasted talents. No one disputed he had a good brain. I always knew him as a gentle and kindly person, and rarely saw one of his dark moods. He seemed to relate best to children. Although he had a serious and studious disposition, Vern was not without humor and could be frivolous.

I think he must have felt frustrated for most of his life. One wonders how things would have turned out if he had better health and had been able to use his talents in a wider sphere. But then perhaps the booklets would never have been produced. One thing is for sure: if he were still around today, Vern would have been pleased with the interest still being shown in his ideas. ■

Booklets Published by V.R. Parton.

- *Curiouser and Curiouser*, 1945 and first published in *Fairy Chess Review* (Vol.16, No. 8).
- *100 Squares for Chess + Damante*, 1972, 15pp.
- *My Game for 2000 A.D. and After*, 1972, 12pp.
- *Enduring Spirit of Dasapada*, 1973(?), 19pp.
- *Idea for a Personal Game*, 1973, 12pp.
- *Cheessys for Duffer and Master*, 1973, 23pp.
- *Challenge and Delight of Chessical and Decimal*, 1970, 13pp.
- *Cheessys*, 1970, 26pp.
- *Cheessical Cubism or Chess in Space*, Date of production unknown, 13pp.
- *Curiouser and Curiouser*, 1961, 31pp. Printed and bound with orange-brown sugar-paper covers by George Reed & Co., Liverpool. The remaining booklets had cyclo-style binding.
- *Chessire Cat Playeth Looking Glass*, Alice Chess appears in this booklet, although the game was invented in

(Reproduced from *The Birmingham Post*, 9 September, 1957.)



Sixth Dimensional Chess Invented by Cannock Man

by a Staff Reporter

Mr. V.R. Paton (*sic*), of Hatherton Road, Cannock, who has invented dimensional chess, showed me how to play it. After 30 years of inventing difficult games, as a hobby which gives him intellectual exercise, Mr. Paton has produced "Ecila Chess." Ecila, he explained, is Alice backwards. "Remember *Alice through the Looking Glass*?" he asked.

Sixth dimensional, spacial or Ecila chess [*Presumably the writer is confusing games here. —Ed.*] needs rather more than the conventional chequered board, and a mind that is able to cope with pieces moving upwards, downwards and in peculiar routes through space as well as in the conventional directions to which pieces are normally limited on a chess board.

Mr. Paton, a retired teacher, began to teach me the elements of his game as he set up his own board in four planes. "You must imagine the whole as one big cube with three dimensions in which are contained four other cubes, also with three dimensions," he began. "You do play ordinary chess?"

I said that I did, in a fashion.

"Well, let us take the rook first," he said. "Rooks move parallel to the edges of the enclosing cube—that is through the faces of its cubic walls. When a rook changes its cube it must move in its new cube to that cell corresponding to its cell of departure."

It took about two hours for Mr. Paton to go through the moves of king, queen, rook and bishop so that I could understand them. Then I discovered that there was a more complicated form of the game, with pieces called unicorns, griffins and wyverns. The ways in which these unfamiliar pieces moved gave me a crick in the neck. "Do you mind if we play the simple version?" I asked.

I started by losing my queen almost immediately, but that did not matter. My triumph was in not contravening the rules of the game for more than two-thirds of the time.

Mr. Paton reflectively moved a bishop down two flights. "Of course, this is the simplest type of space chessboard of its kind," he said. "The next size would have to have 2,187 squares, which makes it rather unwieldy, and you would need teams to play the game.

"This already has 16 times as many possible combinations as ordinary chess. One of my problems now is to work out a simple way of teaching this game."

Watching another of my pieces meet its doom, I suggested that we played another game—of ordinary chess. Mr. Paton said: "I'm not very good. I haven't played for four years."

I lost the ordinary chess game, too.

Between Heaven and Hell

Inspired by Alice Chess

by L. Lynn Smith

Recently, I was researching 3D Chess variants and came across an interesting game, which utilized two standard Chess boards, as does Alice Chess, called Heaven and Hell. This variant is the creation of Dan Troyka. What follows are Dan's own words:

"Although I wish I could say otherwise (message from God, voices in my head, psychedelic punch), the development of H&H Chess was pretty prosaic. It occurred to me earlier this year that it might be interesting if captured Chess pieces were permitted to fight a separate battle among themselves. This initial idea pretty much developed itself—the natural arena for this battle would be a separate 8x8 board, the natural method of transfer would be for captured pieces to go directly to the corresponding square on the lower board, and separate Kings would have to be placed on the lower board in order to give meaning to the battle of the captured pieces. A player wins by checkmating either opposing King. It did not take long for the Heaven and Hell theme to occur. Pieces on the top are in Heaven and are condemned to Hell when captured.

"Certain details had to be worked out. For example, if the corresponding square on the lower board is already occupied, that piece is removed from play. Captures on the lower board are true captures, i.e., those pieces are removed from play. And repetition has to be defined as a loss. This last rule addresses what would otherwise be a major flaw in the game. Perpetual check comes very easily on the lower board. All you need to do is force the capture of your Queen on the top board, then check away on the bottom. By defining three-move repetition as a loss for the moving player, this problem is avoided.

"The White King in Hell is underneath the Black King in Heaven. While this may seem asymmetrical, it gives the game stability. If friendly Kings were stacked, then checkmate could be obtained too easily by attacking the King in Heaven with a Queen, which would be impervious to capture because the queen would check the enemy Hell King from the corresponding space in Hell. Stacking enemy Kings has the effect of making Kings in Heaven immune to check until one of the Kings has moved away. The reason for this is that any consummated capture of the Heaven King would result in capture of the enemy Hell King on the space underneath. For this reason the Heaven King cannot be placed in check in the first place.

"This example requires some reflection on the nature of check. Basically, check occurs only if you could in fact capture the King on the next turn if there was no intervening move. No check occurs if capturing the enemy King would simultaneously result in capture of your own King because capturing your King—under any traditional view of Chess—has to be illegal.

"H&H Chess also presents an interesting checkmate situation. If you check the enemy King in Heaven, and the checking piece would also check the enemy Hell King from the corresponding square in Hell, then check cannot be avoided by capturing the checking piece. The Heaven King has to move out of check or is checkmated if that is not possible. Again, this exact situation does not arise in Chess, but this definition of checkmate is a logical extension of the Chess rule that you cannot make a move exposing your King to check.

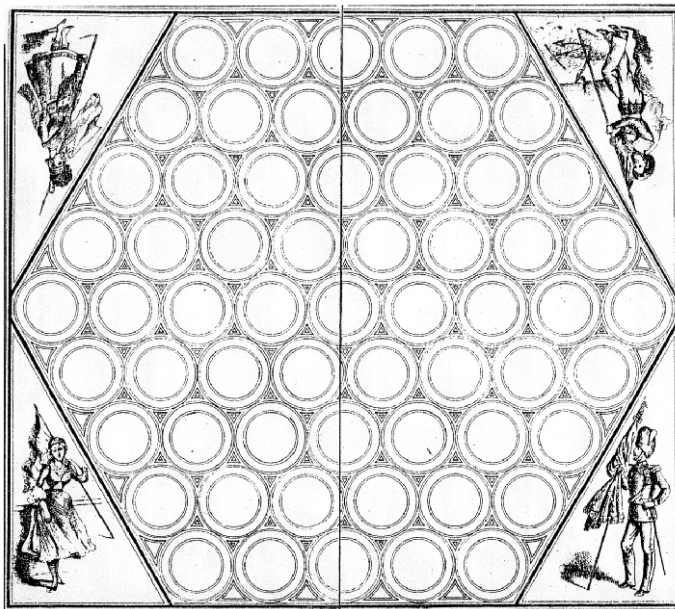
"I was aware in developing this game of its rough similarity to Alice Chess. The board designs are essentially the same and the games share the concept of pieces moving into and out of a 3D

space. The twist to H&H Chess is that the opponent controls when your pieces move between boards, although you can force the opponent's hand. Alice Chess is a faster game, which I generally prefer. H&H Chess really does play out like two separate Chess games, both of which usually progress to an endgame before a player manages to win in one of them. (Of course, Hell begins as an endgame). Also, in Alice Chess corresponding spaces on the two boards cannot be simultaneously occupied and the game can be represented, as Pierre Tourigny did in his Zillions implementation, on a single 8x8 plane. H&H Chess requires the extra plane."

I have played this game using the Zillions-of-Games program. It can be very aggravating, but highly enjoyable. I suggest that any reader who is interested try this game, at least once.

Dan has developed a variation of the game involving pieces captured in Hell being 'redeemed' in Heaven, as well as another variation in which the players start off with a full complement of pieces in both Heaven and Hell. During the compiling of this information it occurred to me that there could be another interesting variant, one that utilizes a third board. This board would be called 'Earth.' The game begins with a full complement of pieces in both Heaven and Hell. Earth is empty. Captures are 'reincarnated' on Earth. On Earth a piece that makes a capture move is sent to Hell, and the piece that was captured goes to Heaven. Any piece displaced by these transfers is removed from the game. On Earth pawns are allowed to promote upon reaching the farthest rank. This encourages aggressive behavior between the players. This game results in pieces cycling from Heaven to Earth, Hell to Earth and Earth to Heaven and Hell. Actual captures, removals from the game, are rare. Earth becomes a battleground of aggression and sacrifice. The game is won by checkmating a king in either Heaven or Hell. ■

Alice Chess and Heaven & Hell Chess, as well as hundreds of other games, can be played with the Zillions-of-Games program for the PC: <http://www.zillions-of-games.com/>. See AG1 for a review of Zillions. – Ed.



Congo Board



THE GAME OF CONGO

by Michel Boutin
translated by Patrick Mouchet

Rules

Congo is a game for four players, played on a hexagonal array of 61 spaces. (See bottom left.) Each player has 12 pieces of his own color, the four colors being black, white, red, and yellow. A series of four rounds is played. The privilege of moving first rotates, so each player moves first in one round.

Initially the board starts off empty. The players take turns to place one of their pieces in an empty space on the board. A player cannot place a piece in a space adjacent to an opponent's piece. A piece may, however, be placed next to a friendly piece. When a player is unable to move on his turn, he is *blocked*: he must give each of his opponents a number of points equal to the number of unplayed pieces he has, and he takes no further part in the game. The game continues with three players, then two, with the same rules. As each player is blocked he donates points equal to the number of his unplayed pieces to his remaining opponents. Finally, three of the four players will have been blocked, and the round finishes.

In each round the players will accrue a partial score. The player with the highest total score at the end of the four rounds wins the series.

Round	Black	White	Red	Yellow
First	5+3+2		5	5+3
Second		4+3+1	4+3	4
Third	6+4+2		6	6+4
Fourth		5+2	5	5+2+1
Total	22	15	23	30

Example of scoring

Commentary

The game Congo was issued around 1900 by Watillaux, a French publisher, which in 1874 succeeded the Coqueret company. The latter was originally established in 1820. Watillaux offered probably the best selection of fashionable "parlor games" of the time: Agon, Halma, Reversi, Assaut, and so on. Congo was included in the 1903 catalogue for FF1.25 (equivalent to around FF23 today). This singular game deserves special attention: the board is a tessellation of hexagons, the pieces do not move once placed, the winner is determined by means of a scoring system, and the game is played in several rounds. In spite of these original features, Congo was not mentioned in any specialized books, and was therefore consigned to an undeserved oblivion.

The symbolism of Congo is the colonization of Central Africa by the Europeans. According to the original rule book the board represents a certain place on the banks of the Congo, where the "visitors" put up their flags while removing flags belonging to rival countries. In his presentation of the game the publisher censures the behavior of the architects of the colonization policy:

"There are those that have no compunction about removing a competitor's flag, replacing it with one of their own, without even returning the displaced object to its owner, who could at least use it elsewhere. This behavior is not astonishing; what surprises me more is that in the past no government has really got angry because of this offhand behavior, which proves once again that we can accustom ourselves to anything, even including swallowing an affront." ■



SALTA

The Humanistic Game by Ralf Gering

Perhaps each time has its own game. While Camelot could be considered the American game of the 1930's and Teeko that of the 1950's, Salta (Lat.: "Jump!") was clearly the German game of the 1900's. It was called the "humanistic game" and was meant to become the "chess of the people." Like Maack's Raumschach, Laskers's Lasca and Scarne's Teeko, Salta was very popular for a short time, but then it fell into oblivion.

Salta was invented in 1899 by the forgotten German composer Conrad Büttgenbach (1870-1939), who was born in Heerd, near Düsseldorf, and later moved to Hamburg. Just two years later, the game had an international following in Austria, England, France, Germany, and Sweden. The most famous Salta player was Sarah Bernhardt (the "Divine"), a Frenchwoman, who was the first movie star in film history. Bernhardt and Büttgenbach played a game of Salta on 1 July, 1901, in London, of which a game record and a photo survived.



Conrad Büttgenbach and Sarah Bernhardt play Salta

This enormous success came about after the game was awarded a Gold Medal at the World Trade Fair in Paris in 1900. The German Emperor, Wilhelm II, ordered a Salta set with pieces adorned with diamonds, emeralds and rubies. Ordinary mortals could buy sets in every German city from 2.50 to 475 Goldmark. Only the rich could afford the more expensive editions. Salta magazines were begun in Germany and Sweden. Several books described the game in great detail. Numerous well-known magazines and newspapers published reviews: *Die Gartenlaube*, *Le Matin* and the *New Yorker Staatszeitung*. The *Vie Illustrée* of Paris and the *London Daily Express* both offered their readers 12,000 Goldmark for solving some difficult Salta problems. Salta clubs were organized all over Germany and in several other European countries. An international tournament was held in Monaco, with a first prize of 20,000 Swiss Francs.

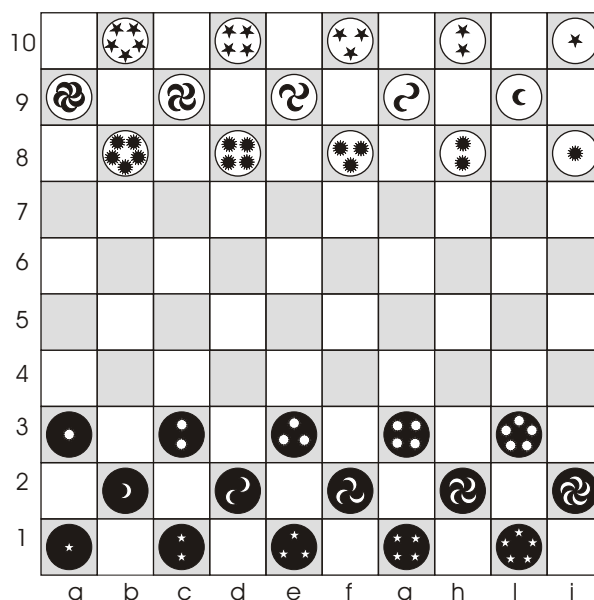
After World War I Europe changed and Salta disappeared. Sometimes the game was subsequently described in German

game books. The correct rules were given by C.D. Grupp and R.F. Müller, and the wrong rules by W. Hirte. In the English-speaking world the game was described with incorrect rules by R.C. Bell, and later by R.W. Schmittberger, which caused even more confusion. Also, it was implemented with incorrect rules by K. Scherer for *Zillions of Games*. About 15 years ago I had the fortune to find the grandson of Conrad Büttgenbach in Hamburg. He kindly sent me a copy of a Salta booklet published in 1902, which includes the original rules and a sample game.

