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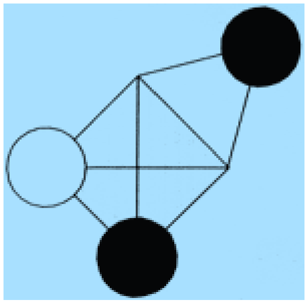


ONYX

An Original Connection Game

by Larry Back

The June 2000 issue of Games magazine featured an excellent article by R. Wayne Schmittberger describing the various connection games in existence along with the history of their invention. Some of these games are played by placing pieces down on spaces or intersections of lines in order to form an unbroken chain that links up various sides of the board. The very first connection game, Hex, is one example of this; the Game of Y is another. Other connection games, such as Bridg-it of Twixt, involve the use of bridges to form connections. Still others, such as Trax or Kaliko, are played with tiles that have different colored paths printed on them. None of these games, however, has a capturing rule.

I realized back in 1984 that there was a dearth of connection games with a capturing rule so I decided to see if I could invent one. I understood that anyone could add some contrived capturing rule to a connection game and claim to have invented something new, but I also knew that, to have any merit, a capturing rule should pass certain tests: the capturing rule should actually improve the game; the capturing rule should be consistent with the theme of connection; positions should not repeat; the game should end; and finally, someone should win.

It took me eleven years to achieve this goal, but I believe I finally succeeded. In this article I would like to explain not only the rules of my game but also the process by which I developed them.

After doing some experimentation with Hex I came to the conclusion that Hex is not improved by adding a capturing rule to it. Therefore, I decided to create a unique connection game on a unique board. Since connection games that use pieces tend to be played on boards with hexagonal spaces or triangular grids, I decided to devise a connection game with a board that would be square in overall shape and would also be comprised of squares.

Now, a connection game on a square board would never work without some rule to break deadlocks, but since I was going to have a capturing rule I thought it could serve this purpose. Diagram 1 shows what I mean by deadlocks. Neither of the two black pieces or the two white pieces are connected to each other. Because of this deadlock, a connection game played on a square boards would normally end in a draw.

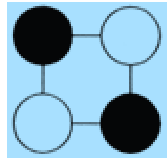


Diagram 1

Since my capturing rule would need to prevent this kind of deadlock from occurring I decided to adopt a rule stipulating that placing the last piece on a deadlocked square would result in the capture of the two opponent's pieces on that square. The nice thing about this rule is that after the captured pieces are removed there are two ways to connect the two remaining pieces. So connection of those two pieces is assured.

Once I drew up a board and started testing my idea it did not take me long to discover a flaw. It is very easy to arrive at a stalemate position where neither player wants to be first to move to either of two points. In Go this is called a seki. For example, in Diagram 2, if a player places a piece on one of the 'X' points then that piece, along with another, would get captured by the opponent's move to the other 'X' point. As a result, both players would have to avoid these points and so neither player would make a connection.

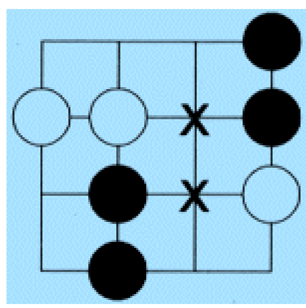


Diagram 2

Because of this problem I decided the game could not work, and I forgot about it. Then, two years later, I was experimenting with different boards when I came up with the design in Diagram 3.

