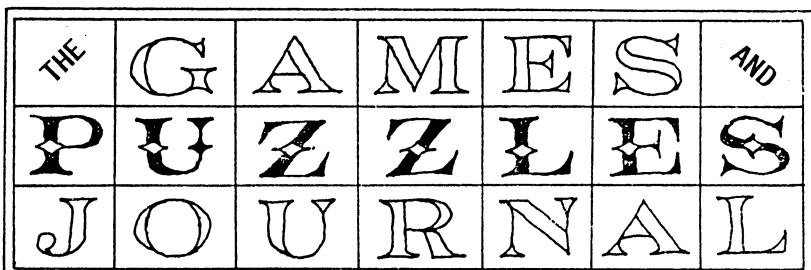


FRONT PAGE



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### Introduction to the Journal

The Games and Puzzles Journal has developed in part out of my very much more specialised chess puzzle periodical Chessics, which was subtitled "The Journal of Generalised Chess" and explored the territory between Chess and Mathematics. Consequently there is likely to be much of a chessic nature in the G&PJ, at least initially, but the intention is for the Journal to cover as wide a range of games and puzzles as possible, and to include something for everyone in every issue. To do this I will of course need quite a bit of help from readers, so don't hesitate to write to me, saying what you want to see in the Journal that isn't there, putting me right on any errors, and especially contributing original material for publication.

Before my discovery of the world of chess problems, through The Problemist, and of chess variants, through Anthony Dickins's A Guide to Fairy Chess, which combined with an interest in printing and publishing to produce Chessics, I had long been interested in Mathematical Recreations, mainly via the excellent compilations by W.W.Rouse Ball and by Maurice Kraitchik, and also of course H.E.Dudeney's Amusements in Mathematics. Other important influences have been R.C.Bell's two volumes of Board and Table Games from many civilizations, H.J.R.Murray's A History of Chess, Robert Abbott's New Card Games (which includes the chess multi-variant Ultima) and Sid Sackson's A Gamut of Games. Thus it will be evident that the themes of history of games, their classification, invention and mathematical analysis will continually recur throughout these pages and will guide the presentation and choice of material.

Particular attention is drawn to the two new Magic Knight Tours by Tom Marlow on page 11. They are the first new 8x8 examples to be discovered for nearly 50 years! It looks as though Mr Marlow's work, when completed, will round off an important chapter in this fascinating subject.

**PQR.** - Throughout the pages various puzzles will be found. These may be classified as **Problems**, which have a definite solution, **Questions**, which have less definite answers (sometimes unknown to the Editor!), and **Recreations**, which take the form of activities usually leading to constructions. The results of readers' work on all these are invited. A solvers' ladder, with a prize for the leading solver at the end of a year, is proposed for the Chess Problems (which are numbered). A similar competition may be possible for the other puzzles, if sufficient entries are received.

## Zine Scene

It was only recently that I became aware of the extensive activity in this country among games players in the production of small-circulation home-produced magazines (known as **zines**) for the promotion, mainly, of postal games play. These publications naturally vary vastly in size, quality, frequency, reliability, and any other variable you can think of. The dividing line between zine and mag is somewhat elusive. Many of the games zines also double as pop music/film buff/political/sci-fi pamphlets.

A list of current postal-games-playing zines is included as a supplement. The number of zines currently alive and kicking is at least 50 in the UK alone (overseas zines will be listed next time). There are new zines appearing, and old ones disappearing, every few months, also many of them are infested with **sub-zines**, so that any supposedly complete listing is inevitably out of date even before publication. The bold figure after the zine name is the last issue number I've heard of. Those marked with an asterisk have actually thudded onto my doormat. The others listed have been reviewed in other zines or are mentioned in the zine directory Mission from God by Iain Bowen (Feb 87 issue) published by Pete Tulk, 76 Portland Road, Edgbaston, Birmingham, B16 9QU.

The supplement also gives a rough guide to the 180 different games that are available for postal play through the zines. It is obviously impossible to give here an explanation of all the games (even if I knew them all) but I hope to include all the main types at least in the next few issues. By far the most played single game is **Diplomacy**, and a good proportion of the other games listed are Diplomacy variants or offshoots. We therefore begin with a sketch of Diplomacy, strictly for beginners (like myself).

Many games, such as Diplomacy, are invented ostensibly as the result of an attempt to model or simulate some real-life situation (such as wars, market trading, football leagues, crime detection) or to bring to life some fictional fantasy world (such as Tolkein's Middle Earth) or a combination of both (e.g. Conan Doyle's fictional Sherlock Holmes in the historical context of Victorian or Edwardian London). But once created the game takes on a life of its own. The principles underlying the working of a game, its basic structure or mechanism, are generally applicable to the generation of other, variant, games which do not necessarily simulate any real or imagined situation but simply exist in their own right. The underlying structure of Diplomacy is particularly coherent.

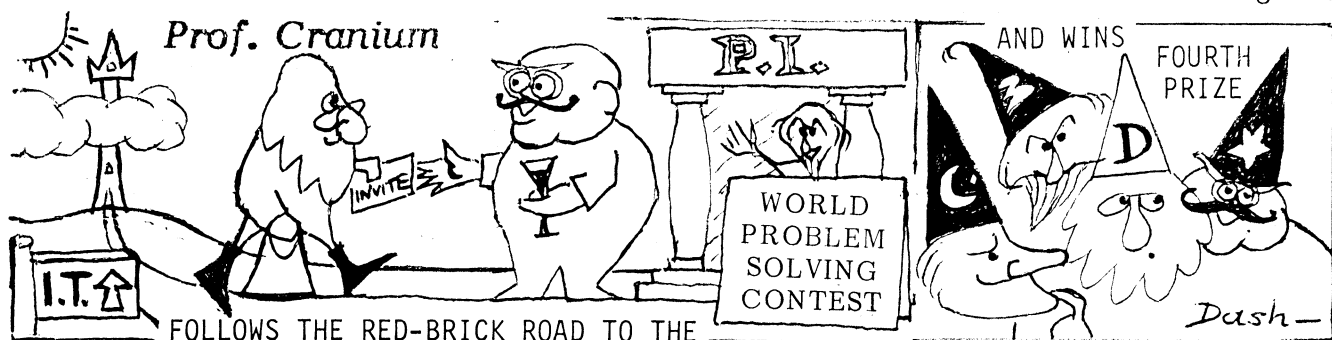
## From Letters to the Editor

Paul SIMPKINS: "I wondered at first about your flyer and whether it was a spoof - anyone who has an interest in Diplomacy and who lives on Bohemia Road ..."

[Bohemia is the only doubly land-locked area on the Diplomacy board.]

Paul EVANS (alias Pevans): "The SFCP's main game is En Garde! , a role-playing (of sorts) game set in the fictional 17th century Paris of the Three Musketeers, Cyrano de Bergerac and Harry Flashman! The players submit orders for their characters for one month at a time and the Games Master/Referee works out all the interactions. These are then published in narrative form, together with various tables to give players a picture of what's going on (individual players also get a sheet of details for their character). The En Garde! game came about because we started running a game at GamesFair (held at Reading University each spring). To enable us to handle that successfully we developed some computer software to help us administer the game. Once we'd got that, it seemed silly to use it only once a year, and so The Small Furry Creatures Press was born! We have since added other games, but En Garde! is our mainstay."

[It is interesting to see role-playing games getting away from wizards and dragons!]



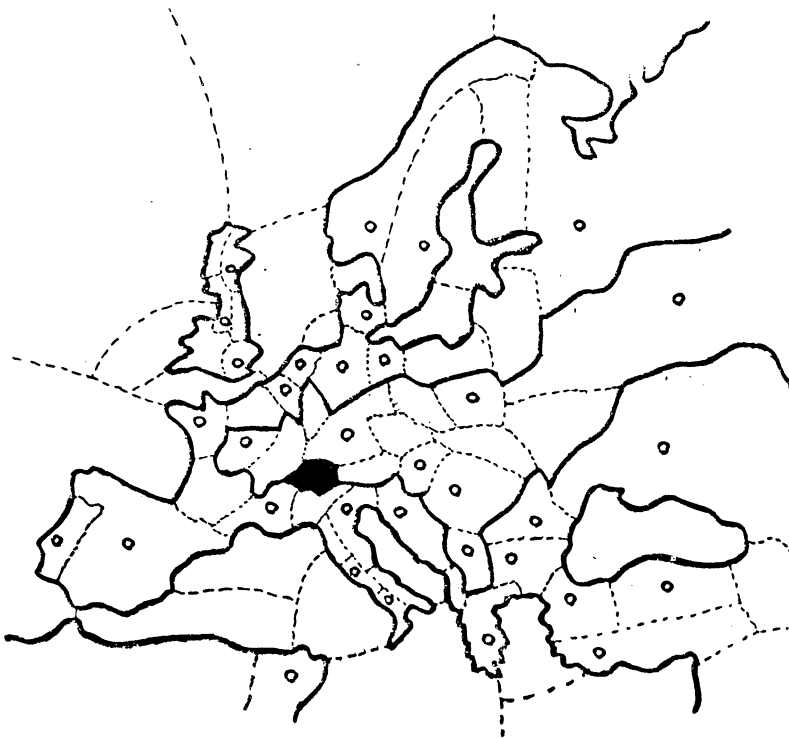
FOLLOWS THE RED-BRICK ROAD TO THE

## An Outline of Diplomacy

Diplomacy is best for 7 players. It is played on a board representing Europe c1900. The players represent Austria, England, France, Germany, Italy, Russia and Turkey. The areas into which the board is divided are connected as shown in the simplified diagram below. Only one piece at a time can occupy any one area. Switzerland, shown blacked in, is not one of the playing areas; it is considered impassable.