About Salta

"Salta is played in the finest saloons; it is the most noble and most popular entertainment of the modern intelligence: according to Professor Grosse, the touchstone of the faculty of thought and the mind; according to Professor Schubert, of educational effect for the future professional life of the youth, the favorite game of the ladies, a battle on the table and a strategy unique for the officer. Salta is the new unfathomable enigma of combinations for the deep-thinking chess master, the game of the future for all classes, the most interesting tournament game of the 20th century, the most popular and amusing mind sport, the master-stroke of human ingenuity. The growing number of Salta associations is the most eloquent testimony of all. A highlight of the World Fair in Paris, Salta will begin its triumphant march around the globe."

(Deutsche Salta-Zeitung, Central-Organ für sämtliche Spielinteressen. Leipzig, Vol. 2 (9), 1901.)



Salta opening setup

Rules

Salta is played by two persons facing each other over a board of 100 squares, which is checkered black and white. The board is set with the bottom corner black square at the player's left.

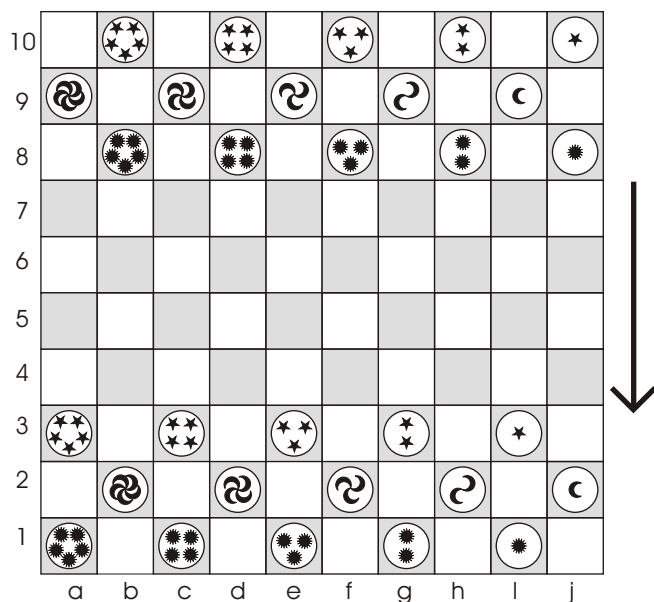
Each player has 15 pieces: five Suns, five Moons and five Stars. Each type is numbered from 1 to 5. One player has green symbols on black pieces, the other red symbols on white pieces. The initial setup is shown above.

Green (or Black) moves first, then Red (or White), and so on alternately. All play is conducted on black squares only. All pieces move in like manner: one square diagonally in any direction to a vacant square.

One must jump over an opponent's piece if it occupies a square diagonally in front of one's own piece and the square immediately behind the opponent's piece is vacant. Unlike Checkers a piece leaped over is not captured or removed from the board. Players may jump only one piece per turn, in a forward direction only, and are not permitted to leap over their own pieces. If a player forgets to jump, his opponent can call "Salta!" Then the player must take his last move back and jump, before the game continues.

It is not allowed to blockade all opponent's pieces. However, a player may blockade some pieces, as long as the opponent still has a legal move.

The object of the game is to be the first player to reach the goal position, which is to shift the opening position seven rows forward, as shown in the diagram below.



Salta objective

At the latest, the game is considered "completed" after 120 moves (i.e. 240 half-moves). The players then try to reach their goal position with as few moves as possible, as if the opponent's pieces were non-existent.

The difference in the number of moves needed to achieve the goal positions is calculated. Then one point is subtracted from Green because he made the first move. The winner has a surplus of points, which is a positive integer, while the loser gets 0 points. If both players have 0 points, the game is a draw.

The pieces were not supposed to be touched with the fingers, but moved with a Salta stick.

There is a special handicap system. A 100:120 handicap,

for instance, means that after 100 moves played, the weaker player is allowed to make 20 consecutive moves. Then the game is continued according to the normal rules.

Historical Game

M. Krone (Green) – *W. Grotewold* (Red), played in Jüterbog, Germany, 24 February, 1901.

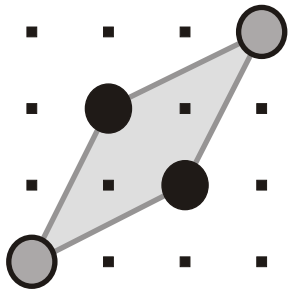
1.e3f4 f8e7, 2.c3d4 d8c7, 3.b2c3 h8g7, 4.g3h4! j8i7, 5.c1b2? i7j6!, 6.i3j4 j6i5!, 7.j4:h6 i5:g3, 8.h6:f8 c9d8, 9.d2e3 d10c9, 10.f8:d10 c7b6, 11.e1d2 g3:e1, 12.a3b4! b8a7!, 13.j2i3 d8c7!, 14.i3j4 c7d6!, 15.d4c5 b6:d4, 16.c3:e5 a9b8, 17.e5:c7 g9h8, 18.c7:a9 d6e5!, 19.f4:d6 h10g9! 20.d6:f8 g7h6!, 21.f8:h10 h6g5, 22.h4:f6 b8c7, 23.f6:d8 g5f4!, 24.e3:g5 f4g3, 25.h2:f4 e9f8, 26.f4:d6 c9b8!, 27.f2:h4 b10c9, 28.d8:b10 e7f6, 29.g5:e7 c9d8, 30.e7:c9 f6g5, 31.h4:f6 g3h2, 32.g1:i3 h8i7, 33.i1:g3 d4c3!, 34.b2:d4 c3b2, 35.a1:c3 d8e7, 36.f6:d8 i9h8, 37.d4:f6 h8g7, 38.f6:h8 j10i9, 39.h8:j10 f10e9, 40.d8:f10 e5f4, 41.g3:e5 f4e3, 42.d2:f4 c7d8!, 43.f4:h6 g7:i5, 44.h6:j8 e3d4!, 45.j4:h6 b8c7, 46.d6:b8 a7b6, 47.c5:a7 e7f6, 48.e5:g7 d8e7, 49.c3:e5 e9d8, 50.g7:e9 i9h8, 51.e5:g7 f6e5!, 52.g7:i9 f8g7, 53.h6:f8 g5h4, 54.i3:g5 i7h6!, 55.g5:i7 h8:j6, 56.i9h8 e1f2, 57.b4c5! e7f6!, 58.c5d6 g9:e7, 59.h10g9 e7:c5, 60.f8e7 f2g3, 61.e9f8 h2g1, 62.d10e9 g3h2, 63.j10i9 h2i1, 64.i9h10 h4g3, 65.j8i9 g3f2, 66.i9j8 f2e1, 67.j8i9 i5j4, 68.i9j8 j4i3, 69.j8i9 i3j2, 70.i9j8 b2c1, 71.j8i9 d4e3, 72.i9j8 e3d2, 73.j8i9 b6a5, 74.a7b6 a5b4, 75.i9j8 c7:a5, 76.b6c7 d8:b6, 77.b8a7 b4c3, 78.c9b8 c3b2, 79.c7d8 b2a1, 80.b8c7 a5b4, 81.d8c9 e5d4, 82.c9d10 f6e5, 83.e7f6 h6g5, 84.i7h6 g7:i5, 85.j8i7 d4c3, 86.f8g7 c3b2, 87.e9f8 b2a3, 88.b10c9 c5d4, 89.c9d8 b6c5, 90.a7b6 d4e3, 91.d8e7 e3f4, 92.f10e9 e5d4, 93.g9f10 d4c3, 94.h8g9 c5d4, 95.b6c5 c3b2, 96.c7b8 g5h4, 97.d6c7 h4g3, 98.c7d8 g3h2, 99.d8c9 i5h4, 100.c9b10 h4g3, 101.g7h8 g3f2, 102.h8i9 j6i5, 103.i9j8 i5h4, 104.f8g7 h4i3, 105.g7h8 f4g3, 106.h8i9 d4e3, 107.i9j10 b4c3

Red wins by 27 Points! ■

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Ralf Gering graduated from Tübingen University, Germany, in 1999 with an MA in Cultural Studies and Religious Studies, and is now doing research in medical sociology and large communal societies. His hobbies are abstract board games, hiking, the Internet and cooking. –Ed.



TWIXT TACTICS

PART 2

by David Bush

In this episode we examine some more corner battles, and start to look at ways different battles can influence each other. The board used this time is 16x16, large enough to show off several different tactical themes, but hopefully not so large as to swamp the reader with complications. Even so, a Twixt set, or some way of looking at variations, is highly recommended. Graph paper and a pencil might be sufficient. There is an excellent Java Twixt database program available at <http://www.xmission.com/~kwalker/jgame/>.

The diagrams highlight the *crucial diagonals*. These are useful guidelines for quickly estimating which moves are more likely to work for any given battle.

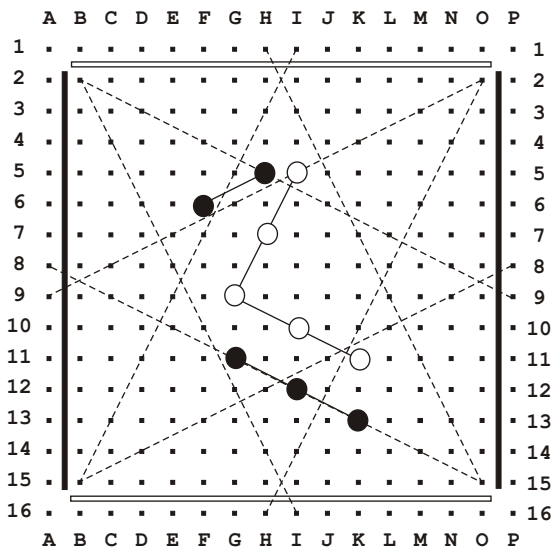


Figure 1 – White to move

For example, in Figure 1 it is clear that White can force a connection to row 1. The I5 peg is on the crucial diagonal leading to O2. Even better, I5 is also “inside” the crucial diagonal that leads to B2. This results in threats that are *widely spaced* (G4* or K4*), so Black cannot block all of them. It is almost as clear that Black wins along the bottom, stopping any attempt by White to connect to row 16. Black’s linked K13 peg, cutting off White’s K11 peg, is an image that should be “hard-coded” into your Twixt mentality since this pattern happens a lot. There is not enough room for White to cut around, when Black is just two holes away from the corner hole O15 (measured along the crucial diagonal). For example, if White plays 1.N13 Black has 1.... O13. Or if 1.C11 E10* 2.D8 B11, or if 1.B11 C11 2.D12* E12** 3.C9* C13*.

Figure 2 shows a similar position with a very different result. Instead of just telling you the best moves for each side,

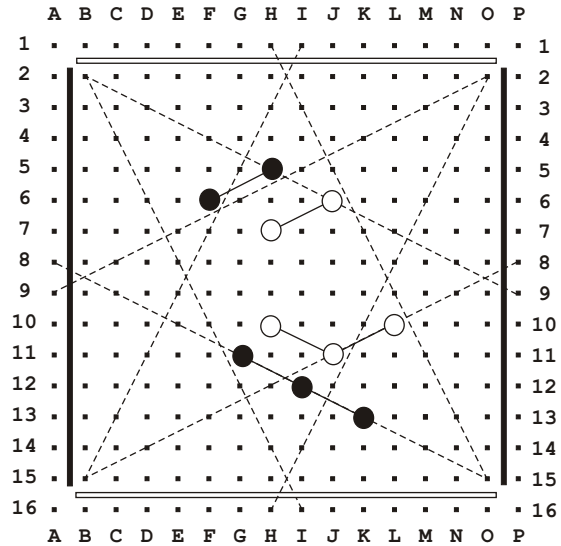


Figure 2 – White to move

here is some of the methodology used to arrive at these moves. Each move should strive either to make more threats than the opponent can block, or block all the opponent’s threats. White should ask, what are Black’s threats? Is he threatening to cut me off from row 1? This is where knowledge of the basic tactical patterns is helpful. The threat of Black playing K4 should stand out as a move to consider. But even if Black goes first here, 1.K4 could be answered by White’s 1....K3. Then 2.J2* L5**, 3.L3* M3*, and White has reached the crucial diagonal to O2.

So, White’s position is secure along the top right. But the bottom may seem just as bad as it was in Figure 1, if not worse. After all, White’s L10 is even further from Black’s K13 than K11 was, and I told you to “hard-code” that position in your brain as WINNING FOR BLACK. But let us look at it more closely. Just because L10 is further away, does not mean the position is worse. In fact, the further back you are, the more room you may have to “cast your net.” White should ask, what is Black threatening to do and how can I stop him? There are basically three strong threats: M14*, M12*, or O13. Is there a way to block all three? Yes! The proverb “play where your opponent wants to play” is just as valid in Twixt as in Go. 1.O13 cuts Black off. Or does it? Clearly any linking move by Black would lose: 1....M14*, 2.N15* or 1....M12*, 2.N11**. Is there a way for Black to make two threats at once? Yes! 1....M13 is a “mesh hammer attack.” Is there a way for White to block both of Black’s threats? Well, how could White do that? By making two threats of his own! 2.M14*! attacks the 2-0 mesh setup between K13 and M13. Now if 2....L15**, 3.N11** N14*, 4.N15*, or if 2....O12*, 3.L12**. This is an exception you should keep in mind along with the winning position in Figure 1.

Crucial diagonal guidelines are not always useful. They are

good for showing how a “ladder chase” such as in Figure 1 will turn out, but if the opposing pegs are further apart, other tactics may predominate. For example, you may still win even if you are on the wrong side of the crucial diagonal.