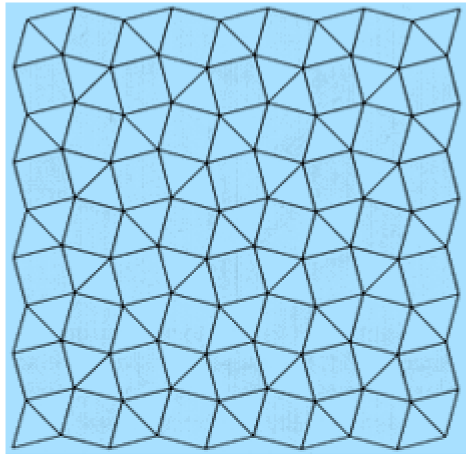


Diagram 3

As I was trying to figure out what kind of game I could develop for this board I suddenly remembered my connection game with the capturing rule. I realized that since this board had squares I could retain the same capturing rule and yet, since no two squares were joined at the side, it would not be possible for the stalemate position to occur as on the original square board. So I thought that perhaps my connection game could work on this board. Unfortunately, once again, I soon discovered that it was still possible to arrive at a stalemate position, albeit a different one. Disappointed, I shelved the game and forgot about it once more.

Then, nine years later, in 1995, I came across this board in a drawer, and I started thinking about it again. I became convinced that as long as there were squares on the board then a stalemate position could probably always occur. Then it hit me: I could draw two diagonal lines connecting opposite corners of each square so as to divide the squares into four triangles and create a new point at the center of each square. Now this new board would be comprised of nothing but triangles, and yet it would retain the squares. So the capturing rule could still be used. I was now anxious to find out if turning the squares into four triangles would prevent the old stalemate position from arising, but as nine years had passed I first needed to recall what that position had been. After a bit of trial and error I finally managed to recreate the stalemate position on the old board, shown in Diagram 4.

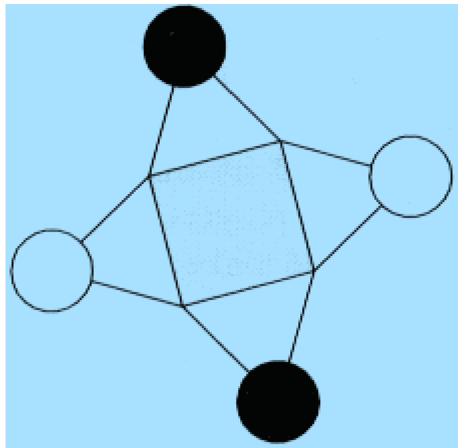


Diagram 4

Let us say it is Black's turn. An attempt by Black to connect the two black pieces by moving to one of the corner points of the square merely results, three moves later, in White making a capture on that square. Diagram 5 shows the sequence. White's move '2' blocks Black from connecting and forces Black to play '3' to stop White from connecting; but then White's move '4' captures the two black pieces on the square.

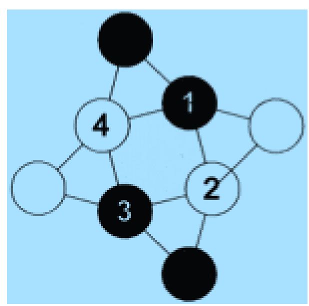


Diagram 5

So neither player wants to be the first to move to one of the corner points of the square. Yet, if both players avoid the square then neither the black pieces nor the white pieces will become connected. Does dividing the square into four triangles help break this stalemate? Yes, it does, and in a most elegant way!

With a move to the midpoint of the square, shown in Diagram 6, Black now has two ways to connect the piece on that point to each of the other two black pieces. So connection is assured, and there is no stalemate. At this point I realized I had achieved my goal: I had invented a connection game with a capturing rule. Furthermore, the capturing rule seemed to pass all my tests: positions were not repeated; the game was definitely more interesting with a capturing rule; and someone had to win. I just had to make one amendment to my capturing rule: because the squares now had midpoints, I had to specify that a capture can only be made on a square where the midpoint of the square is unoccupied.