One of the main original features special to the Diplomacy family of games is that all the players make their moves simultaneously! This is done by each player writing down, privately, the moves he chooses. These "orders" are then passed to the next player round the circle (or in postal play to the "games master" who is usually the zine editor). The orders are read, and where they conflict (e.g. two players ordering a piece to the same area) decision is made by applying the "laws of war", which are basically that the "stronger" force wins and equal forces result in a "stand-off" (neither moves).

At each turn of play (known as a "campaign" since all the players move) each piece is allowed one move, but instead may "stand" or else "support" another piece that occupies, or wishes to move to, an area the support piece could move to. The "strength" of a piece counts the piece plus all those supporting it. The support action of a piece is "cut" however if the supporting piece is itself attacked (it has to use its powers to defend itself). If an attack succeeds the ousted piece retreats to an adjacent area, or else is "disbanded".



The small circles in the diagram mark the 34 "supply centres". For an outright win one player must control 18 of these. Every area is adjacent to at least one centre. The pieces are of two types: Fleets and Armies. The 75 areas comprise 19 of sea (for Fleets only) 14 land-locked areas (for Armies only) and 42 coastal areas (for either type of piece). A Fleet may move directly from one coastal area to another with a common coastline. Fleets at sea, instead of moving, may "convoy" an Army across the sea (or seas). This is the only occasion when a piece can get to a non-adjacent area in one go. Entry to the Baltic is in two moves, through Kiel, Denmark or Sweden; and to the Black Sea through Constantinople.

Initially (at Winter 1900) each player has three pieces (Russia exceptionally four) occupying supply centres. There are two campaigns every "year" (in Spring and Autumn) followed by a round of readjustments. A player is held to "control" all the centres he is occupying at the end of the year plus any others he controlled last winter that are not now occupied by others. The numbers of pieces a player has on the board is now equalised as far as possible with the number of centres he controls, either by removing excess pieces (any he chooses) or raising new ones on any of his original home centres that are vacant but still under his control. The game thus cannot be won outright before winter 1904 (by Russia) or winter 1905 (by any other player).

The other original feature of Diplomacy, from which it gets its name, is that one player may support or convoy pieces of another provided agreement can be reached during the period of "diplomacy" that precedes the writing of orders. But there is nothing binding in these agreements, so that a prudent player will never stake everything on such an uncertain alliance, and the value of "diplomacy" in the game is somewhat imponderable.

Diplomacy is distributed in the UK by Gibson's Games, Greenlea Park, London SW19 2RB.

## Domino Threes & Fives

Having consulted a few "Hoyles" at random I was surprised to find that the form of Dominoes played in my circles was not described, so I give a sketch of it here. The double-6 set is used. Each player takes 7 (or if three or four play each takes 5). Each player in turn either places one of his tiles in the centre or draws one from the stock. The first tile played can be any the player chooses, but each subsequent tile must match one of its ends with one of the two free ends of the dominoes previously placed, so that they form a chain. Doubles are placed sideways on, purely for aesthetic reasons.

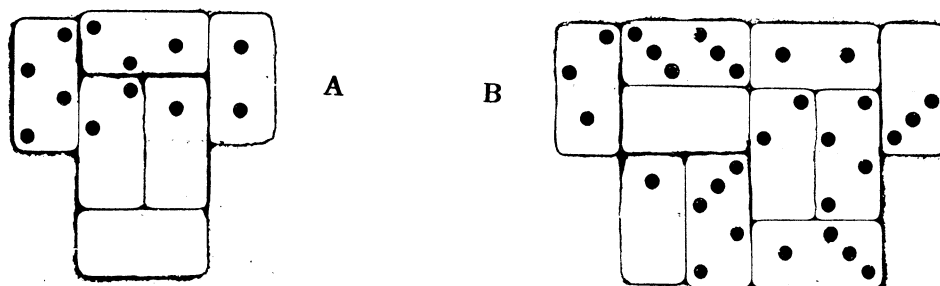
A peg-board (such as is made for Cribbage) is used for scoring. At each placement of a tile the two free ends are added and the player scores the number of threes and fives in the total. A double counts double. Thus, for example, if the first player puts out the [4,5] he scores 3 points, since  $4+5 = 9 = 3 \times 3$ . If the next player puts down the [5,1] he scores 1 point, since  $4+1 = 5 = 1 \times 5$ . The maximum score that can be achieved in one go is 8, from a total of 15, which scores 3 for fives and 5 for threes. The game ends when one of the players has played all his tiles, or no more play is possible.

## Domino Odd Primes

An elaboration of the game of "Threes and Fives" that I have devised for those with a more intense interest in number theory is the game of "Odd Primes". The rules are the same as for "Threes and Fives" but scores are counted also for sevens, elevens, thirteens and seventeens. This becomes even more interesting if the game is played with a double-nine set, since totals up to 34 can be formed and scores up to 16, but there are only two more primes, 19 and 23, to be looked for.

## French & English Quadrilles

In a double- $N$  set of dominoes, numbered  $[0,0]$  to  $[N,N]$ , each number occurs the same number of times, viz  $N+2$  times: twice on the double and once in combination with each of the other  $N$  numbers. When  $N$  is of the form  $4n+2$  then  $N+2 = 4n+4$ , a multiple of 4, and it is possible to form the patterns known as **quadrilles** in which the dominoes are arranged so that their ends are grouped into squares of four alike. For example, with the double-2 set we can form the pattern **A** below. The next case in which quadrilles are possible is with the  $[6,6]$  set. Solutions for this case, by Henri Delannoy, were published by Edouard Lucas in Vol II of his *Récréations Mathématiques* (1883). He commented however that "This problem has been treated previously by Monsieur Laquière, but the notes drawn up on the subject were lost during the siege of Strasbourg". The siege took place in 1870. **Recreation:** Construct a quadrille (hopefully a new example).



With a double-3 set it is not possible to form quadrilles of the usual type, but it is possible to create similar formations composed of squares-of-four each of them containing four different digits. Let us call patterns of this type **English Quadrilles** to distinguish them from the **French** ones. **B** is an example. For this new type of quadrille to be possible the number of dominoes must be even, so that the number of faces is a multiple of 4. This occurs when  $N$  is of the form  $4n+2$  or  $4n+3$ . We must also have at least four different digits, which implies  $N > 2$ . Thus the next case in which a solution may be possible is again when  $N=6$ . **Recreation:** Construct an English quadrille with the double-six set, no two sets of four being alike.

### Carpet Squares

This is a new card game, for children of all ages (as they say). The cards are shuffled and 24 or 25 are dealt out equally between the players (i.e. 2 get 12, 3 get 8, 4 get 6, 5 get 5, 6 get 4, each). The rest of the pack makes a face-up pile in the centre of the playing area (with room to form three rings of cards round it). Each player in turn removes the top card from the centre and plays it, or one of the others in hand, face-up, next to the centre or next to a card previously played; ("next" meaning edge-to-edge or corner-to-corner). When all the cards have been removed from the centre, play continues by each player placing one card from his hand. When the 7x7 array is complete the remaining three cards are played on top of existing cards in the array.

Scores are made during the play for **matchings**, that is for placing your card next to another (a) of the same **rank** [there are 13 ranks, A,2,3,4,5,6,7,8,9,10,J,Q,K] or (b) of the same **suit** [there are 4 suits, Clubs, Diamonds, Hearts and Spades] or (c) adding to 14, i.e. **complementary**, [there are 7 matchings of this type: A+K,2+Q,3+J,4+10,5+9,6+8,7+7]. A pair of sevens scores twice, since they are equal and also complementary.

Furthermore, for N matchings you score not N but N squared (i.e. N x N). Thus 1 matching scores 1, 2 score 4, 3 score 9, 4 score 16, 5 score 25, and so on. Scoring can be done on a peg board. When playing a card on top of another the card below should also be considered when counting "matchings". The theoretical maximum single score is thus 144 from 12 matchings, but is extremely unlikely to occur.

### Space Rummy

The distinctive features of this type of Rummy are the wider range of "matched sets" allowed and the method of scoring by "weighing" the hands. The aim is to achieve "weightlessness" (as in space travel, whence the name).

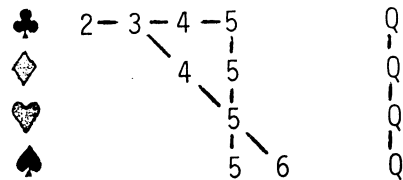
Two play, the usual pack is shuffled and cut and each player is dealt 13 cards. The rest of the cards form a face-down **stock pile** between the players. Each in turn, non-dealer first, draws a card and discards one. The **discard** may be the one drawn or one of the 13 held. The discards form a face-up pile next to the stock. The object of play is to build up matching sets in your hand.

A **showdown** occurs when either (a) no stock card is left to be drawn or (b) one player decides to **declare** instead of drawing and discarding. This may be done any time after the first eight drawings. At the showdown each player **displays** his hand and its **weight** is calculated. The weight of each hand is scored to the opponent.

The "weight" of a hand is basically the sum of the face values of its cards, Aces counting 1 and Court cards 10, but this can be reduced by forming matched sets which weigh zero. These are: Four of the same rank; Four cards in sequence, one of each suit; Four or more cards in sequence, all of the same suit. Unlike usual Rummy games, a card is allowed to form part of two matched sets.