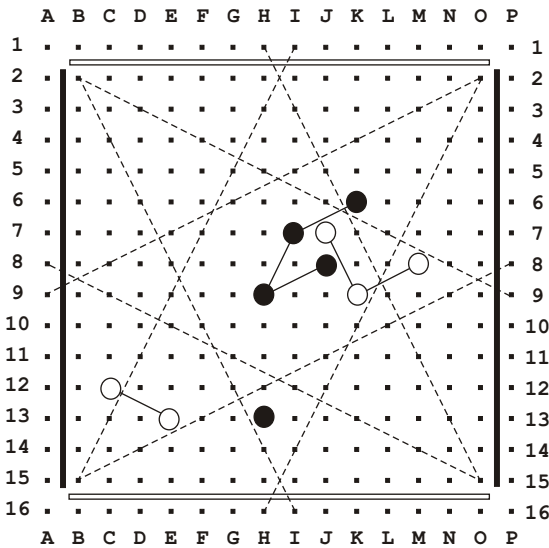


Figure 3 – White to move

The top right of Figure 3 can be won by White with the simple 1.N6*, and now 1....L4*, 2.O4* N2, 3.M3* L3*, 4.O2*, or 1....M4, 2.M3 L2*, 3.O4** N3*, 4.N2*, or 1....N2, 2.M4*. A linking move is frequently the strongest, and should generally be considered before other moves. It might appear that 1.M5 will also win the top right corner, but this is an example of getting too fancy. This is a 3-0 gap to the linked peg at M8, and is in linking opposition to Black’s K6. This defensive pattern was briefly discussed in the last article. It should generally be considered a fragile defense, with very tricky tactics. 1....N5 misses the mark: 2.O4* M7**, 3.N6**. 1....L5 also loses locally: 2.K4* N6*, 3.L6**. The simple linking move 1....M7* does not get it either: 2.N6* N5*, 3.O4**. But Black has the surprising resource 1....M3! And now 2.K4* M7*, 3.N6* N5**, or 2.N3* L5*, 3.L7** O2*, 4.K5* J4**. 1....N4 also works: 2.O4* L5*, or 2.K4* M7*, 3.N6* M6*, 4.L8*(trying to draw) N5*.

Let us look at the whole-board situation in Figure 3. 1.N6* leaves White vulnerable along the bottom; for example, 1....L13 forms a 4-0 “beam” setup at right angles to another. Where your bridge path takes a sharp turn like this, you should watch out for ways your opponent can threaten two gaps at once. White might play 2.F11*, which would seem to gain a tempo because now J11* is a real threat, and at the same time White’s bottom left group is in better position to try to cut Black off along the left. How can Black deal with both threats? The answer is to find an area of the board that would *influence* both battles. The top center region meets this criterion. Black’s plan is to find a move which renews the threat of winning the top right corner, and which also creates more threats to connect to the left than White can handle. For example, 2....H3, 3.J11* N2, 4.N4 (or 4.M4* L3*, 5.K3*J2**) O4* (threatening M5**) 5.L5** L3*, 6.J4* J2**, 7.F4! G11** (renewing the threat of N12* and also threatening to cut White off with E10*) 8.E9*, and Black’s plan falls short. White’s F4 peg is a good example of the power of placing in linking opposition, playing where your opponent wants to play. Black’s H3 has lost its influence over the left side of the board. One continuation might be 8....D7 (threatening

F8**) 9.F7* F6*, 10.H5** (renewing the threat of L12*) N12*, 11.G5*. 2....J4* also fails: 3.D6! shows the power of gaps that are three links long. D6 is three links away from F11, a 5-2 gap, and is also three links from C12, a 6-1 gap. There are so many ways to form a setup from here that D6 is very strongly connected to the C12/E13/F11 group. It is almost as if D6 were already linked to the bottom. As far as the top connection goes, D6 is that “magic” spot that you should recognize as unstoppably connected to row 1. The only question remaining is, can Black attack that lone peg somehow? The only holes worth considering are C6 and E6, and they both fail: 3....C6, 4.C8* E5*, 5.L2! shows the power of the 4-2 gap. Technically, 4-2 is not a setup, since there is only one way to connect in one move. But if your move contains a second threat in another direction, that may not matter. If 5....L3*, 6.F5* G4*, 7.H4* I3*, 8.J3**. Or 3....E6, 4.F7* D4*, 5.G5* is too close to row 1. (5....G1 is illegal.)

So, White can win with 1.N6*, but a simpler choice would be to cut Black off immediately along the left side. In order to do this correctly, you should not be timid! Do not be chained to the notion that you have either to link or form a setup with every move. Even a 4-0 beam setup would not be far enough: 1.E9 D5, 2.F7* F4* and Black wins easily. You have to leap into the void! But how far should White go? Naturally, when you place a distant peg, you should pay attention to how your opponent can respond. 1.D6 works here, even though 1....D9 looks like it smashes through. White has the resource 2.F11*!, with the double threat of either C8* or N6* (as examined above). 1.E7 also works. This is a 5-2 gap from C12. There are six ways this gap could be turned into a setup: C8*, D9*, F9*, B10*, D10*, or E11*. For this reason, 5-2 gaps are generally difficult to block. If 1....D7, 2.C8* B8*, 3.D5* D9*, 4.F11* F10**, 5.N6* wins. 1....D9, 2.D10* E2 is a new defensive pattern, borne of desperation. If now 3.F5*?, G3* cuts White off. But the 5-0 opposition pattern can often be met with a 4-0 “beam hammer” attack: 3.E3! D4*, 4.D5** (not 4.G4* F8**, 5.C8** E6**) 4....F4*, 5.C3*. Black cannot work up a real double threat because of 1....E3, 2.F5*, or 1....F7, 2.G8*.

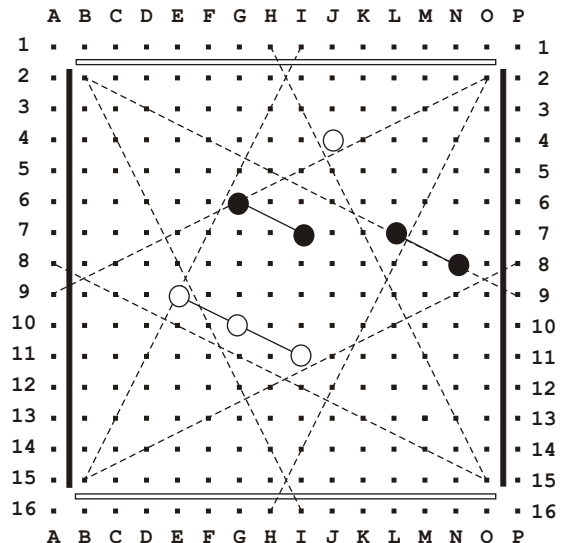


Figure 4 – White to move

Sometimes you can attack your opponent’s proposed bridge by threatening one gap while building up threats against another. In Figure 4 the natural 1.E5 seems to fail against 1....F5. But after 2.F7** D4* comes 3.I6*!, with the double threat of G5** or J8*. White’s J4 peg was perfectly positioned for this double attack.

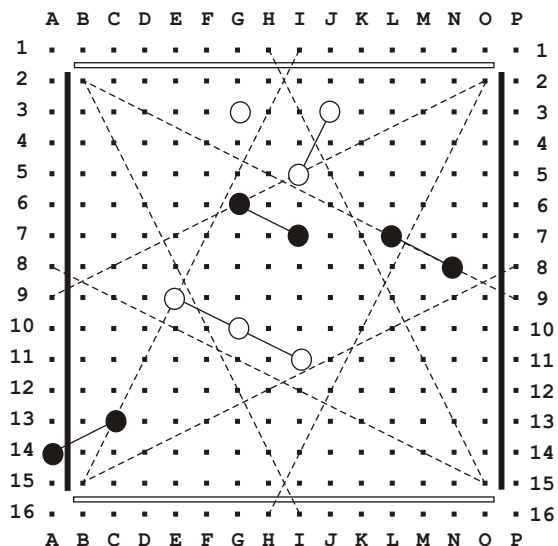


Figure 5 – White to move

Compare this to Figure 5, where White has three pegs in the same region, but none of them is placed well for the attack: 1.E5 F5, 2.F7** D4*, 3.H5* G7*; or 1.D6 C6; or 1.C6 D4, 2.D5 E6*, 3.E7** F8**!. ■

2002 Game Design Competition: Unequal Forces

Abstract Games magazine, together with About Board Games, and the Strategy Gaming Society, is sponsoring the Second Annual Game Design competition, this year with the theme of Unequal Forces. The goal is simple: design a great two-player game with unequal forces 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, a one-year membership in the Strategy Gaming Society, 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, in *The Strategist* (the Strategy Gaming Society newsletter) and in *Abstract Games*. Additional entries may also be published in the same outlets. About Board Games, The Strategist and *Abstract Games* retain non-exclusive rights to publish any entry in the contest.

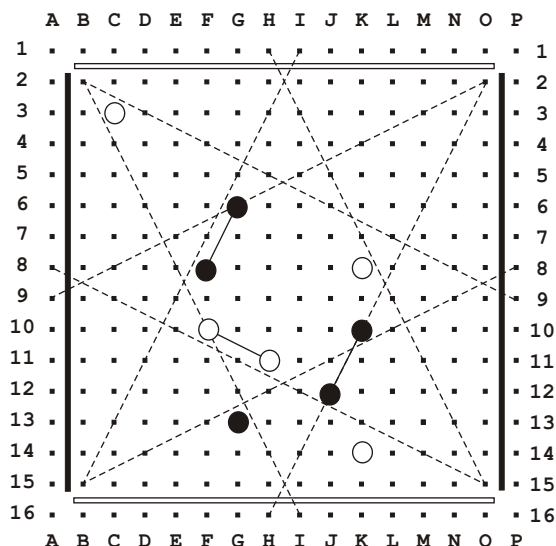
Official Rules

- Games must be designed for play on an easy-to-replicate game board, using checkers, Go stones, Chess pieces, Poker chips, and 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.)
- Games must be designed for two players. Additional players are allowed, but cannot be mandatory.
- Games must include unequal forces. That is, one player must begin with at least one less piece than the other player, or be otherwise handicapped at the start of the game. (Examples of game with unequal forces include Fox and Geese and Tafl. Games such as Mastermind or Entropy—in which players take turns at different roles and the one with the higher score wins—do not qualify.)
- Entries will be judged by a panel selected by About Board Games, the Strategy Gaming Society and *Abstract Games*.
- Winners will be determined using the same system employed by the Strategy Gaming Society to determine the winners of the Gamers Choice Awards. For more information visit this page: <http://pages.about.com/strategygames/wizzh.html>.
- Entries must be received by email (plain text, please—no attachments will be opened) at boardgames.guide@about.com no later than December 31, 2001, at noon Eastern US time. Any entries received after that time, regardless of reason, will not be considered. Entries should include the designer's name, email 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. If you do not have access to a computer but would like to enter, please mail your entry to About Board Games, PO Box 63, Cornwall, PA 17016-0063, USA.

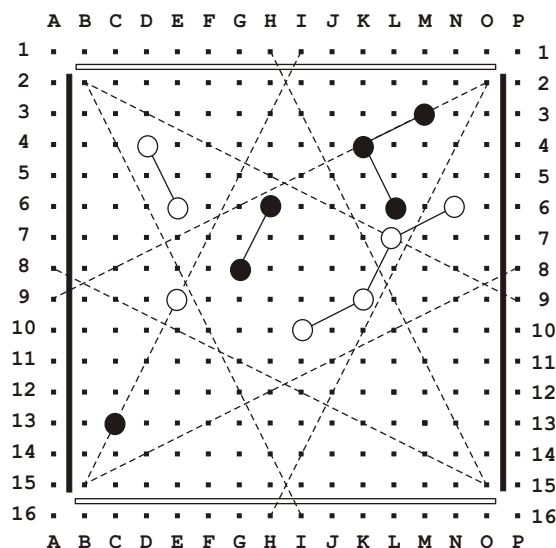
If you have any questions, please email them to boardgames.guide@about.com.

Twixt Puzzles

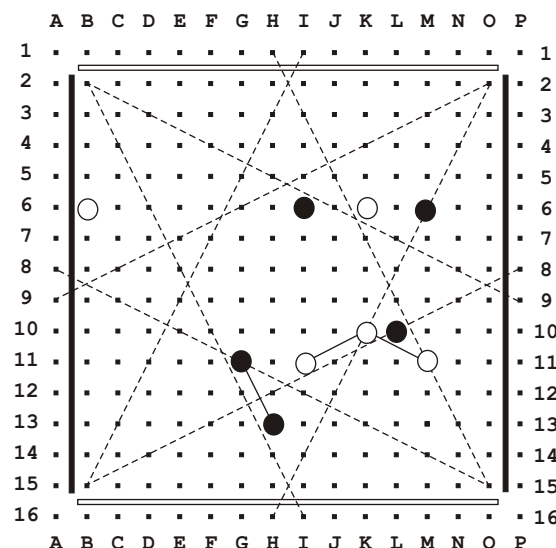
Find the strongest move. The answers are on page 21.



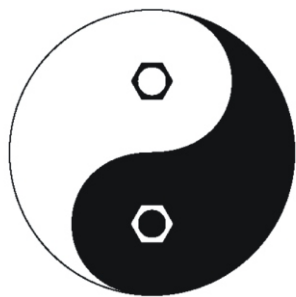
Puzzle 1 – White to move



Puzzle 2 – Black to move



Puzzle 3 – White to move



Hex Strategy

Part 4: Computer Hex

by Cameron Browne

In *AG4* we discussed ladder handling techniques for Hex. This issue we look at computer Hex players, and examine a short algorithm that plays a surprisingly good game given its simplicity and lack of strategic knowledge.

Computer Hex

Claude Shannon built the first Hex-playing machine in the early 1950's shortly after the game's invention. This analogue device represented the Hex board as a grid of resistors forming a potential field, and determined the move to be played based on saddle points of current flow within the grid [Shannon 1953]. In the intervening 50 years there has been little work in the development of automated Hex players until a recent surge of interest in the game, culminating in Hex making its inaugural appearance at the Fifth Computer Olympiad in August 2000 held in London. Three programs fought out the event: Hexy, QueenBee and KillerBee.

Place	Program	Author	Score
1	Hexy	Vadim Anshelvich	8
2	QueenBee	Jack Van Rijswijck	4
3	KillerBee	Emanuele Brasa	0

Figure 1 – Results from the Hex division of the Fifth Computer Olympiad.

Although Shannon's machine had only moderate success as a player, its electric circuit-based approach inspired the development of the gold medallist Hexy. Hexy is freely available for download from <http://home.earthlink.net/~vanshel/>, where you can also find an excellent paper describing the program's inner workings [Anshelevich 2000]. This work was announced an Outstanding Paper of the AAAI-2000 conference—further indication that Hex research is recognized as a topic of interest.

The runner-up, QueenBee, is the result of many years of work by its creator Jack Van Rijswijck and is described in detail in [Van Rijswijck 2000]. Hexy and QueenBee take significantly different approaches to the game, which Vadim Anshelevich summarizes as the difference between deep search (QueenBee) and short search involving deep connections (Hexy). Hexy is based on virtual connections defined by AND and OR deduction rules that closely correspond to the *extension* and *consolidation* operators described in the second article of this series on Hex Strategy. Unfortunately little is known about Emanuele Brasa's program KillerBee.