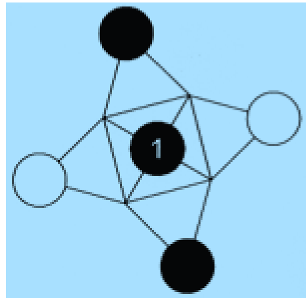


Diagram 6

After some more experimentation I decided one more rule was needed. In Diagram 7 Black is threatening capture on the upper square. White has two ways to defend: White can move to the midpoint of the square, or White can move to the corner point of the square. However, a move to the corner point of the upper square results in a capture by Black on the lower square, so the midpoint move is safer. Since safer midpoint moves result in fewer captures, they also result in games that are less interesting. Therefore, I decided to have a rule that restricts moves to the midpoints of squares.

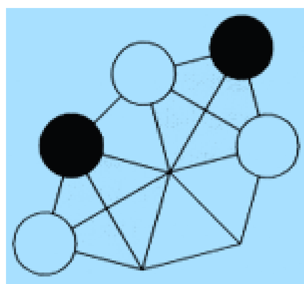


Diagram 7

After a while I started to notice that, except for the above situation or when there are no pieces on the corner points of a square, if a move to the midpoint of a square is a winning move then a player has at least one other winning move that does not involve moving to the midpoint of a square. Therefore, it is never necessary to move to the midpoint of a square except to avoid a capture or when there are no pieces on the corner points of that square. I cannot quite prove this, but it seems to be true. So, for simplicity, I decided that the rule restricting moves to the midpoints of squares should state that a player cannot place a piece on the midpoint of a square unless there are no pieces on any of the four corner points of that square. Diagram 8 illustrates this rule.

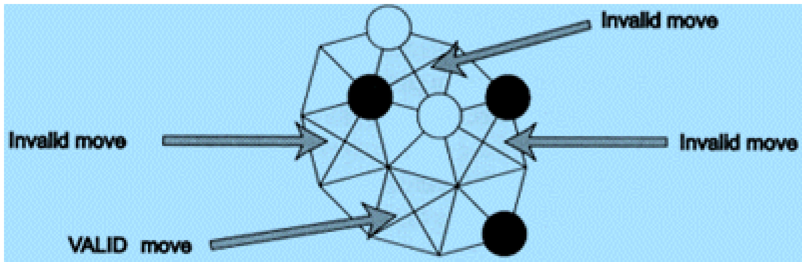


Diagram 8

Also, although it would rarely occur, it is possible to capture two pairs of pieces on two different squares with one move. For the sake of completeness, it is important to have a rule stipulating that, in case of double capture, all four captured pieces are removed from the board.

After some more experimentation I decided to have the game start with four black pieces and four white pieces along the sides of the board. Diagram 9 shows the opening position.

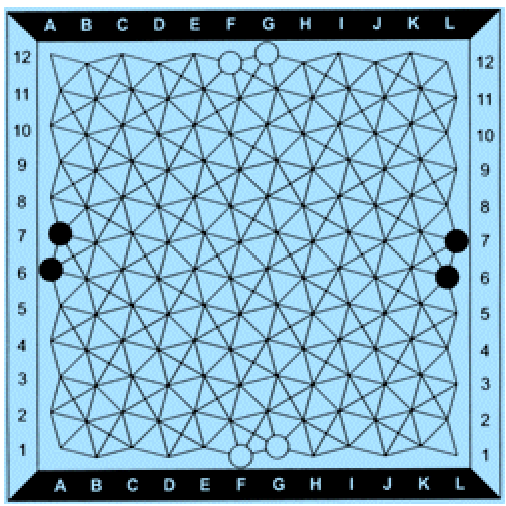


Diagram 9

In the game, Black is trying to connect the top and bottom sides of the board with an unbroken chain of black pieces; White is trying to connect the left and right sides of the board with an unbroken chain of white pieces. Black starts with two pieces along each white side, and White starts with two pieces along each black side. Of course, the game can be played with different starting positions, including having no pieces on the board at all. However, I find that having two pieces along each side of the board in this way tends to sharpen the play and results in more interesting positions.

As with all connection games, board size is arbitrary. A larger board results in more strategic depth but also a longer game. It seems a board of this size with twelve points along each side is ideal for this game.