There are also the following bonuses: (a) 5 points for each card left in the stock pile (maximum 5x18 = 90) scored to the declarer if his hand has the lowest weight, but otherwise to the non-declarer. This rewards an early successful declaration but penalises a rash one; (b) 50 points for a zero hand; (c) 50 points for a "triangle" of intersecting matched sets; (d) 50 points for a sequence A to K regardless of suits.

An example of a fully matched hand, including a triangle is:



### Carpet Rummy

The two games described above can be combined in one, as follows. Two play and receive 13 cards each, the rest forming the stock pile, which is placed face up. The play proceeds by drawing from the stock and discarding to the "carpet". Scores are made in play for matchings made in the carpet. The showdown occurs when there is no card left in the centre (or earlier if there is a declaration). J,Q,K count 11,12,13 for weighing purposes (in line with their values in carpet play) and in forming matched sets any card can stand in for its complement (e.g. 2C,QD,2H,QS counts as four of a kind).

## Series-Play Chess Variants

One way of "speeding up" chess is to allow one player to make a series of moves instead of just one per go. Thus one has **Double-move Chess** in which each player makes two moves at a time, and **Progressive Chess** in which White plays one move, Black two, White three, Black Four, and so on. Slightly less hectic would be **Semi-progressive Chess** in which the Nth go by either side is of N moves.

Various conventions with regard to check are possible in series-play. The usual **Single-check** rule adopted is that check may only be given on the last move of the series and must be defended on the first move of the reply. Single-check Double-move Chess is known as **Marseilles Chess** and Single-check Progressive Chess is **Scotch Chess**.

Alternative conventions of interest are for example: **Multi-check** - in which a player is allowed to check the opposing King freely (but not to capture it) and the opponent's reply-series must eliminate all the checks (otherwise it is mate). **Abstract-check** - in which a King is considered to be in check if it could be captured by the opponent in one or more moves of his next turn to play. e.g. in Abstract Double-move Chess after 1.e4,Bb5 the BK is in check (since W could next play Bxd7,BxK)

Numerous examples of (Single-check) Progressive Chess are given in the recent Informatore A.I.S.E. No. 11 [from Alessandro Castelli, Via Potenza 11, Villa Potenza (MC), I-62010, Italy]. An account of the game was apparently first given by E.Znosko-Borovsky (who, improbably, saw it played in Scotland) in 1947.

Marseilles Chess was popularised by Albert Fortis in the 1920s. Here is the score of a game he played against Alekhine (reported in L'Echiquier, May 1926, p88).

White	Black	7. Ba3, Bxf8	Kxf8, Sf6	15. d4, de+	Ke6, b5
A. Alekhine	A. Fortis	8. Qc1, Qa3+	c5, Kg7	16. Sf5, Sg7+	Ke7, c4
1. g3, Bg2	d5, Sc6	9. d3, Sg2	Sf5, Sd4	17. bc, Sf5+	Kf8, bc
2. Bxd5, Bf3	Sd4, Sxf3+	10. Se2, Sxd4	Qxd4, Qd8	18. e6, e7+	Kg8, Re8
3. Sxf3, b3	b6, Bb7	11. Rb1, Qb2+	Qd4, Qxb2	19. Rb8, Rxc8	Rxc8, Rb8
4. Oo, Kg2	g5, g4	12. Rxb2, Sh4	Kf6, Ke5	20. e=S, Sf6+	Kf8, Rb2
5. e4, Sh4	Ba6, Bxf1+	13. Ke2, Ke3	Rac8, Rhd8	21. Ke2, e5	Resigns
6. Kxf1, Sc3	e6, h5	14. f3, f4+	Kf6, e5		

For chess players who are used to N for Knight I should explain that in these pages N will stand for Nightrider. We use the problemist notation S, for Sir Knight! Pawn-moves are indicated simply by the destination square, and Pawn-captures just by the file-names.

## A Series-Play Synthetic Game

The earliest example of series-play chess that I can trace is the following remarkable "synthetic game" by C.D.Locock, given in the British Chess Magazine October 1909. It is also No. 115 in his book 120 Chess Problems and Puzzles that was published in 1912. **Problem:** Black conceded his opponent (a weak player) the odds of 30 moves start, on condition that he moved only his King and two Pawns, both of which he promoted. White made such good use of his start that, on the expiration of his 30th move, he had (without giving check) captured the entire Black forces with the exception of one Rook and one Pawn. Black then mated on the move! **Solution:**

1 Pb4 2 Pb5 3 Pb6 4 Pf4 5 Kf2 6 Kf3 7 Pf5 8 Kf4 9 Pf6 10 Kf5  
 11 ba7 12 fe7 13 b8R 14 f8S 15 Rc8 16 Rc7 17 Rb7 18 Rd7 19 Rd6 20 Se6  
 21 Sd8 22 Rh6 23 Rh7 24 Sf7 25 Rh8 26 Kg6 27 Kh7 28 Kg8 29 Rh7 30 Kh8

for BKxf7 mate! (Note that 4Pd4 would not do, since the WQ would stop the mate).

Locock's problem contains all the ingredients of the modern **serieshelpmate** problem, save only that the sequence of moves is not completely determinate and that White has the series and Black the mate, instead of vice versa. The following was one of the first serieshelpmates published, and I think still holds the length record for 4 pieces.

**Problem:** T.R.Dawson, Fairy Chess Review, 1947. WKc1, BKa1, WSa5, BPf2, Serieshelpmate in 17 moves (Shm 17). **Solution:** 1-7 Ke1 8f1R 9Rf2 10-16Ka1 17Ra2 for Sb3 mate.

A book, The Serieshelpmate by J.M.Rice and A.S.M.Dickins was published in 1971.

## Series-Play Chess Problems

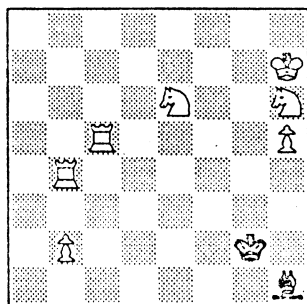
Of recent years related stipulations such as **serieshelpstalemate** or **seriesselfmate** have been investigated. In a **seriesselfmate** the White pieces play the series and get themselves into a position where Black, given the move, must give checkmate, whatever he plays. The composer of the first five original problems given here, Nigel Nettheim, writes: "These problems were composed after a suggestion of Arthur Willmott, Chess in Australia, September 1986, p268, calling for a **seriesselfmate** using only two Black men. I have shown each of the five Black men in turn, aiming for an effect of unity in the suite." The diagrams (shown here reduced in size) were printed by a computer program which the composer wrote himself (the program only prints the diagrams, it doesn't compose!).

The next four originals, by Theodor Steudel, show **serieshelpstalemates**. In these Black plays the series and reaches a position where White, given the move, can stalemate him in one move. These originals all have the added feature that Black can also **autostalemate** himself in one move, i.e. in one move he reaches a position where, if it were still his turn to move, he could not make any further legal move.

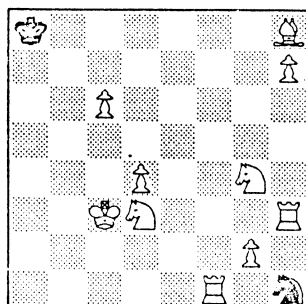
Problem 10. shows a series of two White moves - one backward in time, the other forward. Problem 11. was inspired by a study of C.E.Kemp's length-record compositions. Problem 12. was composed as long ago as 30 April 1978 but I've been unable to get it to work without the extra condition which rather gives away the solution.

The following abbreviations are used for the stipulations: S=series, s=self, m=mate (meaning checkmate), p=patt (meaning stalemate), r=retract, d=double.

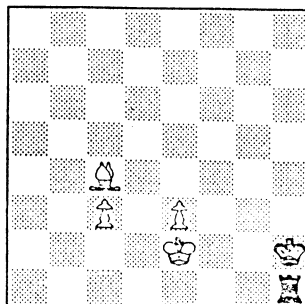
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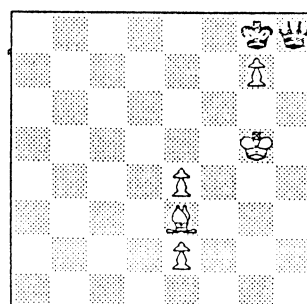
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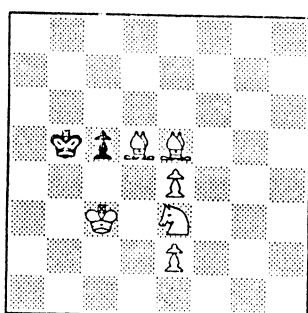
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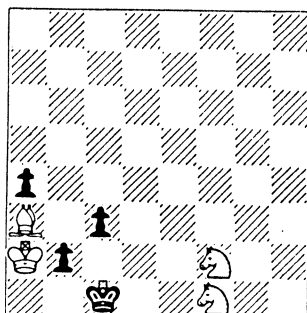
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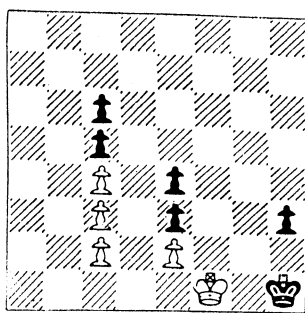
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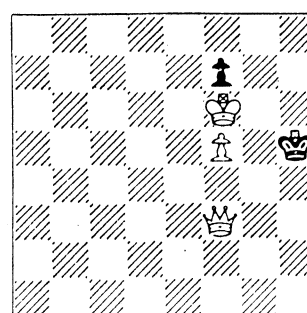
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Shp 6