The algorithm presented shortly comes from a simple program called Hex Maniac, so named because it often makes moves that at first look crazy. It was born out of curiosity as to whether a known property of asymmetrical Hex boards could be exploited to produce a competitive $n \times n$ player with minimal effort. The result was a success—almost! Hex Maniac plays a surprisingly strong game if allowed to open in one of the obtuse

corners, but is not difficult to defeat if the opponent has first move.

Test runs reveal that Hex Maniac beats Hexy on the 8x8 beginner level with first move, otherwise Hexy dominates. However, Hex Maniac puts up quite a fight and usually forces play until 66-75% of the board is covered, whether it wins or loses (an average game of Hex typically takes up about 33% of the board). This tendency towards long and convoluted games is to the program's advantage, especially against human players, as it maximizes the opponent's opportunity to make an error. Remember that *strong defense is equivalent to strong attack*, given that a player's connection precludes the opponent's connection.

It should be pointed out that the algorithm behind Hex Maniac is little more than a parlor trick. It uses almost no knowledge of the game's strategy, hence produces an unconventional style of play which tends to cause players some difficulty until they work out what is going on. Other attractive features of the algorithm include its ease of implementation and extremely fast response time. It involves no search(!) and responds to moves almost as quickly as the screen can update, regardless of board size.

Background Theory

Hex Maniac separates the board into two areas of interest: a *dual point region* and a *blind row*.

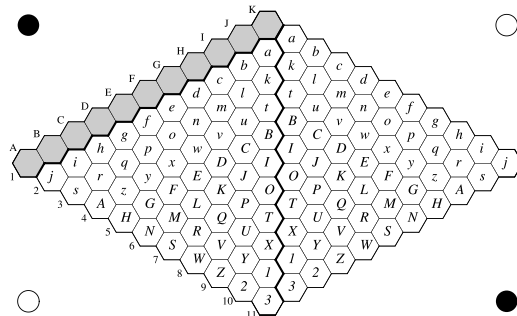


Figure 2 – Dual point region (matching triangles) and blind row (shaded).

The dual point region is composed of two triangular areas that form an $n(n-1)$ sub-board, such that each point within this region is associated with a *dual point* in the opposing triangle that bears the same label. This leads to a simple winning strategy for the player trying to connect in the shorter $n-1$ direction (Black in this case): at each turn simply occupy the matching dual point of the opponent's last move.

This simple pairing strategy is outlined in Martin Gardner's seminal *Scientific American* article "The Game of Hex," where it is described as a win for the $n-1$ player with second move. However it is also a win for the $n-1$ player with first move: if the algorithm ever dictates a move at a previously occupied point, then

the $n-1$ player can simply move elsewhere at random, safe in the knowledge that having an extra piece on the board can never harm his position.

The single row that lies outside the dual point region is called the *blind row* as any move made there is not covered by the $n(n-1)$ pairing strategy. This is Hex Maniac's Achilles' heel and is where the program spends most of its strategic effort.

Hex Maniac attempts to integrate the unbeatable $n(n-1)$ pairing strategy with a less well-defined, blind-row defense. Unfortunately these two components do not join seamlessly and their combination is analogous to stemming the flow of a leaking dam: you can only plug so many holes before you run out of fingers. Perhaps in a sense this *is* fortunate as it would be disappointing to solve a beautiful game like Hex with such an inelegant approach. The algorithm is beatable in clearly defined circumstances but is still competitive and makes an excellent benchmark for testing the mettle of other computer players.

Exploiting the Blind Row

Figure 3 shows a winning connection for White. This connection was not blocked as the point pairing strategy failed to take into account the two white pieces along the blind row. As far as it is concerned, White's forces have been split into two disconnected chains, and Black has an unbeatable connection in the $n-1$ direction.

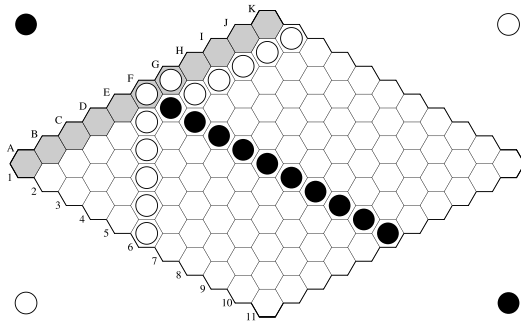


Figure 3 – White has exploited the algorithm's blind row to win.

The blind row is shown as the top row of all diagrams for consistency but could just have easily been the bottom row. The algorithm is more difficult to penetrate if the blind row is randomly chosen as top or bottom. However, a random interior row cannot be chosen for a number of reasons. Firstly, the opponent has four times as many opportunities to exploit a non-edge blind row by connecting across it, as shown in Figure 4.

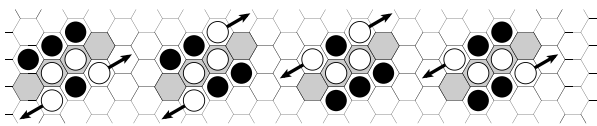


Figure 4 – White can connect across a non-edge blind row in four ways.

Secondly, White requires a chain of at least two pieces to connect through a blind row along the edge, but can breach non-edge blind rows with a single piece, as shown in Figure 5. Choosing the short diagonal as the blind row looks like a promising idea but suffers from similar shortcomings.

The leftmost diagram of Figure 5 shows that White has established a connected pair of *reentry points*, connections that cross from the dual point region into the blind row and back again.



Figure 5 – White requires only a single piece to cross non-edge blind rows.

To defeat the algorithm, White must establish at least one such pair of reentrant points connected by a continuous run of White pieces. Therefore, for any potential reentrant pair Hex Maniac's blind row defense endeavors to:

- block the upper reentry point, or
- block the lower reentry point, or
- separate the pair of reentry points along the blind row.

Given the rare but happy opportunity of a spare move, Hex Maniac strives to block the blind row where future reentrant pairs threaten to develop. It cannot block every possible reentrant combination, but is able to sufficiently narrow down the number of successful sequences to make things difficult for the opponent.

The blind row defense could be made stronger if some White moves on the second row were answered by playing a corresponding defensive blind row move rather than playing the dual point directly. Unfortunately, violating the point-pairing strategy for even a single move invalidates the entire dual-region defense.

To be a successful player, the two key parts of the algorithm (dual-point pairing and blind-row defense) must be integrated to form a global strategy. This is no easy task and has serious implications from the first move of the game.

Opening and Swapping

Figure 6 shows a bad opening sequence for Black. $1 A2$ is a deceptively strong opening preferred by many good players, and is about as strong an opening move as should be played under threat of swap. Recall that the *swap option* is used to equalize the huge first player advantage of Hex: following the opening move the second player has the choice of either continuing to play or swapping colors, effectively stealing the first move. This ensures that the first player does not make an overly strong opening.

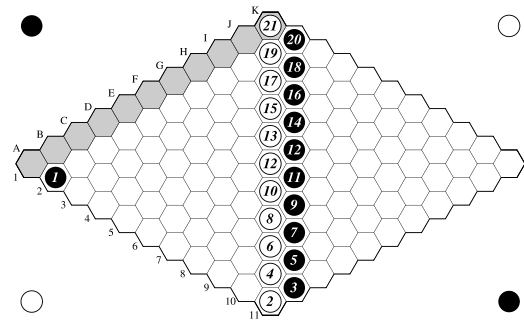


Figure 6 – Black's opening $1 A2$ allows White to exploit the short diagonal.

Unfortunately $1 A2$ is not compatible with Hex Maniac's strategy and leads to an easy win for White, as shown. Eventually White plays the winning move 21 on the blind row, which Black fails to take into account. As far as the algorithm is concerned, White's chain stops at piece 19 and is blocked from the top right edge. Note that Black's immediate reply to each move from 2 onwards is the dual point as shown in Figure 2.

Figure 7 shows openings along the short diagonal that avoid this trivial and embarrassing defeat. Of these, however, it turns out

that only the obtuse blind row corner (indicated) gives Hex Maniac any chance of winning. It is interesting to note that central point F6, traditionally considered to be the strongest possible opening, is a losing play for the program.

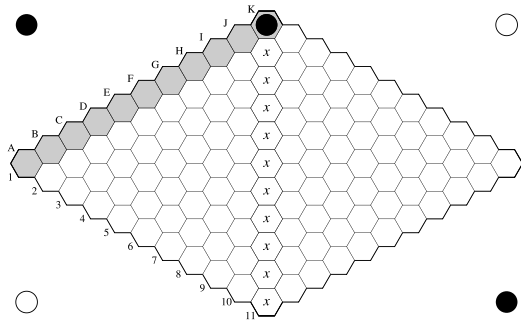


Figure 7 – Possible openings along the short diagonal with optimal opening marked.

For similar reasons, Hex Maniac will swap any opening along the short diagonal given the opportunity, although only the obtuse blind row corner will give it a good chance of winning.

The Algorithm

The algorithm is described in pseudocode and C++ code taken directly from the working program. There is not space to reproduce the entire program here so we will concentrate on a few key functions.*

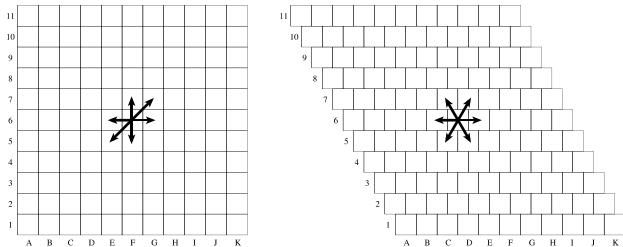


Figure 8 – The hexagonal grid is conceptually similar to a skewed rectangular grid.

The board is represented internally as a 2D (rectangular) array. Connections are defined as existing between cells' four adjacent neighbors and two diagonal neighbors to the top left and bottom right. This is conceptually similar to using a skewed rectangular grid to simulate a hexagonal grid as shown in Figure 8. Note that 0-based indexing is used for board coordinates in the code.

Because a 2D array is used, the players are described as VERT and HORZ indicating their direction of desired connection. VERT corresponds to Black and HORZ corresponds to White in the diagrams. The Coord structure describes a board position [i, j] which can be either: EMPTY, occupied by VERT, or occupied by HORZ.

The current board size is indicated by the variable N, which can be any value in the range MIN_N..MAX_N. Sensible limits are MIN_N=3 and MAX_N=26, the upper limit of the alphanumeric labeling system.

The variable Last records the point at which the opponent last played. This is the crucial piece of information that drives the algorithm. NumMoves indicates the number of moves played so far this game. Hex Maniac is always Black (VERT) for consistency.

The function BestComputerMove() is the crux of the algorithm and determines whether the program should:

- Select an opening move,
- Swap the opponent's opening move,
- Defend the blind row, or
- Play in the dual point of the opponent's last move.

```
bool BestComputerMove(Coord& move)
{
    if (NumMoves == 0)
        BestOpening(move); // opening move
    else if (NumMoves == 1 && GoodSwap>Last))
        return true; // swap!
    else if (Last.j == 0)
        DefendBlindRow(move); // opponent attacked blind row
    else if (Last.i < N - Last.j)
        move = Coord(N - Last.j, N - Last.i - 1); // left dual
    else
        move = Coord(N - Last.j - 1, N - Last.i); // right dual

    if (Board[move.j][move.i])
        SpareMove(move); // spare move

    return false;
}
```

Figure 9 – The BestComputerMove() function.

The functions BestOpening() and GoodSwap() are trivial and produce moves that will surprise many players. Hex Maniac prefers to open at the obtuse top corner (K1 on the 11x11 board), and will swap only moves along the short diagonal for the reasons outlined in the previous section.

```
void BestOpening(Coord& move)
{
    // Take obtuse corner in blind row
    move = Coord(N - 1, 0);
}

bool GoodSwap(Coord const& move)
{
    // Swap any opening along the short diagonal
    return (move.i == N - move.j - 1);
}
```

Figure 10 – The BestOpening() and GoodSwap() functions.

If the game has moved beyond the opening stage, BestComputerMove() bases its behavior on the opponent's last move. If the opponent played in the top (blind) row then Hex Maniac defends that region, else it simply takes the dual point of the opponent's last move.

DefendBlindRow() is straightforward. Given that White has just played along the blind row, it searches a database of blind row defense templates to determine the appropriate response. Key defense templates are shown in Figure 11.

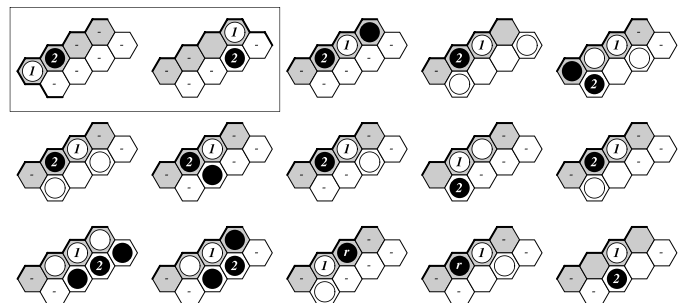


Figure 11 – Blind row defense templates.

Pieces labeled 1 indicate White's last move and pieces labeled 2 are Black's best response in each situation. Cells labeled with a dash have no bearing on the template and may be empty or occupied by either player. Black pieces labeled r indicate that Black should perform a reentrant block in that direction. This involves following any White pieces connected to intrusion 1 along the blind row until the end of the chain is reached, then

playing at that terminal piece's reentrant point, or next adjacent point along the blind row if the reentrant point is occupied.

The top left figure shows Hex Maniac's response to a White move in the acute blind row corner, and the second top left figure shows Hex Maniac's response to a White move in the obtuse blind row corner. As the top obtuse corner is the program's first choice of move, this situation will only occur if White has swapped the opening move away from Hex Maniac. The remaining templates describe general cases along the blind row. Reflections are not shown.

As some of the blind row defense templates make moves on the second row (which belongs to the point pairing region) it is possible that a point at which Hex Maniac chooses to play is already occupied. This can be a bonus if the point is occupied by Black or disastrous if the point is occupied by White.

Given a spare move, the algorithm first looks for the urgent situations shown (without reflections) in Figure 12. Urgent points are marked *u* and include situations where Hex Maniac (Black) is able to:

- Form a solid double piece block adjacent to a White piece on blind row 0, or
- Intrude into a White bridge, at the same time creating an adjacent block along blind row 0.



Figure 12 – Urgent moves for Black along the blind row: adjacent block and bridge intrusion.

If no urgent situation exists the algorithm takes the top obtuse corner if empty. If this point is occupied it attempts to block reentry points on the second row or otherwise interfere with White's progress along the blind row. Failing this, the algorithm simply takes the first empty point from the top obtuse corner downwards. We know from the solution to puzzle H that at least one unoccupied point must exist on the board if the game is not yet over.

