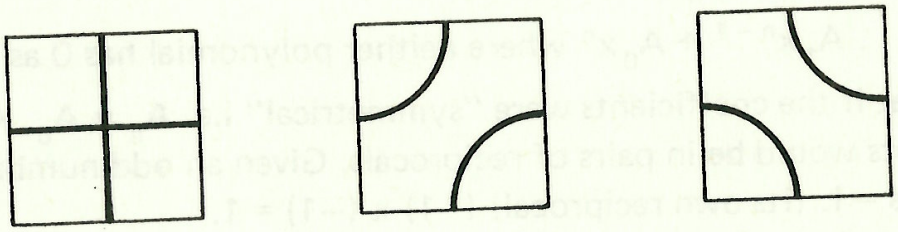
MATHEMATICAL GAMES

Black

The game chosen for this issue of Parabola is quite a recent game. It was thought of by an American university student, William Black, in 1960.

The game is played on the standard 8 x 8 chessboard with the following three tiles being used as playing pieces.



To start the game the first player places a cross in the top left hand corner of the board. Then turns are taken by placing tiles on the board so that a continuous line is formed from the cross. Each play must extend that line.

To win the game, a player must take the line out through an outside edge of the bottom right-hand square. If a player is forced to take the line out of an outside edge of any other square then he loses.

A sample game is played overleaf on a 4 x 4 square to give you a better idea of how to play.

Of course, the game is quite well played with just pencil and paper without going to the trouble of making up a set of tiles.

There is a known strategy for this game, and will be given in the next issue of Parabola. However, you are urged to try and find one for yourselves. Remember a way to do this is to reduce the size of the playing board so that analysis becomes easier.

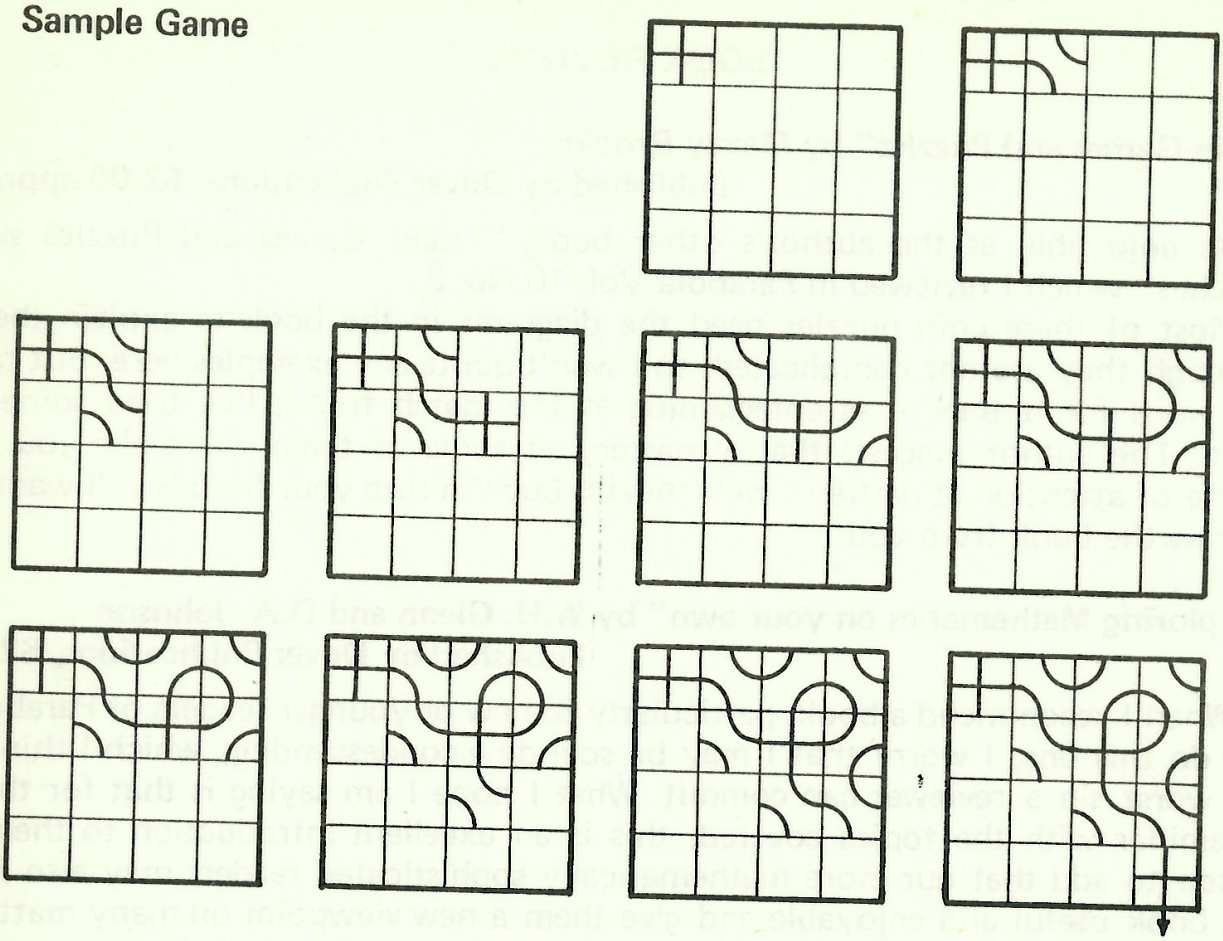
3 Dimensional Noughts and Crosses

In the last issue of Parabola (Vol. 10 No. 3) we left you with some questions to puzzle over.

The reason that 3D noughts and crosses is not played on a 3 x 3 x 3 board is that it is too easy for the first player to win the game, so it is no real contest.

He does this by placing his first mark in the very centre cell. He now has 9 different 3 x 3 playing boards to play in which he has the centre cell. (Can you find all 9 of these?) He then chooses the board to play, by selecting one in which the second player did not use. So effectively the first player plays 2D noughts and

Sample Game



crosses except that he has the advantage of having two first goes. You can see for yourself that it is very easy to win now.

There are, however, some interesting variations that can be played on the 3 x 3 x 3 board.

The first is played in the normal manner, except that the person who makes a line first loses. (Is it possible to have a drawn game?)

The second is to play until all the cells are marked. The player with the most lines formed wins the game.

The third variation is somewhat different because not all the cells can be played at any given time. You are restricted in which cells you can choose to play. You cannot use a cell in a higher layer until the cell directly underneath it has been marked. For example the centre cell cannot be played until the centre cell of the bottom layer has been played. You can play this variation without the 3D board by using coloured blocks that will stack on top of each other. There is a winning strategy for this game also. See if you can find it: it's a little more difficult than the previous one. Once you have worked out the strategy for this game, try another variation where the first player to make a line loses.

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