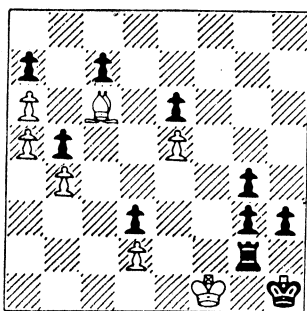
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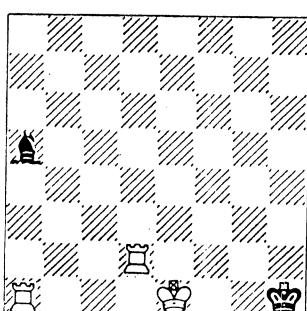
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Shp 19



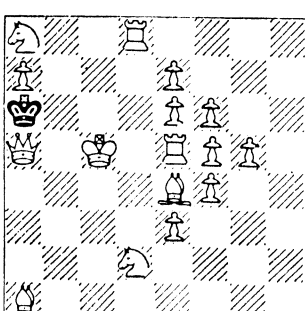
9. Th. STEUDEL  
Shp 17



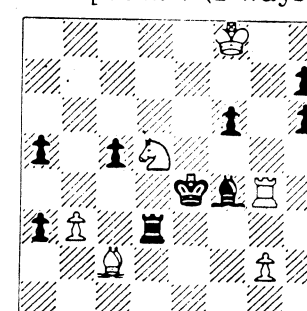
10. Th. STEUDEL  
r 1 for m 1



11. G.P.JELLISS  
Shm 31



12. G.P.JELLISS  
Sh d-pin m 7 (2 ways)



Solutions to reach me by 1st December.



## Step-by Step Transformation Problems

This subject will I hope provide a regular page in the Journal. Back in Chessics issue 2 in 1976 I proposed the name Transitions for this class of mathematical recreations, since they form a class as important as the Dissections. Well known members of this group of puzzles are the Tiring Irons (Chinese Rings), the Tower of Hanoi (or Pyramid Puzzle) and Difficult Crossings, and the Rubik Cube. Another large subset is provided by Sliding Piece Puzzles, which are now catalogued and described in detail in an excellent new book with this title by Edward Hordern. It is number 4 in the Oxford University Press Recreations in Mathematics series (price £15 hardback). The only previous book that covered this subject in any detail that I know of is one by A. Filipiak, and the solutions in the edition I saw were almost completely haywire. Hordern's book, I am glad to say, is admirably accurate. Many of the solutions given are in fact great improvements on previously published results.

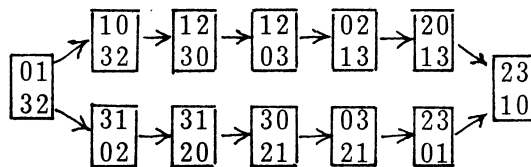
In his preface the author admits that "This is not a book for readers!" There are two introductory chapters, one on classifying, describing and solving the puzzles and the other on their history. The remaining nine chapters comprise a catalogue of 272 puzzles selected from the author's collection of some 750 sliding piece puzzles (part of a wider collection of some 8000 items). The main disappointment of the book, for me (particularly considering the series title) is the absence of any mathematical theory, apart from a short note on "parity" and an Appendix by the Series Editor (David Singmaster) referring the interested reader elsewhere.

By a "sliding piece puzzle" the author means any arrangement of pieces in a confined space in which the purpose is to rearrange them by translatory motions. Thus, rotational puzzles, such as Rubik's cube, are excluded (they are dealt with in number 3 in the series). The implication is that there must be an unoccupied space within the confined area to enable the moves to take place. For the present we will consider only the very simplest puzzles of this type - we will come back to the subject regularly.

### Sliding Block Puzzles

The simplest sliding piece puzzles consist of square blocks, all the same size, on a squared board, with one vacant square. Any motions of the pieces can be described equivalently as "tours" of the board by the vacant square. In any transformation the space will never retrace a series of moves because this merely has the effect of putting the blocks back where they were at the start of the series. So, if the space returns to a square it does so by a different route, forming a loop. In our diagrams we will number the space 0 and the pieces 1, 2, 3, ..., n-1.

The smallest board on which anything interesting can happen is the 2x2 board. The only looping motions of the space are to go round the board clockwise or anti-clockwise, and the transformation requiring the most moves is to transfer each piece to the opposite corner. This takes  $1\frac{1}{2}$  loops (i.e. 6 moves) either way, viz:



The 2x3 board is the simplest considered in Mr Hordern's book. He quotes two examples, requiring 16 or 17 moves to solve. For solution here however I offer

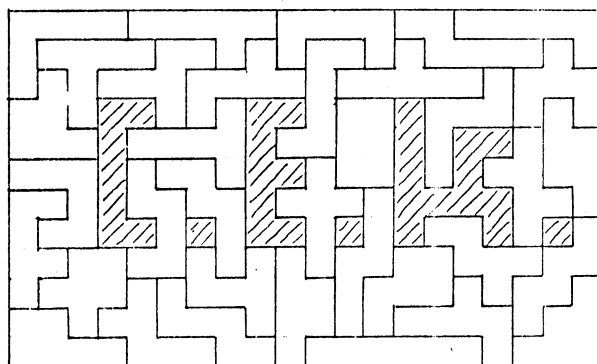
**Problems:** Transform  $\begin{bmatrix} 501 \\ 432 \end{bmatrix}$  to  $\begin{bmatrix} 402 \\ 531 \end{bmatrix}$  (2 ways) or to  $\begin{bmatrix} 105 \\ 234 \end{bmatrix}$  (4 ways)

i.e. transpose each end pair top to bottom, or interchange the end pairs left for right. Each of these transformations takes 20 moves, which is the maximum length transformation possible, if the space is to be left where it started.



## Grid Dissections

The special issue of *Chessics* (No 28) on chessboard dissections has met with many favourable comments. It is available as a one-off for 60p (\$1) but I am already planning an expanded *Chessay* on the subject, to appear next year. On this page of the *Journal* we will be concerned with dissection questions of all types, not just those with cuts restricted to a square grid. But we begin with two square-grid examples. The following is another dissection from Walter Stead's manuscript notebooks. It will serve as a tribute to C.E.Kemp, the chess problemist and editor of *Fairy Chess Review* during its last two years, who died in November last year aged 84. It shows the 35 pieces of 6 squares forming a rectangle 12x20 with 30 holes, spelling out the initials C.E.K.



W.Stead  
undated

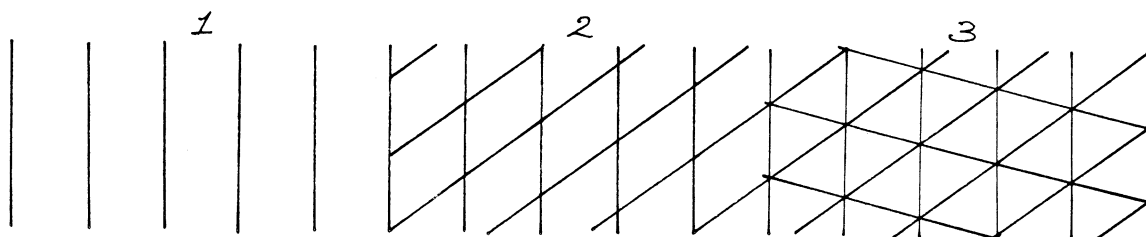
## A Chessboard Dissection Question

Philip M.Cohen of Aliquippa, Pennsylvania, USA, sends the following question which he says he worked on about 20 years ago. He achieved 43 in (a) and 18 in (b) but did not succeed with (c). Can any reader do better?

**Recreation:** Dissect a chequered 8x8 board into the 12 possible 5-square shapes and a 2x2 square, in such a way that the pieces can be rearranged so that: (a) the largest number of the 112 pairs of squares with a common edge are the same colour, in other words so that the board is as "unchequered" as possible; (b) the largest possible connected single-colour area is formed; (c) so that a connected single-colour area is formed that touches all four sides.

## Crossing the Parallels

A single "beam" of parallel equidistant straight lines divides a plane area into strips all alike (except near the edges which we take to be at a large distance and ignore). Two such beams at an angle divide the plane into parallelograms, all of the same size, shape and orientation. These parallelograms may in special cases be rectangles or diamonds or, even more specially, squares. A third beam can always be added to the first two, crossing all the parallelograms diagonally, to divide the plane into triangles all of the same size and shape, though in two different orientations.

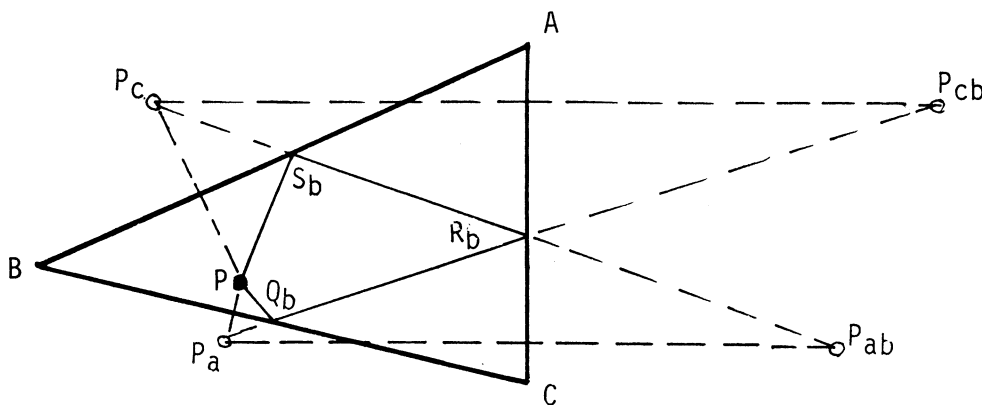


**Problem** What is the maximum number of beams that can be combined so as to divide the plane into pieces all of the same size and shape? An illustration of the dissection is required, not just a statement of the number of beams.