Like most other Hex programs, Hex Maniac is *without memory* in the sense that it selects its best move based on the current board situation independent of move order.

That is all there is to it. The algorithm performs no search, has limited knowledge of strategy and makes trivial decisions—but still manages to play a reasonable game. To tackle the algorithm's deficiencies and elevate Hex Maniac to the next level of play, it will be necessary to develop a method of borrowing moves from the point-pairing region to aid the blind row defense along the second row. I would be interested to hear any readers' suggestions on how this may be achieved, or proof that it is not possible.

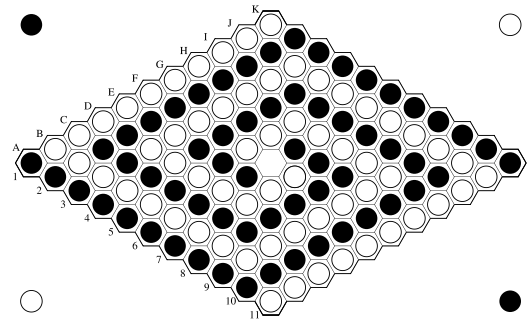
Conclusion

Hex Maniac is not the ideal opponent to practice with as it ignores most principles of strategic play. An established program such as Hexy is better able to teach the subtleties of the game. Descriptions of additional computer Hex players can be found in *Hex Strategy: Making the Right Connections*.

Wanted

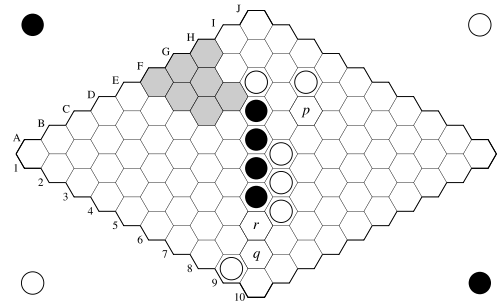
A set of **Palabra** cards. If anyone has a set and is willing to sell, please contact us: Carpe Diem Publishing, Box 33018, 1583 Marine Drive, West Vancouver, BC, Canada V7V 1H0; email: info@abstractgamesmagazine.com.

Solutions To Puzzles from AG4

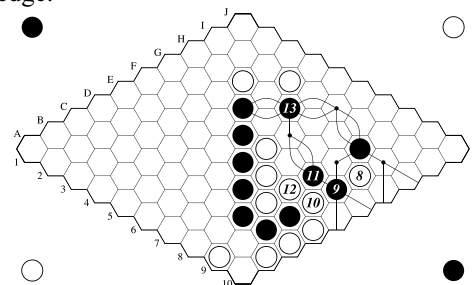


Solution H: 120 is the maximum number of moves that can be made on the 11x11 board before the game is won by either player. A spiral pattern that produces this result is shown. The next player to move will win the game, in keeping with the property of Hex that no game can end in a tie.

Not surprisingly, the total number of moves that can be made on a general $n \times n$ board before either player wins is $n^2 - 1$. A similar spiral pattern can be constructed to demonstrate this for any $n \times n$ board, although the pattern will be asymmetrical in the central four hexagons for even-sided boards.



Solution I: C8. The first thing to establish is that Black's solid line of pieces is connected to the top left edge. This is non-trivial, but we can simplify the task by realizing that Black has a single-move edge template connection next move if White plays anywhere except in the shaded area. By process of elimination we can demonstrate that none of these moves stops Black connecting to the top left edge.



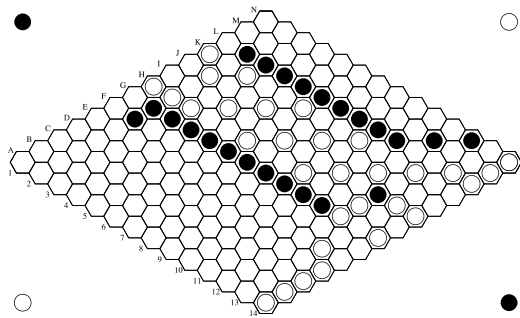
Having demonstrated Black's connection to the top left, we now concentrate on the connection to the bottom right edge. Points *p*, *q* and *r* look particularly promising. However, a move at *p* that attempts to connect through the gap and down is easily refuted by White. Similarly, a move at *q* that forces a ladder up column B can be defeated by White with move C2.

1 C8 at *r* is Black's only move. White is forced to reply 2 B10, then Black can force a ladder with moves 3 and 5 before playing the killer move 7 H8, against which White has no defense.

This puzzle is drawn from an actual game position and demonstrates that every move in a game of Hex is an exercise in problem solving—some more difficult than others! It is one of the

few puzzles to require the solution of connections to both edges, and while many Hex problems can be solved in non-unique ways, this puzzle has only one solution as far as we know.

Puzzles



Puzzle J: Black to play and win.

This puzzle was devised by Claude Berge, who would like to point out that it was misprinted in its original publication [Berge 1981] because it was missing the Black piece at G11. This omission invalidates the puzzle, as demonstrated in Appendix B of *Hex Strategy: Making the Right Connections*. ■

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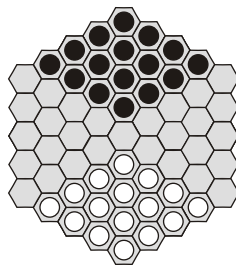
*If any readers wish to obtain the source code, please email us at info@abstractgamesmagazine.com. – Ed.

Solutions to Twixt Puzzles

Puzzle 1: 1.I7* (not 1.M9* L4) H7* (or 1...J5, 2.J6*) 2.J10** J6*, 3.L5 K5, 4.J4* threatening K6** or M7**.

Puzzle 2: 1.D10 (not 1.G12 F11*, 2.E11* (threatening E7*) D11*, 3.F14* H12**; nor 1.E11 D11*, 2.F9* F7*, 3.F13* G9**, 4.K13 K14) 1...C10* (or 1...D11*, 2.E8* D8*, 3.F10** C9*, 4.E12**) 2.F9* F7*, 3.H10** B12*, 4.D15* E11* (or 4...D13*, 5.F14*) 5.F14* G12*, 6.I13 H12*, 7.H13* (threatening G11**) F13**, 8.K14* M13, 9.N13.

Puzzle 3: 1.I7* H8*, 2.H9** K5**, 3.G7* F5 (3...G5*, 4.F5* E4*, 5.C4* D6*, 6.C8* E8*, 7.D10*) 4.F4 (not 4.F6 E7* threatening G6**) G3*, 5.E6** (not 5.D5** E7*, 6.C8* F9**, 7.C12 B12) E4*, 6.C4* D6*, 7.C8* E8*.



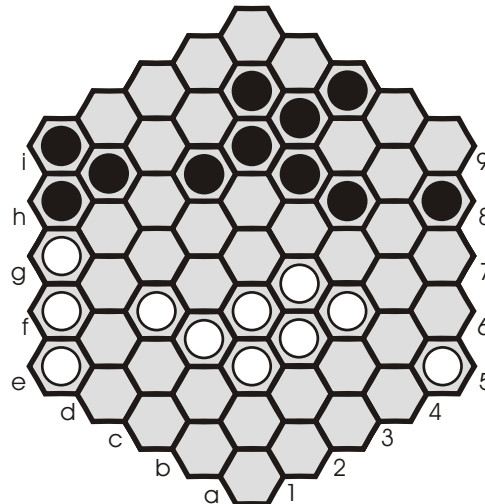
Hexdame

A nice combination

by Fred Kok

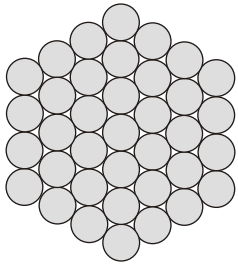
Hexdame was devised by Christian Freeling, inventor also of Grand Chess and Havannah, to name a just a few of my favorite games. According to the Fédération Mondiale du Jeu de Dames (FMJD), which should be considered the international arbiter of the rules of many of the checkers variants, "The rules of HexDame mimic the rules of International Draughts to the last detail. The only differences are the ones inherent in the hexagonal board." In other words, the unpromoted men have a choice of *three* spaces to move to, directly forward or forward to the left or right, and they may capture in any of *six* directions. Likewise, kings may move and capture any number of spaces in a straight line in any of the *six* directions. The starting position is shown at the top of this column. It can be seen that there are now *nine* possible promotion spaces. Lastly, the rules governing declaration of a draw in International Checkers with three kings against one are not applicable in Hexdame. Actually, there are likely to be fewer draws in Hexdame because a lone king can be trapped and captured by only three opposing kings, whereas International Checkers requires four. For this reason alone the FMJD is actively promoting Hexdame as an alternative to the square game.

Recently I played an unofficial match for the provincial championship of North Holland against Marco Goverde. Goverde was 2-1 up, but in the 4th game I had a nice combination.



In this position I played: 1.c5d6! e7:c5:e5, 2.d4:f6:h6 h5:h7, 3.e3f4 h7h6, 4.f4g4 h4:f4, 5.g3h4 i5:g3, 6.f2:h4 h6h5! Black fights back. A hexagonal king is very powerful, so Black is forced to invest some pieces in the defense. 7.h4:h6 g7g6, 8.h6:f6:f8 g9:e7, 9.e1f2! White walks away to the promotion zone, and there is nothing Black can do. After a few moves Black resigned. The match ended in a 9 ½ - 3 ½ victory for me.

Unfortunately Hexdame has few followers at the moment. At the Mind Sports Olympiad in 1998 we had six participants, in 1999 there were seven players, and in 2000 eleven. It seems that many players want to stick to their old-fashioned games. But I am convinced the readers of this magazine are more open to experimentation! ■

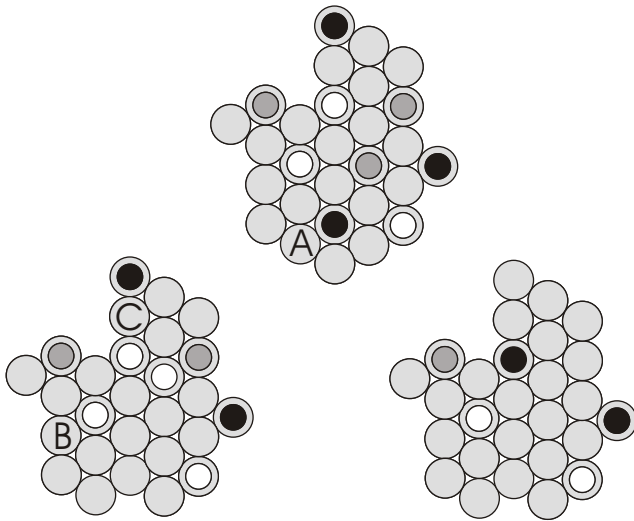


Strategy Guide Part 3

by Stephen Tavener

Sente

Sente is a term I have borrowed from Go, but which is very useful for Zèrtz as well. In Zèrtz a player is said to have *sente* when he is not obliged to capture, and therefore has a free choice of move. A move that does not force your opponent to capture, and therefore gives the initiative to your opponent, is said to be *gote*. Playing *sente* moves is a good thing, since once the board has shrunk a little *sente* is probably worth two balls of your choice. Bearing this in mind, look at the following rather crowded position at the top of the following diagram (taken from an actual game):



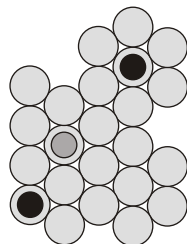
Keeping *sente*

By playing a white ball at A, you can set up the capture of two white balls in two ways. Capturing two white balls, and ending at B may be your first choice, but this is a *gote* move. (It gives your opponent *sente*.) However, if you capture two white balls and end at C, your opponent must recapture, leaving you with *sente* in the position to the bottom right.

When the board is crowded, it is always worth looking for a combination that lets you keep *sente*. In order of priority:

1. Look for a win.
2. Look for a *sente* move.
3. Look for a move that doesn't lose!

Puzzle: Sacrifice two black and one grey for a white, and keep *sente*.



See AG9 for puzzle solution and next installment in the series. ■

In most two-player abstract games the players begin with equal forces. In some traditional games, however, the two sides will have different forces and different objectives. Designing games of unequal force is difficult for game inventors because of the problem of getting the balance just right so that both sides have an equal chance to win. The Second Game Design Competition (see page 16), which asks for such games, will be a real challenge!

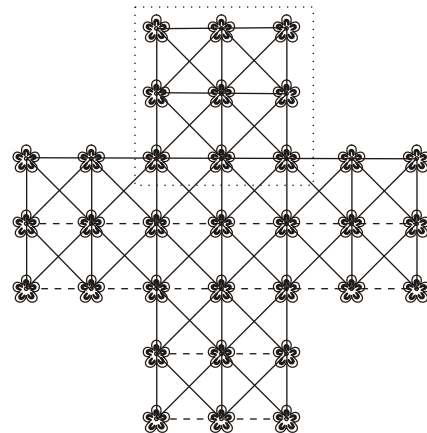
The two major traditional genres of these unequal force games are the Fox and Geese group and the Tafl group. The latter type of game usually involves a king, aided by his defenders, attempting to escape from an invading army. The typical thematic setting of the former is a group of hunters chasing down and trapping some prey.

Although historically the Fox and Geese games have been played in Europe on an Alquerque board and on a board constructed by joining together five smaller Morris boards in the form of a cross, readers will probably be most familiar with versions of the game on an 8x8 checkered board. Opposite, John Beasley takes as his starting point the simplest form of this game and develops it into something much more sophisticated. John is the secretary of the British Chess Variants Society, and one of the team who produces their magazine Variant Chess. He is a well-known writer on peg solitaire, on other mathematical games, and on (orthodox) Chess endgame studies.

Variations of Fox and Geese were still being developed in the nineteenth century for the older, cross-shaped board, usually inspired by military events of the time. Transvaal, below, is a typical game of this type. It was discovered in the British Library by David Pritchard. —Ed.

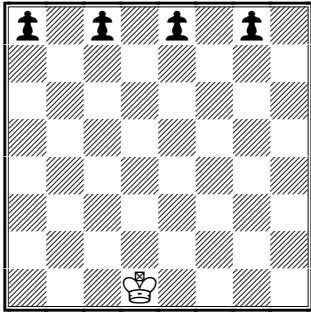
Transvaal

This is a game for two players based on the siege of Ladysmith in the Second Boer (South African) War 1899-1902. The game was marketed by Saussine of Paris at the turn of the century.