Finally, this game uses the same rule that most connection games use concerning the first move. One player starts by placing a black piece on the board and the other player decides to continue playing the game as either White or Black. The player that becomes White makes the next move, and the players alternate moves for the rest of the game. This is the fairest rule for ensuring that neither player starts out with a meaningful advantage.

Since pieces can be captured in this game, is it really true that positions cannot repeat? Well, no, actually they can, but only if both players conspire to bring this about. If either player is trying to win then a repeated position would not occur. Therefore, I see no reason to have a rule to deal with repeated positions or to stipulate that the game can be won with a certain number of captures.

Having decided what the rules were, there was only one thing left to do: I needed to come up with a name for this game. The black glass pieces I was using to play the game reminded a friend of onyx gemstones. I liked the sound of that, so I have named the game ONYX. One nice thing about that name is that each of the letters 'N,' 'Y,' and 'X' is embedded in the board lines, and the letter 'O' is represented by the pieces.

The only other thing I needed to do was publish the rules of the game so that more than a handful of people would know about it. It took five years, but now I have finally done this. If you like connection games I think it is worth the time to draw up a board and give Onyx a try. The capturing rule adds an extra element to the tactics that you will not find in other connection games.

The Official Rules of Onyx

- Onyx is a game for two players.
- The equipment of Onyx consists of an Onyx board and a sufficient set of both black pieces and white pieces.
- One player, Black, plays with the black pieces; the other player, White plays with the white pieces.
- Before the start of the game, four black pieces and four white pieces are placed on the board. Black pieces are placed on the two outside corners of the middle square on both the left and right sides of the board. White pieces are placed on the two outside corners of the middle square on both the top and bottom sides of the board. (See Diagram 9,above.)
- The Onyx board consists of interlocking squares and triangles. The squares are further divided into four triangles forming an intersection at the midpoint of the square. A move always consists of placing a piece on the midpoint of a square or on one of the corner points of a square or triangle. However, a piece cannot be placed on the midpoint of a square if there are any pieces on the four corner points of that square. (See Diagram 8, above.)
- Once placed on the board, pieces are never moved from one point of the board to another. However, a piece must be removed from the board if it is captured. Captured pieces are returned to the player from whom they were captured.
- If the midpoint of a square is unoccupied, and a player places a piece on the corner point of the square with the result that both players have two pieces occupying

diagonally opposite corner points of the square, then the two opponent's pieces on that square are captured and removed from the board. (See Diagram 10.)

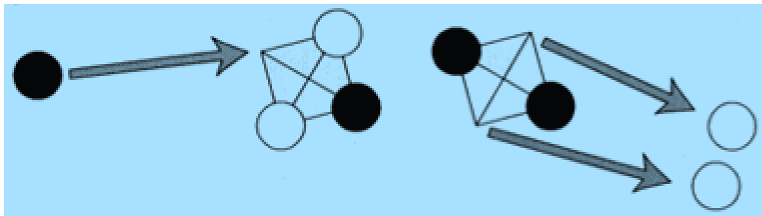


Diagram 10

- It is possible to capture two pairs of pieces on two different squares with one move. In this case all four captured pieces are removed from the board. (See Diagram 11.)