### Triangular Billiards

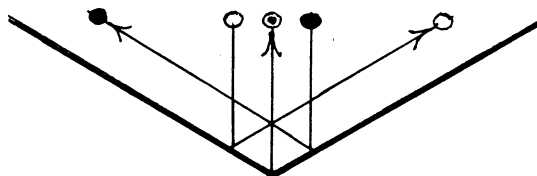
The earliest mention of Triangular Billiards that I know of is in No. 53 of the Pillow Problems of C.L.Dodgson (Lewis Carroll) published in 1893.

The geometrical part of Dodgson's problem involves finding a route PQRSP, from P to P within a triangle ABC via impingements upon the sides at Q, R, S. A construction for one of the three possible routes is shown below. In this diagram  $P_a$  and  $P_c$  are the reflections of P in the sides BC and AB of the triangle. Then  $P_{ab}$  and  $P_{cb}$  are the reflections of these points in side CA. The cross-joins  $P_aP_{cb}$  and  $P_cP_{ab}$  meet at  $R_b$  on AC, and cut BC and CA at  $Q_b$  and  $S_b$  respectively. Then  $PQ_bR_bS_bP$  is the required path. (Similar constructions lead to the alternative routes  $PQ_aR_aS_aP$  and  $PQ_cR_cS_cP$  with the second impact point  $R_a$  on BC or  $R_c$  on AB.) Dodgson's diagram omits point  $P_{ab}$ , but I have put it in to bring out the symmetry of the construction method. Note that  $R_b$  is **not** the foot of the perpendicular from P to AC unless the angles at A and C are the same.



In the particular case when SPQ is a straight line, so that the billiard ball will carry on again round the same path, the points Q,R,S must be the feet of the perpendiculars from A, B, C to the sides BC, CA, AB. That is, P must be a point on the "pedal triangle" of ABC, which is the inscribed triangle of least perimeter. [For proof of this see H.S.M.Coxeter, Introduction to Geometry, 2nd edn, 1969, p21.]

Many puzzling questions arise in triangular (and generally multi-angular) billiards, and we will consider a series of them over the next few issues. One of the paradoxes of the subject concerns the question of what happens when a ball is cued directly into a corner, without pocket, so as to hit both the sides of the angle simultaneously. One might suppose that what happens at the corner could be deduced by considering what happens when the ball hits close to the corner and then considering what happens as the distance of the impact from the corner gets less and less. But, consider an angle of  $120^\circ$  and three balls, one cued along the bisector and the others along parallels to the bisector. Their routes will wildly diverge! (Assuming they do not collide.) Symmetry suggests that the ball cued directly into the corner will come straight back - but the slightest error of aim and it will come out  $60^\circ$  to right or left!



**Problem** : Suppose the angle of a corner is  $V$  degrees and that a ball is cued into the corner, to hit one side first, at an angle of  $U$  degrees to the side ( $U \leq V$ ). At what angle (and from which side) will the ball emerge?

**Question** : What rule applies if the ball hits both sides simultaneously? Will it come straight back along the same line? Will it come out at the same angle to the second side as it had to the first? Or will it stick in the corner? Or does it depend on the angle, or other conditions? I suspect that no two people, taken at random, will agree on the answer to this one! If anyone has the facilities to carry out some experimental tests, I would be interested to hear of their results.

### Cryptarithms

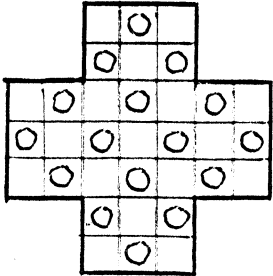
The term "cryptarithm" describes an array of letters that represent the digits in some calculation, the problem being to deduce which digit each letter represents. The first puzzle below was kindly sent to me as a New Year greeting by Mr T.H.WILLCOCKS. The second is an attempted response by me, but is far less felicitous. Where 11 letters are used of course two of them represent the same digit. The GAMES + PUZZLES problem has two solutions.

**Problems**

PUZZLES  
 PUZZLES  
 PUZZLES  
 GJELLISS

MIMIC  
 UNKNOWN  
 SOLUTION  
 WILLCOCKS

GAMES  
 PUZZLES  
 AMUSING



### An Enumeration

We will regularly include an enumeration problem on this page. Further questions are invited from readers (you don't have to know the answer to pose a question!). Our first problem was posed by T.R.DAWSON in 1907. **Problem** In how many different ways can all the 16 men in the diagrammed solitaire position be captured by adding one man and moving only that man?

### Magic Knight Tours

The first Magic Knight Tour of the 8x8 chessboard was published by William Beverley in the Philosophical Magazine & Journal, August 1848. Over the next hundred years the subject was studied intensively by a dozen or so devotees who discovered a further 95 geometrically distinct examples. A complete catalogue of these was published in Chessics 26 (Summer 1986). Both Beverley's tour and the last to be discovered by Murray in 1940, were formed on the "quartes" system, in which each successive set of four numbers 1-4, 5-8, etc lies in one quarter of the board, one in each rank and file of the quarter. In fact 72 of the 96 tours are formed on this principle. In a note on p121 I commented: "It should be possible to apply modern computer methods to ascertain whether all the magic 8x8 Knight tours of this type have been discovered." Mr T.W.MARLOW has begun to do just this, and has turned up the first new magic knight tours for nearly 50 years!

<b>23q</b>	6 19 32 61 28 21 34 59	30 27 54 9 52 47 34 7	<b>01g</b>
	31 62 7 20 33 60 25 22	55 10 31 28 33 8 49 46	
	18 5 64 29 24 27 58 35	26 29 12 53 48 51 6 35	
	63 30 17 8 57 36 23 26	11 56 25 32 5 36 45 50	
	50 47 4 41 16 9 56 37	64 13 4 57 24 41 20 37	
	1 44 49 46 53 40 15 12	1 60 15 62 17 38 23 44	
	48 51 42 3 10 13 38 55	14 63 58 3 42 21 40 19	
	43 2 45 52 39 54 11 14	59 2 61 16 39 18 43 22	
352                  600                  248	306                  514                  208		

Tom Marlow writes: (30th July 1987): "I have been doing some more computer work on a check on S magic tours by the quartes method - with some small success. ... you may be interested to see interim results. I revised the logic of the programme and rewrote in machine code which runs much faster. The programme takes a specified starting square and looks for all tours from there, so it will be necessary to start from each of the 10 fundamentally different squares. So far I have tried a1, b1 and c1 and used over 170 hours of computer time. For example, starting from a1 the programme found 8 926 565 tours, not counting reflections in a1/h8. Of these only 4 were magic and were 27a,b,c and d in your catalogue". [27a is Beverley's tour and 27b,c,d were discovered the following year, 1849, by Carl Wenzelides.] "From c1 it found ... two ... which do not seem to be in your catalogue." I have reflected the two diagrams so that the tours are in the "standard orientation" used in the catalogue (so c1 becomes a3). The new tours become **01g** and **23q** in the catalogue. Congratulations to Mr Marlow for his work.

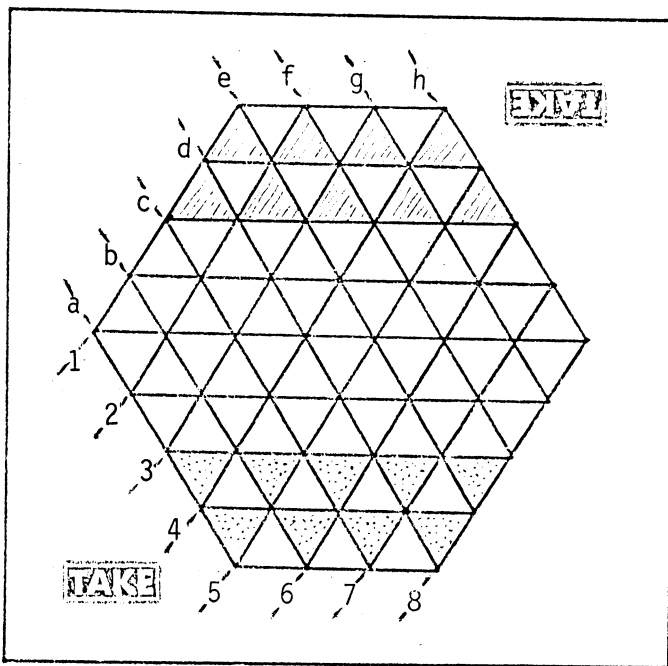
## Baroque Games

In chess the captures, with the exception of en passant, are all by **eviction**; that is, the capturer moves to the cell occupied by the victim. The term **baroque** is applied (e.g. in *Chessics 2*, p4, 1976) to any other form of capture. Capture by hopping over the victim is still current in Draughts or Checkers, but other methods seem only to be found in games of historical interest. [I presume Draughts is still played in the UK? No evidence of it has come my way recently!]. The purpose of this feature therefore will be to encourage more exploration in this neglected realm.

### Custodian Capture Games

Custodian capture, in which a piece is trapped between two enemies, was apparently the basis of the old Saxon game Hnefatafl, as reconstructed in R.C.Bell's *Board and Table Games* (1960). In this and the Finnish Tablut one player's forces occupy the central area and the aim is for the central King to escape to the outer edges of the board, so that unlike chess or draughts these games are not symmetrical between the two players.

#### Take



The game of **Take** is an attempt to employ the custodian capture principle in a game of equal forces, placed symmetrically in the opening position.