Rules

1. There are two defenders, which initially occupy any two points of the fortress (Ladysmith)—the top nine points of the board.
2. There are 24 Boer attackers, which initially occupy all the points outside the fortress.
3. The players take turns to move. The attackers move first.
4. The attackers move forward or sideways only, one point at a time, along the **solid** lines only, and not along the **broken** lines.
5. The defenders move one point at a time in any direction.
6. Only the defenders may capture. Capture is by the short leap (as in Checkers) in any direction.
7. The attackers win if they occupy all nine points of the fortress.
8. The defenders win if they can retain one man or both men in the fortress or if the attackers cannot occupy all nine points. ■



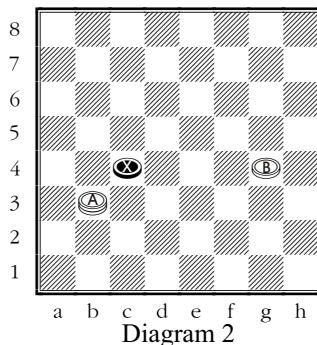
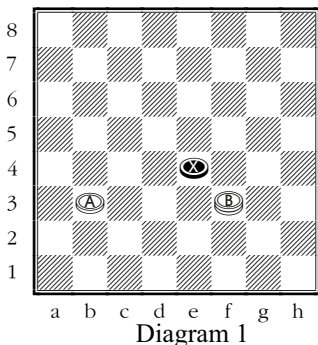
Moving on from Fox and Geese

by John Beasley

This little article describes an exploration. Some of it has already appeared in print (in *Chessics* 18, 1984, pp 18-19 and 23, and more briefly in David Pritchard's *The Encyclopedia of Chess Variants*, 1994, p 259), but the new material leads on from the old and perhaps it is easiest for new readers if I start from square one.

One of the games books of my childhood described a chessboard game called "Fox and Geese." (See the diagram at the top left of this page.) White had a fox able to move one square diagonally in any direction, Black four geese only able to move one square diagonally forward; the fox aimed to reach the geese's back rank, the geese tried to hem him in (no capturing). I eventually satisfied myself that the geese could always win, and the analysis caused me to wonder whether there might be other games of the same kind.

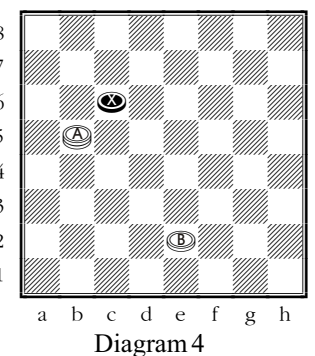
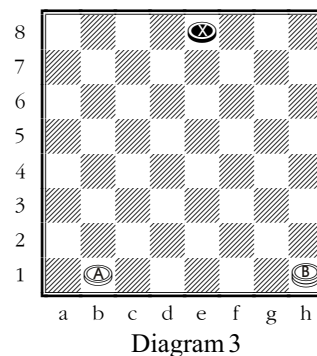
The objective which interested me was not the hemming-in, but the reaching of the opponent's back rank. This led me to consider the following rules: (1) one White man carries a ball and can move one square diagonally in any direction, White's other men cannot move; (2) instead of moving, the carrier may pass the ball to a man on a lower rank, but not to a man on an equal or higher rank; (3) Black's men can move one square diagonally in any direction; (4) White cannot capture, Black can capture the ball carrier but not any of the other men; (5) White wins by carrying the ball to the eighth rank, Black by preventing him (or by capturing the ball carrier). This produced "Rugby Chess," which might be thought of as a form of Fox and Geese with multiple foxes, only one of whom can run at once.



At first sight, this game is trivial. Consider the two-against-one position shown in Diagram 1. (In our diagrams the checker king will represent the man with the ball.) White plays **1.Bg4**, and Black naturally shadows him by **1...Xf5**. White passes, **2.B>A**, and Black must transfer his attention to A: **2...Xe4**. There follows **3-4.Ab5 Xc6** (else **5.Ac6** and White will score) **5.A>B Xd5**, **6-7.Bg6 Xf7**, **8.B>A** and Black has been run off his feet.

But Black can do better: **1...Xd5!** Black ignores the man with the ball, and concentrates on the man without it! But now the pass **2.B>A** can be met by **2...Xc4** (Diagram 2), after which Black

will hold A to the diagonal d1-a4 and he will never get far enough forward to pass back. Alternatively, White can try **2-3.Bg6** before passing, but Black replies **3...Xf7** (Black patrols the diagonal d5-g8, always keeping one rank above B), and after **4.B>A** there follows **4...Xe6**, **5.Ac4** (or **a4**) **Xd5** and again A will never be able to get far enough forward to pass back. Diagram 1 is in fact a win for Black.



The natural two-against-one games start with the men on the back rank and White to move. All these games are won for White, and most are easy (the ball carrier moves to e4, forcing Black to play to d5, and then passes). But if we try this with the non-carrier on b1 (Diagram 3) we find **1-3.Be4 Xd5**, **4.B>A Xc4** and again A will never be able to get far enough forward to pass back. There is a win from Diagram 3, but it is much more difficult: **1-3.Be2 Xd5**, **4.B>A Xc4**, **5.Ac2** (5. Aa2 Xb3 and wins) **5...Xd3** (5...Xb3, 6.Ad3 and 7.A>B as below) **6.Ab3 Xc4**, **7.Aa4 Xd5** (7...Xb5, 8.A>B and wins, 8...Xc4, 9-11.Bh5 Xf5, 12.B>A Xe6, 13-14.Aa6 Xc6, 15.A>B and 16-18.Bg8) **8.Ab5 Xc6** (see Diagram 4) **9.Ac4!** (9.A>B Xd5 and B will be penned in) **9...Xd5**, **10.Ad3!! Xc4**, **11.A>B Xd5** (or **f5**) (11...Xf3, 12.Bd1 Xc4, 13-14.Bb3 Xc4, 15. Ba4 Xb5, 16.B>A, etc. or 15...Xd5, 16-17.Ba6 Xb7, 18.B>A) **12.Bf3 Xc4**, **13.Bg4 Xd5** (13...Xf5, 14.B>A Xc4, 15-17.Aa6 Xb7, 18.A>B) **14.Bf5 Xc6**, **15.Be4!** (15.Bg6 Xf7, 16.B>A Xc6 and Black wins) **15...Xd5**, **16.B>A Xc4** (16...Xe6, 17-18.Ab5 Xc6, 19.A>B) **17.Ae2 Xd5**, **18-20.Ah5 Xc6** (20...Xg6, 21.A>B) **21.Ag6 Xf7**, **22.Ah7 Xg8**, **23.A>B** and **24-27.Ba8**. The ball carriers have made no fewer than five backward moves, three of which have been directly towards the non-carrier in a manner which is the exact opposite of what might seem intuitively obvious (we would expect to pass from a distance, not to run towards the non-carrier and pass at close quarters). Additionally, against Black's best play it is the man who started at h1 who eventually scores at a8, while his companion from b1 finishes at h7.

So two men against one is a win for White, if not always an easy win. What happens with more men? On an 8x8 board, nothing, because if Black has two men he can put one at c8 and play the other back and forth between g8 and f7, and the ball carrier will never get past. But perhaps the game is playable with more

men on a larger board.

Seeking to extend the game within the 8x8 board, I tried giving Black as many men as White but pairing them off, one Black against each White, and permitting only the Black man corresponding to the current ball carrier to move. This produces a game of totally different character. White can now get the Black men to obstruct each other, and it is necessary to allow Black to capture men other than the ball carrier if it is not to be too easy for White to win.

We give five illustrative games, each starting from the position of Diagram 5. The loser makes mistakes, but they are no worse than the errors that result in seven-move classics such as the Legall Mate and Blackburne's Shilling Game in ordinary Chess. (See below.)

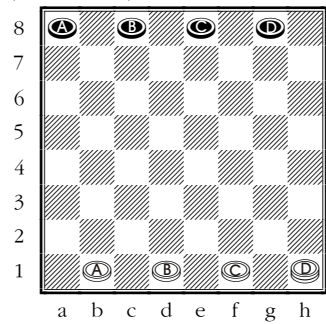


Diagram 5

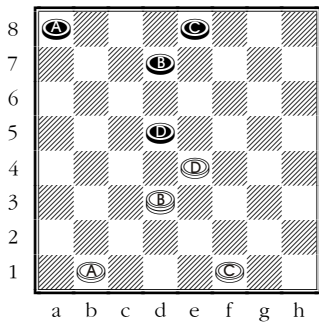


Diagram 6

Game 1 starts **1-3.De4 Dd5, 4.D>B Bd7, 5.Be2**. If Black now plays **5...Bc6**, the continuation **6.Bf3 Bd7** will give Diagram 6 with Bf3 instead of Bd3, and White will play **7.B>C** and score at c8. Hence **5...Be6**, and **6.Bd3 Bd7** gives Diagram 6 as is. Now **7.B>C Cf7, 8-10.Cc2 C:e4, 11.Cb3 C:d3** gives Diagram 7, and White wins by **12.C>A** and **13-21.Ae8** (or **12.Ca4 Cc4, 13.C>A** and scores one move sooner). White will have only one man left on the board, but it is sufficient. White can also pass to A in Diagram 6: **7.B>A Ab7, 8-12.Ag4 A:e4, 13.A>C**, etc.

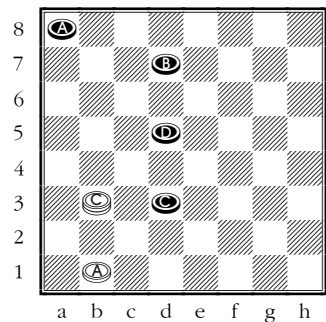


Diagram 7

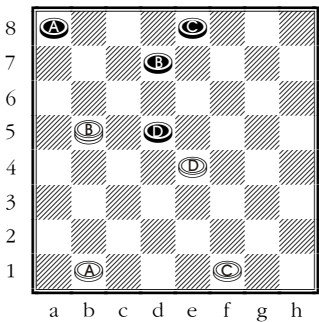


Diagram 8

In Game 2, Black avoids Diagram 6 by playing **6...Bf5**. White's continuation **7-8.Bb5** forces **8...Bd7** anyway (else 9-11.Bc8), but now a pass to C will be fruitless because there is no way through on the left (Diagram 8). However, White can still pass to A, and Black's A will then have to clear the obstruction from b5: **9.B>A! Ab7, 10-11.Ad3 A:b5, 12-14.Ag4 A:e4, 15.A>C** and **16-22.Cc8**.

Legall Mate (*Oxford Companion to Chess*, 1992 edition, p 221): 1.e4 e5, 2.Bc4 d6, 3.Nf3 Bg4, 4.Nc3 g6, 5.Nxe5 Bxd1, 6.Bxf7+ Ke7, 7.Nd5 mate. Blackburne's Shilling Game (*Oxford Companion*, p 474): 1.e4 e5, 2.Nf3 Nc6, 3.Bc4 Nd4, 4.Nxe5 Qg5, 5.Nxf7 Qxg2, 6.Rf1 Qxe4+, 7.Be2 Nf3 mate
I have brought both off in actual play, the Blackburne even when playing blindfold. – JB

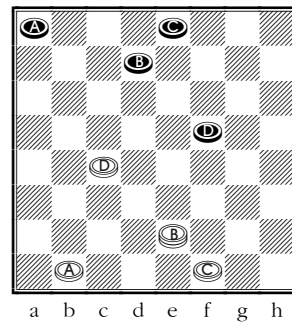


Diagram 9 (BTM)

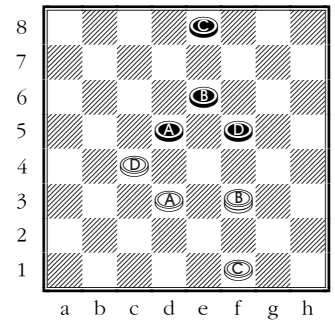


Diagram 10

In Game 3, Black has had enough of ...Dd5, and he tries **3...Df5**. There follows **4.Dd5 Dg6** (4...De6 loses) **5.Dc4 Df5, 6.D>B Bd7, 7.Be2**, and we have Diagram 9. If Black now plays **7...Be6**, White continues **8.B>A Ab7, 9-10.Ad3 Ad5** (else 11.Ae4 and 12-17.Ag8) **11.A>B Bd7, 12.Bf3 Be6**, giving Diagram 10. Now **13.Be2** is met by **13...Bd7** and **13.Bg4** by **13...Bf7**, in each case leaving White's C with no way through, but if White plays **13.Be4** or **13.Bg2** Black is helpless: **13...Bd7** (or f7) **14.B>C** and scores on c8 or g8 as appropriate.

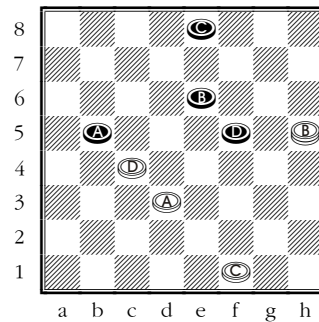


Diagram 11

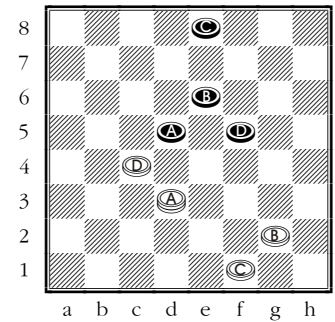
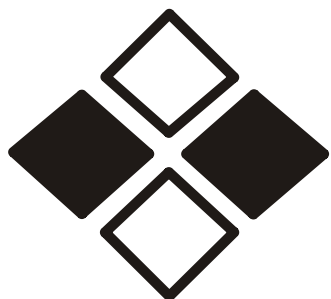


Diagram 12

In Game 4 Black tries to avoid this by playing **7...Bc6** in Diagram 9. However, White still plays **8.B>A**, and after **8...Ab7, 9-10.Ad3 Ab5** (10...Ab7, 11-12.Ad5 Ad7, 13. A>D and scores, 10...Ad7, 11.Ae4 Ae6, 12.A>B) **11.A>B Bd5, 12.Bf3 Be4, 13-14.Bh5 Be6** we have Diagram 11. Now two passes clinch matters: **15.B>D De4** (else 16.Dd5, etc.) **16.D>A**. Alternatively, Black can try **12...B:c4**, but after **13.Be4 Bd5, 14.B>A Ac6** (14...Ac4, 15-17.Ag4 Ad7, 18. A>C) **15-16.Af3 Ae6** we have a position similar to Diagram 10 but with e4 blocked, and this time White's winning move is unique: **17.Ag2!**

The conclusion of Game 5 combines these motifs. Black plays his third option in Diagram 9, **7...Bc8**, and **8-9.Bg2 Be6, 10.B>A Ab7, 11-12.Ad3 Ad5** gives Diagram 12. Now the immediate pass **13.A>C** leads nowhere, but if White plays **13.A>B!**, and then **14. B>C!**, Black is helpless.