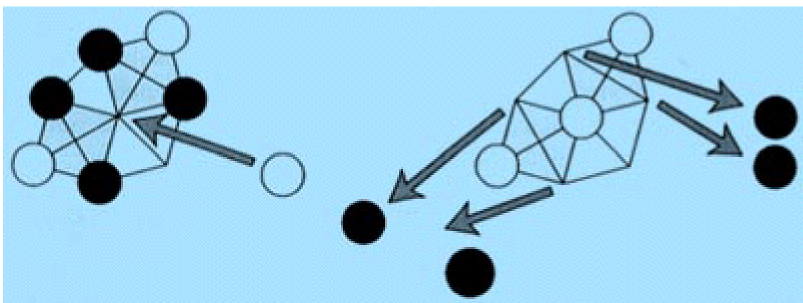


Diagram 11

- At the start of the game neither player is assigned the black or white pieces. One player makes a move by placing a black piece on the board. After this first move has been made the other player then chooses to either continue playing the game as White or continue playing the game as Black. The player that becomes White makes the next move, and players alternate moves for the rest of the game. On each move a player must place a piece on the board. Black always places a black piece on the board and White always places a white piece on the board.
- Each one of the four sides of the board is comprised of twelve edge points. The four corner points of the board are considered to be part of both the adjacent edges that meet at that point. The object of the game for Black is to construct an unbroken chain of black pieces that includes at least one piece on one of the top edge points of the board and includes at least one piece on one of the bottom edge points of the board. The object of the game for White is to construct an unbroken chain of white pieces that includes at least one piece on one of the left edge points of the board and includes at least one piece on one of the right edge points of the board. Once either player accomplishes this goal the game is over. (See Diagram 12.)

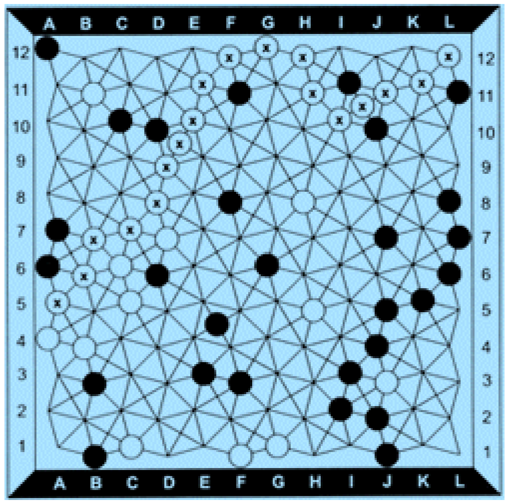


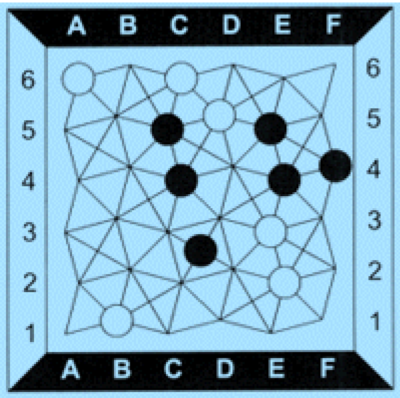
Diagram 12 -- White wins

Notation

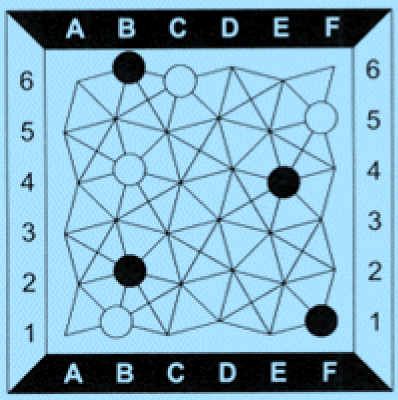
Aside from the midpoints of squares, each point on an Onyx board can be represented unambiguously by a letter and number according to a zig-zag coordinate system. In Diagram 12 above, for example, the first four X-marked white pieces from the left are on points A5, B6, B7 and C7. The midpoints of squares are represented by the four letters and numbers that uniquely determine the corners of the square. In Diagram 12, for example, the two X-marked white pieces on the midpoints of squares are on points DE910 and IJ1011. A move that captures one pair of pieces is followed by an asterix '*'; a move that captures two pairs of pieces is followed by two asterixes '**.'

Mini-Onyx Puzzles

The following two Mini-Onyx puzzles will demonstrate some of the tactical complexities of the game. In both puzzles Black is to find the only move that will win.



Puzzle 1



Puzzle 2