The version that I have been sent for review has a roll-up board about a foot square, printed red and blue with white lines on a dark blue background and chunky red and blue plastic disks, 15 per side, which are placed at the points of the triangles (shown shaded in the diagram). The moves are all straight-line rides along the lines of the board, and capture is by sandwiching one or more opposing men between two of yours. A piece may not move to a point between two others, where it would be captured, unless by so doing it eliminates the danger of capture. In the endgame, when both players have four stones or less a "must take" rule comes into operation

The illustration on the tube containing the game is of a white board with black lines, so presumably it is available in other designs. The suggested retail price is £5.99. The coordinate system that I have indicated in the diagram enables games to be recorded, and also shows that the board is like a chessboard with two opposite corners removed (a6-a8-c8 and h3-h1-f1), the third set of lines being the diagonals parallel to a1-h8.

Like any symmetric tafl game there is the inherent flaw that a determinedly hedgehog like player cannot be prised out of his side of the board, though a new law has been introduced to counteract this in part, namely: In the event of a "stalemate" (formed by stones across the board) the player with most stones on the centre line and beyond is the winner. The general aim is of course to reduce the opposition to one stone.

An important rule is that the edges of the board are "regarded as a continuous line" for capture purposes, but not for moves. Presumably this would mean that after the opening moves: 1. b4-b1 g5-g8 2. e7-h7 all the pieces on c1 d1 e1 f2 g3 h4 h5 h6 are captured by the two custodians at b1 and h7. "Black" can of course immediately retaliate by the symmetric d2-a2 with equal devastation, leaving each player with only 7 men. However, the illustrations provided only show the capture of one man at one corner, so this interpretation of the rule may not be as intended, but would make a good variant.

**Take**, invented by Mike Woods, is distributed by Classic Games Ltd, 15 East Street, Tewkesbury, Gloucestershire, GL20 5HR.

## Sense & Nonsense

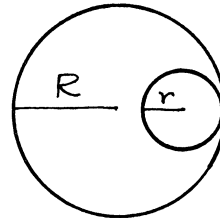
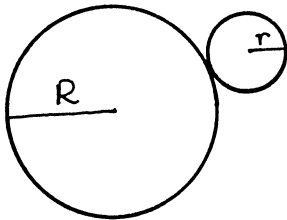
This regular page, if we can keep it going, will be on the theme of Logical reasoning, including paradoxes, fallacies, sophistries, and miscellaneous riddles and conundrums, as well as deduction puzzles. We will also mix in a little more serious Logic and historical notes. Please send your own questions too, even (or especially) if you don't know the answer yourself! Also any errors of reasoning you spot in publication.

### Probable Inequality

If the probability of  $A \neq B$  is  $P$ , and of  $B \neq C$  is  $Q$ , what is the probability of  $A \neq C$ ? Yes, I know the obvious answer is  $R$ ! The answer I require however is a formula for  $R$  in terms of  $P$  and  $Q$ . The sign  $\neq$  here of course means "not being equal to".

### Wheels within Wheels

There is a well-known old conundrum concerning two wheels or coins one of which is held fixed while the other rolls round it without slipping (e.g. H.E.Dudeney, Amusements in Mathematics, problem 203). The question is: How many times does the rolling wheel turn on its own axis in making a complete revolution of the other wheel? The answer to this conundrum may seem surprising or paradoxical, but it is made to appear more reasonable if we consider the more general case of a wheel of radius  $r$  rolling round one of radius  $R$ . Three related questions can be answered at the same time: What if the larger diameter wheel rolls round the smaller? Is there any difference if the small wheel rolls round inside the larger one? Can any meaning be given to the idea of a large wheel rolling round the inside of a small one?



### Logical Grocers

The following problem is due to H.A.ADAMSON (well known for his retroanalytical chess problems) and dates back to 22 October 1915. A manuscript bearing this date, and in the handwriting of T.R.Dawson, was found among the problem collection of the late C.E.Kemp in the British Chess Problem Society Archive.

- Given:
1. All long-nosed grocers are tee-totallers.
  2. No short-nosed grocer is brave.
  3. Every brave non-smoker drinks alcohol.
  4. All dark-haired smokers are grocers.
  5. No long-nosed tee-totaller smokes.

What may be deduced of all grocers?

In this type of problem of course all the distinctions are assumed to be rigidly black-and-white, there are no grey areas. Everyone is either a grocer or not, and no-one has a medium-sized nose! This lack of realism adds a spice of nonsensical humour to an otherwise straightforward piece of logical reasoning.

### Saw Seeing

You are required to saw a cube of wood into 27 equal cubes. How many cuts are necessary? This is not a new question, but I disagree with the answers given elsewhere.

### Saw Saying

The old adage "Moderation in all things" implies in particular "Moderation in moderation", but this allows "Extremism in a few things", which contradicts the original principle, which is therefore not self-consistent. Where is the fallacy, if any, in this argument?

*Structural Analysis of Verse*

**Verse** is language in which significant use is made of regular visual or aural patterns. Language without these patterns is **prose**. (What makes verse or prose **poetry** I will not attempt to define here.) The types of pattern used in verse are: (a) rhythm and metre, (b) alliteration, assonance and rhyme, (c) structure.

**Rhythm** consists of repetitions of stresses on syllables. **Monosyllabic** verse, in which all syllables are stressed alike, can only be used in short sections, like lists. The most common rhythm is **disyllabic**, with simple alternation of stressed and less stressed syllables, and is either **trochaic**, 101010... or **iambic**, 010101.... A regular rhythmic scheme is a **metre**, and the repeated unit pattern of stresses is a **foot**. The **trisyllabic** feet 001, 010, 100 are referred to as **anapaests**, **amphibrachs** and **dactyls** respectively, but seldom does verse split into these patterns with complete clarity. (The other theoretically possible forms: 011, 101, 110, are apparently unnamed and unused.) In **tetrasyllabic** verse the most common form is 01020102... alternating major and minor stresses separated by unstressed syllables. The stress-patterns of a piece will often depend on the reader's interpretation, since the author's intention is seldom marked explicitly.

**Alliteration** is the repetition of consonants, particularly the initial letters of words, while **assonance** is the repetition of vowels. **Rhyme** is the repetition of combinations of consonants and vowels. Purely rhythmic verse, without rhyme, is known as **blank verse**. This group of patterns might perhaps be collectively termed **tonality**.

**Structure** in verse refers to larger scale patterns. It is usual to divide up written verse into **lines**, collected into **stanzas**, but this is often done purely as a matter of typographical convenience, rather than to show up the structure. Just as individual sounds may be repeated, so may a whole line, providing a **refrain**, or a whole stanza, a **chorus**. Prominent features, like rhymes, tend to mark the ends of lines, but are not excluded elsewhere. **Rhyming verse**, strictly interpreted, has a rhyme at the end of every line. Rhyming **couplets** or **triplets** can only use one rhyme: AA or AAA, but a **quatrain** can use two, and they can be arranged in two different schemes: ABAB or ABBA (AABB counts as a pair of rhyming couplets rather than a quatrain). How many different rhyme-schemes are possible in five-line and six-line verses? Can readers provide examples of all of them? More on this next time - and not too many Limericks please!

Other forms of structure of particular recreational interest are visual **shape** (one immediately thinks of *The Mouse's Tale in Wonderland*) and **acrostics** (again, Lewis Carroll provides a perfect example in the rhyming triplets that conclude *Through the Looking Glass*, the initial letters spelling the full name of the dedicatee). We may also mention **mnemonics** such as those for Pi, the numbers of letters in the successive words being: 3.14159 26535 89793 23846 26433 83279 50288 41971 69399 37510, although I've not yet encountered one that goes as far as the 50th decimal place! Such mnemonics are of doubtful utility, it is as ingenious verses that they command interest.

Original versifications are invited from readers, showing particular metric, tonal or structural patterns. The subject matter can be what you please, serious as well as light, so long as it is not obscene or libellous. The approach, befitting the *Journal* is of course recreational rather than high art. Here are two examples, in contrasting moods and of not particularly regular structure, to set the ball rolling.

## AN ASTRONOMIC THOUGHT

*A piece of space, a lump of nought,  
Of utter blackness full of light,  
An insubstantial gram  
Of photon-fraught, vibrating night.*

G.P.JELLISS

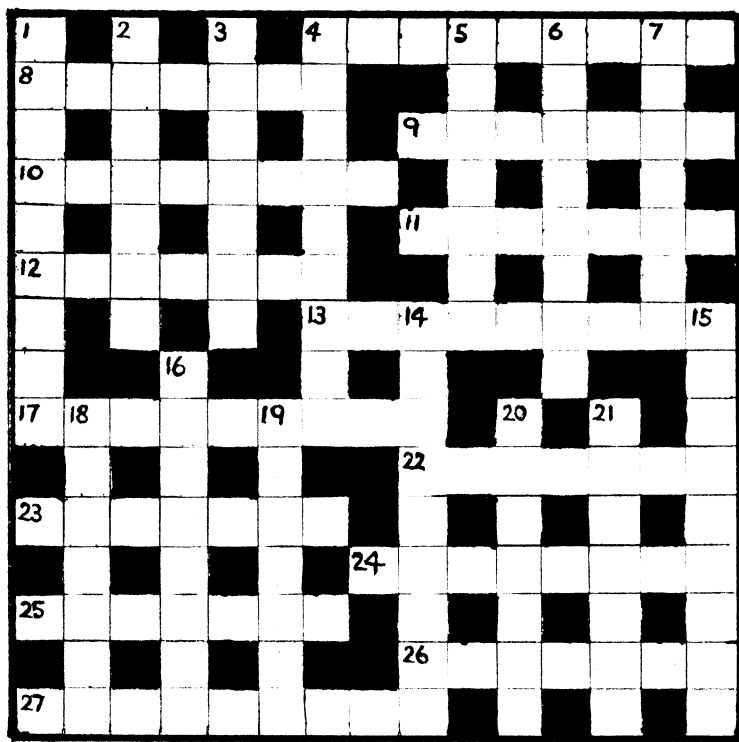
## THE LANCERS

*Pray, Why were you dancing The Lancers,  
With those tall aspidistra-ous plants, Sirs?  
Well, there's several reasons,  
But we think that the best one's  
Just so we can say: Those who ask silly questions  
Are certain to get silly answers.*

G.P.JELLISS

By coincidence, the latest (albeit dated Spring 1985!) issue of *Jabberwocky* (The Journal of the Lewis Carroll Society) is devoted to *The Hunting of the Snark* and contains some interesting notes on its metre and structure. Enquiries about the Society should be addressed to their Secretary, Flat 7, Avondale, 109 Truro Road, Wood Green, London, N22 4DP. *The Snark* is basically a traditional **ballad** in anapaestic metre, structured in quatrains with rhyme-scheme ABAB, but with many variations.