Black can play differently, and I have not yet determined the best-play result from Diagram 5 (let alone from each of the other possible starting positions). But even if these games, like the original Fox and Geese, are analyzable trifles rather than vehicles for serious competition, they show how simple and straightforward rules can sometimes produce games yielding surprisingly elegant play. The winning maneuvers in Diagrams 6-8 and 10-12, like the backward moves of the ball carrier in Diagram 4, all arise in play from natural starting positions; they are in no sense artificially composed problems. ■



8x8 Game Design Competition

Four More Games

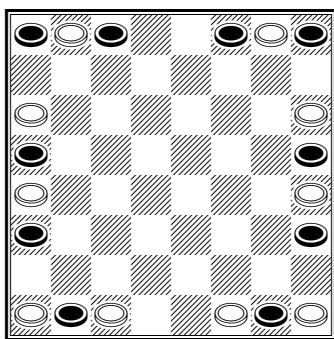
by Kerry Handsomb

Here are four more fine games from the First Game Design Competition. It is an indication of the overall quality of the entries that we can do this. And there are *still* some interesting games that deserve recognition. Following the success of the first competition we have decided to hold a second. Details are given on page 16.

Three Crowns is a game that I want to investigate more. Every game is a sharp tactical battle; it is perhaps the most sophisticated three-in-a-row game I have come across. At the other end of the seriousness scale is Robo Battle Pigs: the inventor describes it as a fight to the death between two rubber pigs, as each attempts to inflict damage by laser or “powerful robot fist.” Mozaic is an alignment game with a very nice mechanism for increasing uncertainty and excitement towards the end of the game. Lastly, I have included Square Board Connect, not because it is a great game, as I think there are a number of connection games that are much more interesting tactically, but rather because it is a very simple, neat idea.

Three Crowns

Three Crowns was invented by Larry Back. It is a game for two players, White and Black, played on an 8x8 board. There are ten white pieces and ten black pieces, initially arranged as shown in the diagram. For crowning purposes extra pieces may be used.



Three Crowns opening position

The pieces are of two types, *crowned* and *uncrowned*. Initially, all pieces are uncrowned.

White has the first turn, and players alternate turns throughout the game. When not making a jumping move, a turn consists of moving a piece, crowned or uncrowned, one square in any direction to an adjacent unoccupied square. On each turn a piece must be moved: it is not permitted to pass. On White's second turn White is restricted to moving the same piece he moved on his first turn. On all other turns, for both White and Black, any piece may be moved. (This rule is intended to offset White's advantage of moving first.)

A *troika* is a formation of three or more uncrowned pieces

in a straight line, orthogonally or diagonally, all belonging to the same player. If an uncrowned piece becomes part of a troika after moving to an adjacent square, then this uncrowned piece is crowned. (Depending on the kind of pieces being used to play the game crowning may be achieved either by placing another piece on top of the uncrowned piece, or by flipping the uncrowned piece over, or by replacing it with a different type of piece.) *At no time in the game can either player have a troika on the board after the completion of a move.*

Instead of moving to an adjacent square a piece, crowned or uncrowned, can make a double jump over two pieces belonging to the opponent. Crowned pieces can only jump over the opponent's uncrowned pieces. Uncrowned pieces can only jump over the opponent's crowned pieces. The jumping piece moves in a straight line, diagonally or orthogonally, over an adjacent opponent's piece into a vacant square immediately beyond the jumped piece. After making one jumping move a piece must make a second jumping move. The second jumping move can be made in a different direction. Continuing with a third jumping move is not permitted. If no second jumping move is possible, then the first jumping move cannot be made. Jumping moves are not compulsory: a player with the opportunity to jump may make another move instead. To clarify, the pieces jump as they do in Halma or Checkers, except:

- All jumping moves must be double jumps.
- Neither single jumps nor triple jumps are allowed.
- Black pieces cannot jump over black pieces.
- White pieces cannot jump over white pieces.
- Uncrowned pieces cannot jump over uncrowned pieces.
- Crowned pieces cannot jump over crowned pieces.

When two uncrowned pieces are jumped over then the second jumped uncrowned piece is captured and removed from the board. When two crowned pieces are jumped over then, as long as it would not become part of a troika, the second jumped crowned piece is uncrowned. If a troika would result from uncrowning the second jumped crowned piece, then, instead of being uncrowned, the second jumped crowned piece is captured and removed from the board. If an uncrowned piece becomes part of a troika after making a double jump, then this uncrowned piece is crowned. At the same time the second jumped crowned piece is either uncrowned or captured, as appropriate.

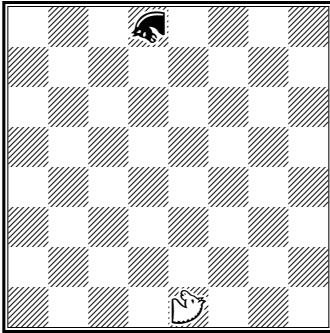
A *crowned troika* is a formation of three or more crowned pieces in a straight line, orthogonally or diagonally, all belonging to the same player. The first player either to capture three pieces or get a crowned troika wins the game. (A crowned troika can be achieved either by moving or double jumping a crowned piece to a square where it is part of a crowned troika or by moving or double jumping an uncrowned piece to a square where it becomes a crowned piece and, at the same time, is part of a crowned troika.)

If the same position has occurred for the third time in the game, with the same player having the next move each time, then either player can declare a draw. A game can also end in a draw if both

players agree to a draw.

Robo Battle Pigs

Robo Battle Pigs was designed by Randy Cox. It is a game for two players, each of whom controls a pig that moves around the board attempting to inflict damage on the enemy pig. (Randy uses rubber pieces from the game *Pass the Pigs*, although Chess knights work just as well since they can be positioned to face in a specific direction.) In addition to the 8x8 board and two pigs, each player needs pencil and paper. The objective is to destroy your opponent's pig by inflicting five points of damage to it, either by laser or by robot fist. The pigs start the game on the squares shown in the diagram, with both pigs facing forward towards the opposite sides of the board.



Robo Battle Pigs opening position

Each round of the game consists of five moves. Both players plan their five moves for each round in advance, recording them on paper as an ordered series of five commands. The players then reveal their "programs." The instructions for the first move are executed by each pig simultaneously, and any consequences resolved before the second move; then the instructions for the second move are executed simultaneously, with any consequences resolved; and so on through all five moves. The following is a list of the ten possible commands for each move:

- | | |
|-------------------|---|
| (^) Forward | Walk forward one space |
| (v) Backward | Walk backward one space |
| (\) Forward Left | Walk diagonally to the left one space |
| (/) Forward Right | Walk diagonally to the right one space |
| (TL) Turn Left | Rotate 90° left (counter-clockwise) |
| (TR) Turn Right | Rotate 90° right (clockwise) |
| (F) Fire | Fire forward-pointing laser |
| (H) Hit | Swing massive robot punching arm |
| (R) Repair | Repair one point of damage (uses all 5 moves) |
| (X) Damage | Do nothing (the result of being damaged) |

All movement directions are relative to the direction that the pig is facing. For example, a pig facing east that moves backwards is moving west. When moving Forward Left or Forward Right, a pig maintains the same facing. (i.e., if it was facing north, then moved Forward Left, the pig ends up still facing north.)

The pigs cannot both occupy the same square on the board at the end of a move. Here are the possible collision states, and what to do about them.

- Pigs move onto the same square:
Neither pig moves.
- One pig moves onto a square where the other pig rotates, repairs, or takes a damage move:

The moving pig stays in the original square, and the other carries out its action.

- Face-to-face, back-to-back, or corner-to-corner pigs attempt to move "through" each other to occupy each other's original spaces:
Neither pig moves.
- Side-to-side pigs attempt to cross paths diagonally:
Both pigs complete their desired moves.
- One pig moves onto the square that the other pig leaves:
Both pigs complete their desired moves.

The Fire and Hit commands are the only ways to damage your opponent's pig. Firing the laser will hit a pig directly in front of you, no matter the range. Hitting will damage a pig standing in any of the three adjacent forward squares. For example, from the starting position the White pig's laser would strafe squares e2, e3, e4, e5, e6, e7, and e8; the White pig's robot arm would hit squares d2, e2, and f2. An opposing pig on one of these squares would sustain one point of damage.

If a pig is damaged, on subsequent rounds, it must play a damage move (X) for each point of damage it has incurred. This damage move can be played at any time during the round. It reflects the fact that the injured pig is performing less efficiently. For example, if a pig has incurred three damage points, its commands for a round may look like this: ^ X X H X. This means that on the first move, it walks forward; then it does nothing for the next two moves; then it hits on the fourth move; and it does nothing again on the fifth move. Remember, the damage moves can be played at any point during the round.

If a pig has been damaged, it may be repaired. To repair, the player writes "R R R R R" as his command set for a given round. During this round the pig does not move or attack. One round of repairs reduces the pig's damage score by one point. A pig can receive damage from its opponent while it is attempting to repair itself. (If it gets hit twice while it is repairing, for example, then subtract one damage point for the repair and add two for the damage.)

Once one round is over the players each write their commands for the next five moves, which constitute the next round. The game continues in this way until one pig has sustained five points of damage. At this time the game ends immediately, and the opposing pig is declared the winner.

Mozaic

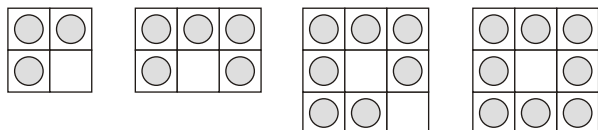
Mozaic is a game invented by Martin Samuel. It is for two players and is played on an 8x8 board. There are 67 pieces, or "gems": 32 yellow "topazes," 32 blue "sapphires," 1 red "ruby," 1 green "emerald," and 1 white "diamond." The board starts off empty and the gems are all contained in a bag, from which they will be drawn one by one randomly during the game. Also required are some paper and a pencil for scoring.

Most game players should be able to improvise a set of pieces from their game collections. But if you want the "real thing," small, colored glass or plastic stones can be obtained fairly inexpensively—I have seen them sold in toy stores as "Pirate Gems."

To start the game, players take turns to draw a gem from the bag until one player draws a topaz. She is represented by this color throughout the game; her opponent is represented by sapphire. The player puts the topaz on any square and any other gems are returned to the bag. Thereafter, the players take turns to draw gems from the bag, one at a time, placing them on empty squares in an attempt to create and block scoring patterns. Every gem must be played as it is drawn, by the player who drew it. Topaz and

sapphire gems are placed in vacant squares on the board; ruby, emerald and diamond gems necessitate some special action, or “exception,” and are then returned to the bag to complete the player’s turn.

Whenever a 2x2 square of gems of the same color is formed, the player represented by that color scores 4 points. It is also possible for 2, 3, or 4 squares to be formed simultaneously, for scores of 8, 12 and 16, respectively.



One more gem added to these patterns will score 4, 8, 12, and 16 points, respectively.

Emerald Exception: The player moves any gem on the board one space diagonally to a vacant space and returns the emerald to the bag.

Ruby Exception: The player misses a turn and returns the ruby to the bag.

Diamond Exception: The player removes any gem from the board and returns it and the diamond to the bag.

Once a gem is played onto the board it cannot be moved other than by emerald or diamond exceptions. The game is over when all 64 topaz and sapphire gems have been played to the board. The player with the higher score wins.

The end of the game can be quite long and exciting as players draw one exception after another. I think this is the best part of the game. For this reason, Mozaic may be even better if played on a smaller board, say 6x6, so that there is a higher probability of drawing exceptions right from the start.

Square Board Connect

Square Board Connect is a pure, Hex-like connection game invented by Roger Cooper. According to Roger his inspiration was Larry Back’s Onyx article in *AG4*, in which Larry discussed the difficulty of creating a connection game for a squared board.

Although it may be played on an 8x8 grid of squares, a larger board, perhaps 10x10 or even 12x12, may be preferable. Also required are a sufficient number of black and white pieces. There are two players, Black and White. Black is attempting to connect the top and bottom of the board with black pieces, while White is attempting to connect the left and right sides of the board with white pieces. The players move alternately, with Black moving first. On each move a player places one, two, or three pieces of his color on vacant squares. If more than one piece is played, the pieces must be placed in a straight, orthogonal (*not* diagonal) line adjacent to each other. The first player to connect his sides wins. Connections are between adjacent pieces. Diagonal connections are allowed. To compensate for Black’s advantage of moving first, on the first move Black can only place a maximum of two pieces. ■

Grand Chess Problem Contest

The response to the Contest has been very positive! Here are the standings as of the end of August:

8 points: Vincent Everaert, Andrew B. Perkis, David Pritchard

5 points: Graham Allen, Joseph E.E. Peterson

3 points: Andre Engels, Jorge Gomez Arrausi, Fred Kok

1 point: L.Lynn Smith.



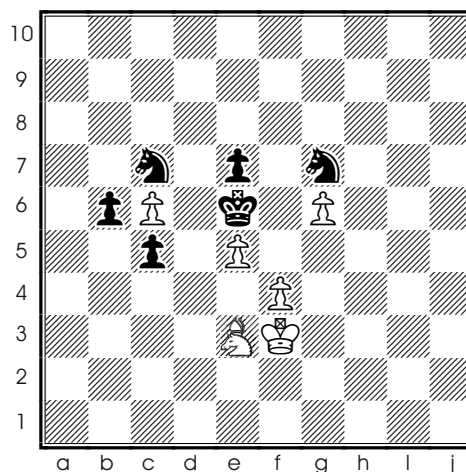
The Grand Chess Corner

by Tony Gardner

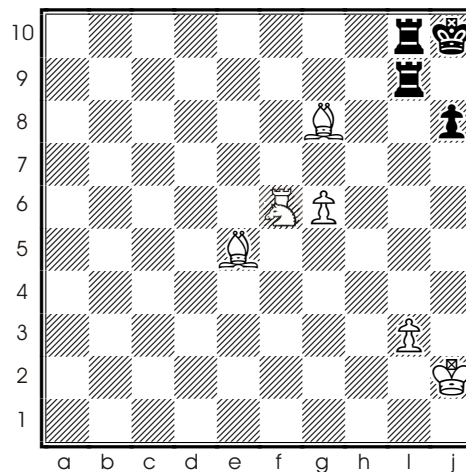
Readers are probably wondering where they can procure a 10x10 board. Though Grand Chess sets are not commonly available, there are a few choices. Deluxe wooden boards can be purchased from <http://www.mindsports.net>, but they are costly and must be shipped from Holland. Omega Chess and Super Chess sets can be bought and converted for play. The last resort is constructing a board out of paper or cardboard and fashioning pieces from several sets of plastic chessmen.