**Cryptic Crossword** 1. By Querculus.



**ACROSS**

- 4. Is zero, decimalised, the same size? (9)
- 8. Set before jury-rig ran amuck. (7)
- 9. This sea becomes most wan. (7)
- 10. Work on hand, intercontinental, in compost. (8)
- 11. For all practical purposes unreal. (7)
- 12. No particular charge made one turn. (7)
- 13. Turning of faucets to cut off air supply. (9)
- 17. News reader in the year uncertainty began. (9)
- 22. Cosh nun wields without rival. (7)
- 23. It's backward in mime to get out of step. (7)
- 24. Horse: delay charge! (8)
- 25. Salesman it is not common to give a new coat. (7)
- 26. Lines by rhyming poet, or Auden perhaps. (7)
- 27. Prison TV centre misplace in the wood. (9)

**DOWN**

- 1. Arrange a march on one instrument. (9)
- 2. Uranium-Carbon transmutation comes to a head. (7)
- 3. Put aside record a little way. (7)
- 4. To paint R in sickly hue shows inherent sense. (9)
- 5. Off it Sam! Come back! No-o! Instructions for dog. (7)
- 6. Artistic three-piece suite becomes this endless crypt. (8)
- 7. With immediate effect, as in TNT. (7)
- 14. Chairs the Royal National Institute in future. (9)
- 15. You sound false and hesitant on this instrument. (9)
- 16. Sport brought to boot in autumn? (8)
- 18. In short, I have innate innocence! (7)
- 19. No M in alphabet begins to appear unrealistic. (7)
- 20. Sport one slopes off to? (7)
- 21. The day after may perhaps begin evergreen growth. (7)

[In cryptic crosswords the punctuation may also be cryptic.]

**Change-Chains**

"Doublets" or "Word-Ladders" in which one word is transformed step by step into another word by changing one letter at a time were apparently invented by Lewis Carroll.

A rather more flexible ladder-forming method is to allow an anagram to be combined with the letter-change.

The minimum number of steps in the chain equals the number of letters that need to be changed. If the words have no two letters in common this is the number of letters in each word.

In the case of short words there are usually several solutions, e.g.:

CAT	CAT	CAT	CAT
COT	CAD	OAT	TAG
COG	COD	DOT	GOT
DOG	DOG	DOG	DOG

but longer words give more interesting results.

It should not be necessary to go more than one step over the minimum. This requires the use of one "catalyst" letter, which appears in the chain but disappears before the end. For example R/L in:

QUEEN	KNIGHT
QUERN	THINGS
RUNES	SLIGHT
CURSE	HOLIST
CRESS	POLISH
CHESS	BISHOP

Others to try are: RIGHT-WRONG, BLACK-WHITE, LIGHT-HEAVY or any others you may choose.

Other types of word-puzzle are invited from readers.



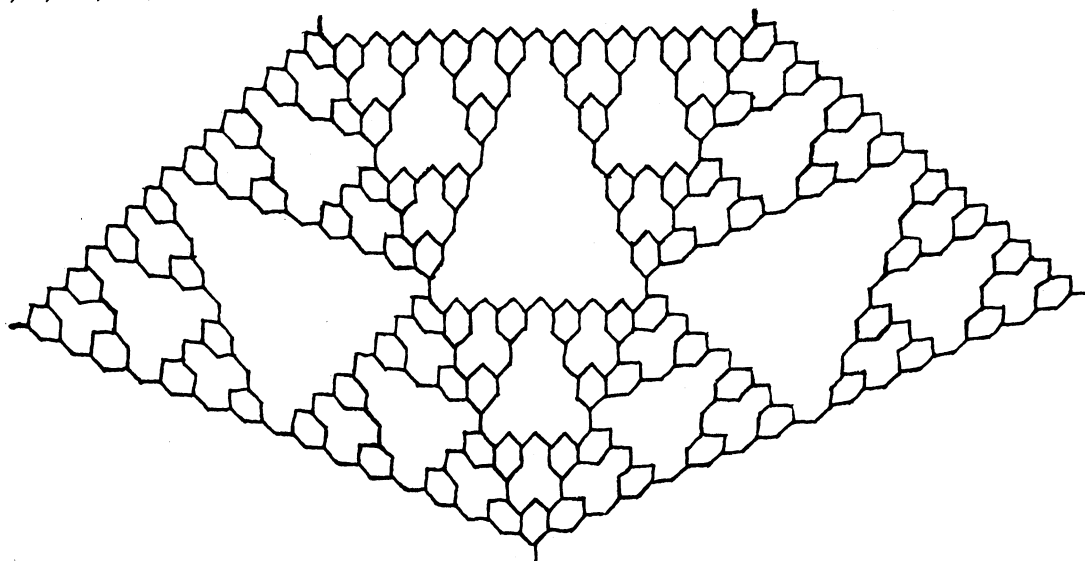
### Mathematical Art?

This regular section will be concerned with patterns of some complexity, but yet of aesthetic appeal, that are nevertheless produced from simple basic constructional directions, usually by some type of step-by-step growth process. Such patterns represent part of the little-explored area between Mathematics and Art. Is it possible to have such a thing as Mathematical Art? Or is it a contradiction in terms? What do you think?

The point about these constructions is that they should be formed from as few and as simply formulated instructions as possible, and the instructions must be followed rigorously. The art lies in choosing the right combination of rules to produce a pattern of the most interesting appearance. There is much scope here for a recreational pastime, and it is hoped readers will contribute further results from their own explorations.

### Pair Trees

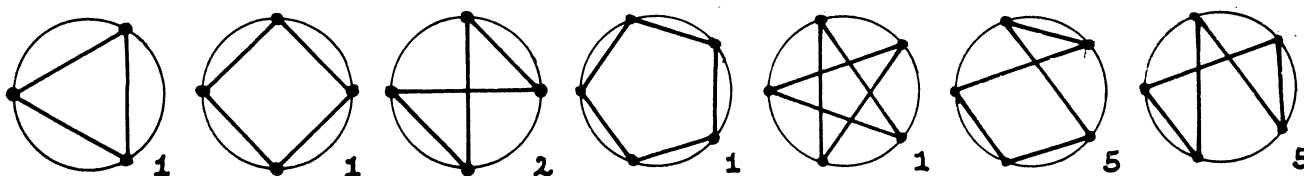
Bifurcation processes are often fruitful in producing significant patterns. Our first picture shows a "Pair Tree" which has grown from a single upright shoot. Each year each growing shoot sends out two new shoots at right angles to each other. When two growing shoots meet they fuse and cease to grow further. Shoots only grow "towards the light", i.e. no shoots will grow towards the ground or towards an existing part of the tree (thus a horizontal shoot only produces one new shoot, sloping upwards). At the end of  $2^N$  years (i.e. 2, 4, 8, 16, 32, ...) there are only four shoots ready to bifurcate the next year.



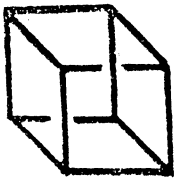
Elsewhere in the Fibonacci Pleasure Gardens there grows another variety of bifurcation tree. It grows in the same way as the Pair Tree described above except that each new pair of shoots are at  $120^\circ$  to each other instead of at right angles. Can you draw a picture of this tree and say what is unusual about its shape after  $2^N - 1$  years?

### Polygrams

A "polygram" is a pattern formed by joining a number of points, equally spaced round the circumference of a circle, by straight lines in succession. There is one polygram of 3 points, two of four points and four of five points. The suffixes give the number of different orientations in which each pattern can be seen, if the points are fixed in place:



Can you draw all the polygrams of 6 points? It is easy to miss one. More difficult is the question of how many polygrams there are of size N.