Here is a correspondence game from last year: Ken Wheeler-Tony Gardner, 2000 1.Rae1 f6, 2.d4 Cxa3, 3.Nc4 Cg9, 4.Nh4 g7, 5.Kd1 Ng8, 6.f4 Nc7, 7.e5 d7, 8.Re2 Ne7, 9.exf6 Ned5, 10.fxg7 Nb5, 11.Re3 Nxe3+, 12.Qxe3 hxg7, 13.g4 c7, 14.Ne5 Na3, 15.Nhg6 Rad10, 16.Md2 Nxc2, 17.Kxc2 Qa6, 18.Rb1 Rjh10, 19.Kd1 i7, 20.i4 Bi8, 21.h5 d6, 22.Nc6 Bxg6, 23.hxg6 Rxh2, White Resigns.

Here are the next two problems:



PROBLEM #5 Mate in 2



PROBLEM #6 Mate in 3

(Note: Please submit supporting lines for mates in three or longer.)



Chu Shogi

...the game of lions

by R. Wayne Schmittberger

Our discussion of step-moving pieces picks up from the position at the end of last issue's column, taken from a correspondence game between me (Black) and Victor Contoski (White).

12	11	10	9	8	7	6	5	4	3	2	1	
香	飛	飛	金	金	王	金	銀	銀	香			a
反	豎			盲	麒麟	盲	角		反			b
	角		馬	龍	奔	龍	飛	馬	飛			c
橫			步	步	步	步	步	銅	橫			d
步	步		銅	獅		步	步	步	步	步	步	e
	步	步	步	仲								f
					獅		仲	步				g
步	步	步	仲	步	步	步	步			步	步	h
橫			步	鳳	銅	銀	步			橫		i
猛	豎	飛	馬		龍	奔	銅	馬	飛	猛		j
反		角	銀	盲	麒麟	盲	角	豎	反			k
香				金	王	醉	金			香		l

Position after 33. ...Ln-8e

From the diagram the game continued: 34.VM-11k (This enables Black to defend against White GB-9g with B-11j.) 34....P-8g, 35.FL-2i GB-9g (Black cannot capture on 8g or 9g without allowing the White lion next to his pawns.) 36.B-2j DH-10c, 37.B-11j DH-4b, 38.FL-11i FL-10b (Since Black will have a ferocious leopard and a silver ready to exchange for White's advancing copper and silver, White correctly begins to bring up another step mover.) 39.R-10l P-9e, 40.S-10j Ln-8f, 41.Ln-6i C-9f?! (Ordinarily, a copper in front of a pawn can be considered "bad shape"—a term that will be familiar to Go and Shogi players. Because the pawn blocks the copper's only retreat, the copper will be at risk of being captured by Black's 9-pawn until it can advance to 8g or 10g. Whether or not Black can exploit the position of this copper is an important theme in this stage of the game; see moves 56 and 63.) 42.G-9k (Black prepares to defend the flank with a third step mover because of White's ferocious leopard move. Because golds are strong defensive pieces, it is a common strategy to keep one gold, along with the drunk elephant and blind tigers, near one's king as a sort of castle. However, one gold can easily be spared and sent to the front lines for attack or defense, and often a position will call for more of these "castle pieces" to leave the king.) 42....P-12f, 43.P-2g P-10g, 44.S-10i FL-9c, 45.Ky-8j FL-10d, 46.FL-2h S-10f, 47.P-3f DH-3a, 48.VM-3k Ph-5d, 49.FL-3g FL-11e, 50.S-4h DH-7f?! (This move allows Black to advance his 6-pawn, which would otherwise fall after White plays Ln-7f.) 51.P-6g Ln-10e, 52.P-7g DH-9d, 53.Ln-7h Ln-8f, 54.Px8g Lnx7g-7f, 55.C-8h P-6e, 56.Ln-5g (If 56.GBx9g Cx9g, 57.Cx9g P-9f!. If Black tries to avoid the bishop attack on his dragon horse with

56.C-5i, White can play Lnx8g-8f. For now, the copper on 9f remains safe from capture.) 56....Ln-6d, 57.Ln-7g DK-6c, 58.C-5i Ln-8e (The GB9g is now defended four times.) 59.C-6h BT-7b, 60.P-5g Ky-6d, 61.DH-4k (This reinforces 8g and allows the R3j to move to 5j or beyond.) 61....P-7e, 62.P-5f (The defense of 5e by kylin and phoenix, rather than by a copper on 6d or 5d, invites Black to attack on the 5-file. Perhaps White's early deployment of a copper to 3d was too committal.) 62....P-7f, 63.Ln-5h GBx9h (This helps Black by freeing his game on this wing, but the possibility of Black GBx9g is burdening White's pieces too much. For example, White cannot play 63....P-11g because the S10f becomes overworked. And so, White's 41st move proves to be a liability after all.) 64.Px9h P-11g, 65.GB-4f FL-11f, 66.G-10j Px10h, 67.Sx10h C-10g, 68.Px11g (Black reluctantly helps White's silver advance, thereby giving up a tempo, because he wants to establish a strong point on 10h that will make it hard for White to break into the promotion zone. Black is also concerned about variations in which the undefended status of the R10l comes into play; e.g., if 68.G-10i Px11h, 69.FLx10h Cx10h, 70.Gx10h S-11g and the S10h is pinned.) 68....Sx11g, 69.G-10i Ln-9f, 70. Ky-10j FK-9a, 71.S-4g Lnx8g-8f, 72.Px5e Phx5e, 73. C-5g Ky-7e, 74.S-5f Ph-7c, 75.P-4h S-4b, 76.P-4g.

12	11	10	9	8	7	6	5	4	3	2	1	
香		飛	奔	金	王	醉	金	銀	馬	豎	香	a
反	豎			盲	盲	角	銀	角		反		b
	角			龍	鳳	龍			飛			c
橫			馬					步	橫	橫		d
			步	麒麟	步	仲	步	步	步	步	步	e
	步	步		獅	步	銀	仲	步				f
	銀	銅			步	銅	步	猛	步			g
步		銀	步	銅		獅					步	h
橫	猛	金		鳳						橫		i
	角	麒麟	馬		龍	奔			飛	角		j
反	豎			盲		龍	盲	馬	豎	反		k
香		飛		王	醉	金				香		l

Position after 76.P-4g

The unfinished game's record ends here. Let us evaluate the position. Because material is even (White's extra pawn has negligible value because it has virtually no potential to promote), we will focus mainly on what the players have achieved with their step movers.

A useful first step is to compare tempi, measured by how many ranks each side's step movers have advanced during the game. Black's step movers have advanced a total of 30 ranks from their starting positions (6 for the silver on 5f, 5 each for the copper on 5g and ferocious leopard on 3g, etc.). White's step movers have advanced a total of 24 ranks, a significant difference of six tempi—or five, considering that it is White's turn. If the Black silver on 10h is ever exchanged for an adjacent White step mover, the comparison will favor Black even more.

Of course, having more advanced step movers is only good if they are functioning effectively. Which side's step movers are better placed? The most striking feature of the position is the pair of Black generals on 5f and 5g, which are currently unopposed by

any White step movers. Together these generals act like a sword pointing into the White position, controlling key squares and giving White problems on the flank and in the center. In particular, note their effect on the pawns at 4d and 6e. Whereas Black's side mover on 1i controls virtually the entire promotion line (once the phoenix moves), White's side mover on 12d has its range of influence limited by the immobile pawn on 4d. This could be a problem for White if Black builds an attack on the 1 and 2 files—certainly a possibility (starting perhaps with B-4h, P-1g, and SM-4i). Meanwhile, the White pawn on 6e temporarily blocks the bishop on 3b from assisting in the attack on the other wing. Black has six pieces attacking 6f, keeping the pawn on 6e from advancing. Eventually Black will be the one who plays P-6f, after which White will be forced to play Px6f, allowing Black to gain another step-mover tempo with Cx6f. At this point Black's phoenix might go to 6g, mounting a quadruple attack against 4e with go-between, silver, phoenix, and dragon horse.

White does not seem to have equally promising lines. The main reason is that White has invested 17 tempi in getting three step movers to 11f, 11g, and 10g, and yet these pieces are largely neutralized by Black's three well-supported step movers on the same files. Black's C8h and FL3g, meanwhile, are also deployed on ideal squares.

Of course, the timing of P-6f is tricky for Black, because it does help open up a diagonal for White's bishop on 3b, and it also allows White to play P-7g to harass the Black lion and open 7f for the White lion. In Chu Shogi middle games, danger keeps coming from all directions, making it difficult to exploit a positional advantage without making a tactical oversight. But Black does have a measurable advantage here, and the difference in the game is clearly the result of Black's having made better maneuvers with his lowly step movers. ■

It's only Natural

by Connie Handscomb

So what do you see when you play a game? I asked. I see patterns, he said. Yes, yes, I agreed wholeheartedly, I understand. I see a lot of colors myself. Not colors, he said, Patterns. I looked again at the game board. Maybe if I unfocus my eyes, I told myself, I'll get a different perspective on this, I'll tune into an alternate reality, *really* get into the game, so to speak—I just know there's something there my ordinary eye is not picking up. I scrunched up my face and squinted hard at the board; I looked close up and twisted my head; I stood farther back and really concentrated on letting all the edges soften and blur.

He said, When you make a move, you often have a strong feeling that it is the right one—I like to play because it's both intuitive and analytical. Aha, I thought, now there is something I really do understand: feelings and intuition. I remember how each of us set out to arrange the books on our bookshelves a few years ago. We watched one another in amazement. And neither could quite understand why the other was doing it that particular way. He would stand behind me, watching quietly, then leave in contemplation to return a little while later to see how I was doing, then depart once again with an involuntary shake of his head. There was no logical reason for my process to work. I had somehow classified the tomes whereby my shelf resulted in a functional symmetry *plus* I managed effectively to get more books onto the shelf than he had for all his cerebral plotting. He maintained I worked by instinct. But I used a logical system of connecting types, too, I added.

As children new to this world, filled with innocence and love and joy, the first thing we do is start to play, I said. It's only natural—we don't think about what we're doing, we just play. The games you play now are simply an extension of that natural affinity to play, with more mindfulness added. I also wondered if this meant one who wasn't obsessively passionate about games was atypical, but I didn't pursue this phenomenon

at length. Everything in Nature, I said, in all of existence, in fact, can ultimately be reduced to a simple mathematical equation which some might see visually as an abstract pattern. I was really getting excited now. I was onto something Big!

He said, Each game is its own Universe really. The words Mind and Matter popped into my brain. Of course! I exclaimed, Players are really co-creators. Playing may be the ultimate in creativity. Like Nature itself: the highest art form. Nature is so healing to humankind because it provides a perfect balance to rough edges, and automatically softens anything close to it.

What a profound spiritual connection all this signifies, I mused. But it is so vast and difficult a notion to depict. Perhaps photos might best describe what the words cannot.... And so I set out to do just that. ■

Index by Issue Number of Games Covered in AG

Alice Chess 8*	Head Start Hex 5*	Phutball 3*
Anchor 5*	Heaven & Hell Chess 8*	Plateau 3
Bao 4†, 5†, 7†	Hex 2*, 3, 4, 8	Ploy 6
Bashne 1*, 3, 7	Hex Kyoto Shogi 5*	Poppy Shogi 4*
Blink 8	Hexdame 8*	Renge Shogi 5*
Bosworth 2	Hexagonal Chess 7	Renju 5, 6
Breakthrough 7*	HexGo 6*	Ricochet Robot 5
Camelot 1, 7*, 8	Hijira 5	Robo Battle Pigs 8*
Cathedral 3	Hostage Chess 4*, 5, 7	Rugby Chess 8*
Chebache 3	Indochine 8	Salta 8*
Chivalry 6*	International Checkers	Square Anchor 6*
Chu Shogi 4, 6, 7, 8	7*	SquareBoard Connect 8*
Colors 3*	Jetan 6*, 7, 8	Square Hex 5*
Congklak 2*	Kimbo 5, 6	Strat 4*
Congo (ca.1900) 8*	Kyoto Shogi 1*, 2, 3, 4	Ta Yü 7
Cross 6*	Latrunculi 7*	Tamsk 4
Dao 6	Lightning 5*	Three Crowns 8*
Deflection 6	LOA 1*, 2, 3, 5, 6, 7	Transvaal 8*
Dvonn 8	Magnetron 7*	Trax 1
Eight Sided Hex 5*	Mem 2*	Triangle Game 8
Epaminondas 3*	Mentalis 1*	Tripples 7
Fox & Geese 8*	Mozaic 8*	Tumbling Down 6*
Freeze 7*	Nana Shogi 5*	Twixt 2*, 4, 7, 8
Gipf 1	Octagons 7*	Zèrtz 4, 6*, 7, 8
Gobblet 8	Octi 2	
Gonnect 6*	Omega Chess 8	* = complete rules
Grand Chess 3*, 4, 5, 6,	Onyx 4*, 6	† = partial rules
7, 8	Patricia 5*	
Gygès 7	Pentagonia 2	

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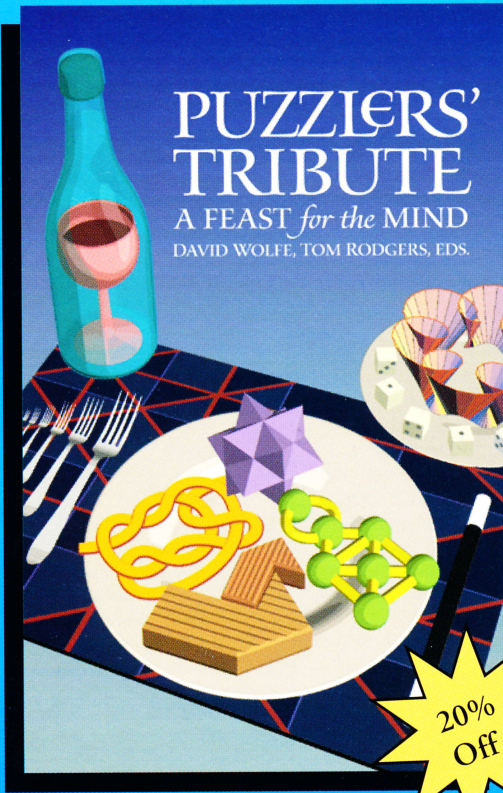
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Paste the following 3-letter words on ten one inch square tiles:

CAR CUB DIM HEN HUT MOB RED SAW SON WIT

Note that every letter occurs exactly twice and that any two letters occur in at most one word. These are called scrub tiles and operate like word dominoes in that two scrubs can abut only if they share a letter in common. For this puzzle, you'll want to cut out the 10 Scrub tiles from heavy cardboard, and construct a board with 10 squares:

See if it is possible to place the 10 scrub tiles on the board. (As drawn, they are almost placed legally, except that SON and RED abut despite sharing no letters in common.)

HEN	HUT	WIT	SAW
SON			CAR
RED	DIM	MOB	CUB

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