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- - - Black on white. Plastic. £ 2.85

- - - Same quality as 9-9 set. £ 6.30

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Bruce, 71.*	Paul Simpkins, 27 West Park St, Dewsbury, WF13 4LE.	Dp EG GS Mn Qu VG Ww
C'est Magnifique, 33.	Pete Sullivan, 36 Bushey Hill Rd, Bushey, Herts, WD2 2ED.	Dp PP RR RS Wo
Cut & Thrust, 52.	Derek Wilson, 6 Caldbeck Dr, Woodley, Berks, RG5 4LA.	CE Df Dp Du EG Me RR
Denver Glont, 54.	Glover Rogerson, 31 Cornwall Rd, Bishopston, Avon, BS7 8LJ.	BD Cl De Df Dp MD MI TS VR
Dib Dib Dib, 47.	Tom Tweedy, 29 Stanley Hill Rd, Amersham, Bucks, HP7 9BU.	Dp Jt Sw
Diversions, 31.	Rip Gooch, 49 Lightwood Av, Newcastle upon Tyne, NE15 6EE.	ET Me RR
Dolchstoss, 106.	Richard Sharp, 27 Elm Close, Amersham, Bucks, HP5 6DD.	Dp Jt TA
EH?, 7.	Alex Barty, 28b Gladsmuir Rd, Archway, London, N19 3JX.	Mn RR RW Sp
Faster than Light, 21.	Alex Zbyszaw, 139 Proffitt Av, Coventry, Marks, CV6 7ES.	Cv Dp Em Jn OW RR Sb Sf VR
Fire & Ice, 10.	Jan Niechwiadowicz, 7 Cambridge Rd, Portswood, Southampton.	AC B! Df Di Dp Ex IR Jn RR SC WR
Five Year Plan, 24.	Anthony Jones, 22 Beechill Rd, Eltham, London, SE9 1HH.	Da De Dp GL RS Sw
Froggy, 9.	Andy Bate, 15 Quinton Rd, Harborne, Birmingham, B17 0PP.	Ac AD Cd D! Dp Du Fu GI Jt LS
Gallimaufry, 68.	Steve Doubleday, 147 Howlands, Melwyn Garden City, AL7 4RL.	Dp DT FE G! IH Sr
Gazfinc, 27.*	Richard Bairstow, 20 Queen's Dr, Guildford, Surrey, GU2 6PP.	Ac AR Ch Dp Fc Fo Me RR Sw St UD
Ghot, 1.	Paul Dunning, 43 St John's Rd, Watford, Herts, WD1 1QB.	AE Dp In ME
Greatest Hits, 130.	Pete Birks, 38 Highland Ct, Highland Rd, London, SE19 1DS.	IT
Home of the Brave, 66.	Geoff Challenger, 117 Shrubbery Rd, S Darent, Kent, DA4 9AP.	Df Dp Mv OW RR Sw ( TL Tr TS Un
Hopscotch, 68.*	Alan Parr, 6 Longfield Gdns, Tring, Herts, HP23 4DN.	Ab En FS GS HC Lc Lt Mn P! RR
Infernal Desire, 26.	Matt Harrison, 139 Proffitt Avenue, Coventry, Marks, CV6 7ES.	BK Cq Dp Em Mv RR Sb WR
Lost Cause, 7.	David Crawford, 14 Kiln St, Fitona, County Tyrone, BT78 2BJ.	Dy Dp ND NF Na SA SB TB
Mad Policy, 126.	Richard Walkerdine, 13 Offley Rd, Hitchin, Herts, SG5 2AZ.	AD Bo Bw Dp Jt MM RR
Masters of Prime, 40.	Bryan Betts, 71b Eleanor Rd, Hackney, London, E8 1DN.	BW De Df D! Dp EG Ex GD JD Sa
Mica, 9.	Dave Rowley, 11 Rutland St, Hanley, Stoke on Trent, ST1 5JG.	At Ca FT IN Ot Sc Sw TT WO
Monochrome, 28.	Robin Mostyn ap Cynan, Penparc, Caergybi, Gwynedd, LL65 1HH.	Cc Dp ET GA UL
Morrigan, 22.	Alan Kennedy, 3 Drumglass Av, Bangor, County Down, BT20 3HA.	AD Dp EG Mu Sg TB Wa
Mouse Police, 24.	Rob Wilson, 6 Henley Close, Appleton, Warrington, WA4 5LY.	BM CW D! Dp Ir Jn ND Sn St WR
NMR!, 81.*	Brian Creese, 256 Canbury Park Rd, Kingstons on Thames, KT2 6LG.	Dp KM RR SC St VR ( Vg WS
Ode, 85.*	John Marsden, 49 Queen Elizabeth Sq, Maidstone, Kent, ME15 9DQ.	Dp Cf Dp ET Ge IN Me Mv OW SD
Personal Foul, 4.	Jon Elcock, 255 Delph Rd, Brierley Hill, Stourbridge, DY5 2RN.	Dp Sb VR WR ( Sg Sw Sp Ss To
Pigbutton, 14.*	Clive Palmer, 94 Markhams Close, Basildon, Essex, SS15 5LB.	BW Df Dp FD GA Gu JD Li MD Sm
Prisoners of War, 18.*	Wallace Nicoll, 228 Kinnell Av, Cardonald, Glasgow, G52 3RU.	Br Dp Df EG EN Ex FD FS Ge NW
Scorpio, 12.*	Dave Carter, 3 Cubbon Cottages, The Level, Isle of Man.	CM Dp Gs GS Sw Ss Un
Sensation, 28.*	Ellis Simpson, 95 Ormonde Crescent, Netherlee, Glasgow, G44 3SW.	BL CL PW SI Ss
Shadows of Amber, 10.	Mike Ferguson, 12 Browning Rd, Wyken, Coventry, Marks, CV2 5HS.	EG Em Hi I! NW RE Sb SM SN
Sharp Practice, 8.*	Ian Giles, 35 Pilton Close, Rectory Farm, Northants, NN3 5EZ.	Dp Ex MB Mr Pr VR
Small Blue Thing, 2.	Ian LeBrocq, 19 Lytton Av, Letchworth, Herts, SG6 3HT.	Cl Dc Dp Jn RR Sp St Un WP
Small Furry Creatures, 11.*	Paul Evans, 42 Wyndale Rd, South Woodford, London, E18 1DX.	BC Dp EG St
Springboard, 3.*	Danny Collman, 14 Westover Rd, Handsworth Wood, B20 1JG.	Dp
Stop Making Sense, 2.	Sean Kingston, 35 Minor Av, Lyme Green, Macclesfield, SK9 6BZ.	Ck DD Df Dp MD RS So Sw Un

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**Ar Df Dp EG Gr Jn LD St Un**  
**AD AE De Di Dp EG Em FC MV PP**  
**AH Cq Cr Dp EA Em FG Mv RT SK**  
**(RR Sp)**

Abbreviations for the games played, offered or described in the Zines

Ab Abstrac	CM Circus Maximus	FO Fo Superbike	Jt Jotto	Pr Pretzelcator	SS Soccer Supremo
Ac Acquire	Cq Conquistador	FM Flatten t'Mutha	KM Kingmaker	St Stab Dp	St Star Traders
AC AD&D Chess	Cr Crusades	Fs Fighting Sail	Lc Lachaino	Sw Sopwith	TA Third Age
AD Abstraction Dp	Cv Civilisation	FS Fair Shares etc	LD Lunatic Dp	Tb Title Bout	TB Tank Battle
AE Aberration Dp	CW Car Wars	FT 4000 AD	Li Linrodeth	Td Tour de Scorpio	TL Traffic Lights
Ar Archipelago Dp	Da Decathlon	Fu Future Tense	LS Lose your Shirt	To Touchdown	Tr Tribute
AR Ark Royal Dp	Dc Dictator	GA Grab for Africa	Lt Latino	TS 1066 Dp	TT 221b Baker St
At Atlantic Airlines	DD Davis Dp	GD Gunboat Dp	MB Mind Bender	UD U-boat Dp	UL Utterly Ludic's
AH After Holocaust	De Definitive Df	Ge Gesta Danorum	MD Mad Dp	Un United	Ve Venture
BB Bus Business	Df Downfall Dp	GI GIT Dp	Me Maneater	Vg Variant of Ghods	Vr Vain Rats Dp
BC Bluff my Call	Di Diadochi	G1 Gladiators	ME Middle Earth	Ma Warlock	Wi Winter 1900 Dp
BD Blitzkrieg Dp	Dl Deluge	GL GLC Battleground	MI Milan Dp	Wo Woolworth	WO World War 1
Bk Broker	Dn Dreadnought	GP Grand Prix	Mm Middleman	WP Win Place & Show	WR War of the Roses
BK Barbarian Kings	Dp Diplomacy	Gr Gridiron	MM Multimind	WS Wooden Ships	WW Wimbledon Wager
Bl Blood of Kings	DT Dark Tower	Gs Grand Slam	Mn Minds		
BL Baseball League	Du Dune	GS Golden Strider	Mr Mercator		
BM Blackmorn Manor	Dy Destroyers	Gu Guinness	Mu Murder		
Bo Bourse	EA Empires,Ancient	HC Hopscotch Ch	Mv Machiavelli		
Br Britannia	EG En Garde	Hd Holiday	ND Nuclear Dp		
Bw Brum Wars	EI El Gordo	Hi Hit	Na Naval War		
BW Baseball Wars	Em Empires	IH Iron Horses	Nu Nuclear War		
Ca Careers	En Entropy	II Illuminati	NW NW Frontier		
Cc Circuit	EN El Nabisco	ID International Dp	NF 1914 Dp		
Cd Chalkdust	ET 1829	In Intimate	Ot Othello		
CE Cosmic Enc'nter	Ex Excalibur	IN Int'nat'l Ter'sm	OW Origins of WW2		
Cf Confrontation	FC Finchley Central	IT Insider Trading	Pb Pinball		
Ch Chess	FD Fiction Diction	IR Into the Ruins	PB Pax Britannica		
Ck Chakra	FE Fall of Empires	JD Judge Dredd	PJ Parachute Jump		
Cl Cline-9	FG Free the Galaxy	Jn Junta	PI Plutonomy		
CL Cricket League	FO Formula One	Js Joust	PP Pass the Pigs		

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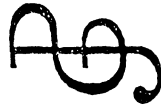
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