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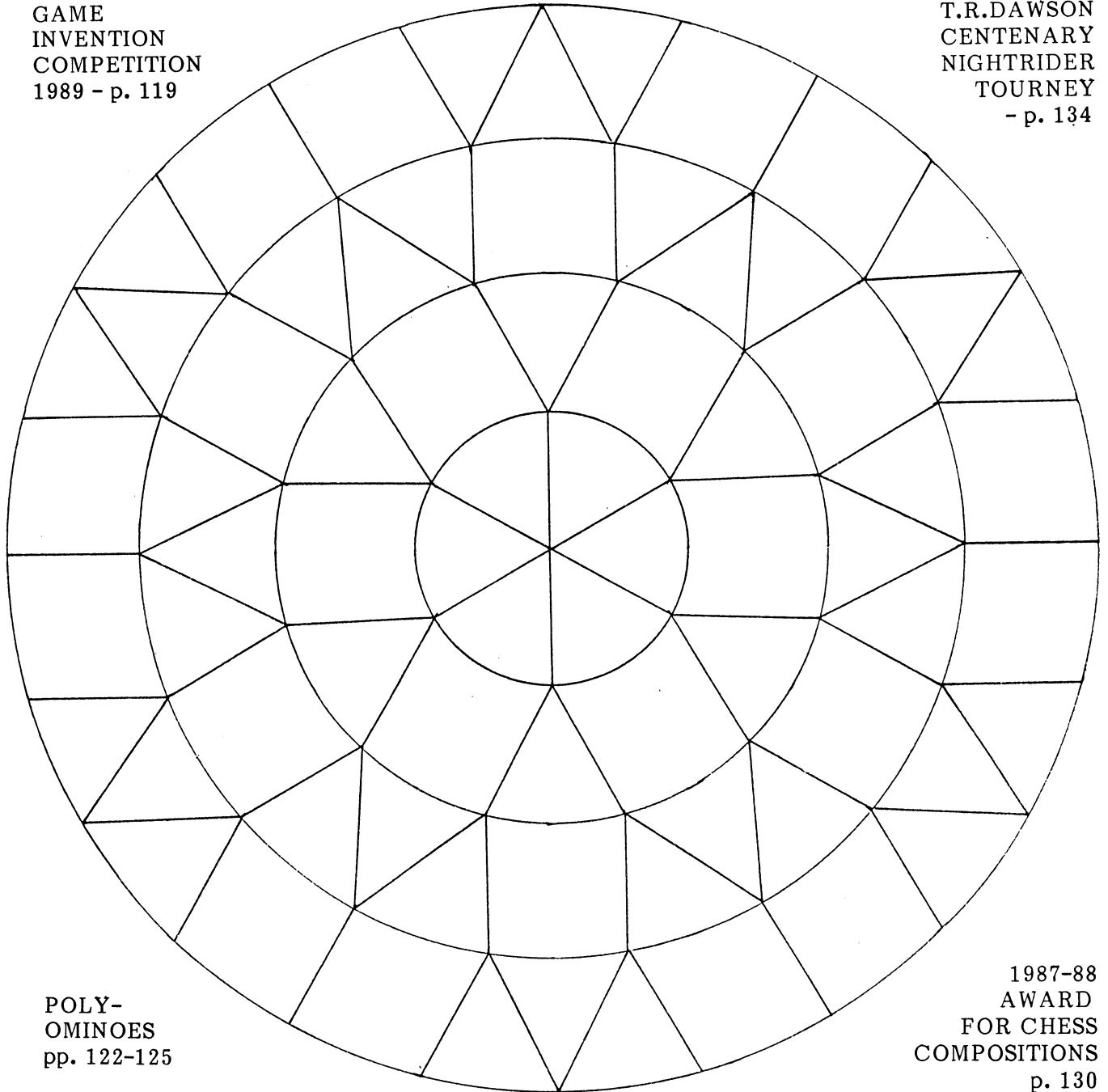
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Contents

ZINES & MAGS

The Games and Puzzles Journal. Apologies for the late appearance of this issue. I've allowed things to slip behind schedule due to work on my other projects, such as the Chessays. Actual publication date for this issue is 23 April 1989. I hope to catch up by issue 12 at least.

Games Monthly. My prediction that this magazine looked like a stayer could not have been more wrong. It folded after only four issues. Nominally it is being incorporated into Games International, but this appears to be only a commercial deal, allowing the latter to take over the former's subscription list and distribution network, not a combining of editorial input.

Games International. This, the third of the new games magazines, at last reached me at issue 3. I paid a £10 subscription, asking for it to start at No.1, but it seems that back issues are already unavailable. The address is: Lamerton House, 23a High Street, Ealing, London W5 5DF. In format it is between Games Monthly and Games Review - with larger type than the latter, colour only on the cover, and a rather mechanical layout. This issue contains articles surveying Election games and Trivia quizzes - neither of which inspire me with enthusiasm.

Ac-mong is another zine that got missed out of the survey in G&PJ 1. It comes from Gordon McDonald, 'Benbecula', 3 Taylor Park, Scroggy Road, Limavady, BT49 0NT. Besides Diplomacy and its variants its main theme is Early Irish History.

VARIOUS BOARD GAMES

Triangular Nimmity. Len Gordon writes that a similar game, under the name 'Japanese Corn Game' appears in a booklet called Puzzle Craft published by Lynn Rohrbough in 1930. It uses a five-a-side triangle, but does not impose the restriction that the pattern must not be disconnected. Also Martin Gardner describes a Square Nimmity, called 'Tac Tix', and some other varieties in Mathematical Puzzles and Diversions (Pelican Books 1965), where the idea is attributed to Piet Hein. This book incidentally has just (1988) been re-issued by University of Chicago Press under the title Hexaflexagons and other Mathematical Diversions.

The Game Invention Competition - 1988

The prize for the 'game invention competition' announced on p.53 (issue 4) has been won by Stephen Taylor for his version shown opposite employing custodian capture. Various other alternative systems of rules are also described. They all begin with the pieces set up as for Draughts except that the White pieces are on Black squares and the Black pieces on White squares, and the pieces remain on these colour squares throughout the play.
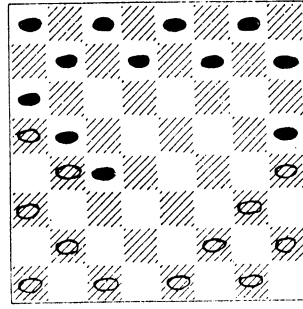
Two-Colour Checkers. Michael Keller sent a description of this game from Nost-Algia Number 302, July/August 1987 (a U.S. 'zine that I've heard of but never seen). Mannis Charosh and Garry Crum played a test game in 1974 under the rules: all moves as in normal Checkers except that captures are by short jumps forward along the files for Pawns, and in any direction for Kings. M.C. wrote: 'We agreed that there is not sufficient variety in the play. One error seems to be enough to lose a game. A king plays havoc quickly because it can approach an opposing plain man on 3 sides, and often cannot be stopped from capturing 3, 4 or even 5 at a time. Yet the idea is so intriguing that I wish you could amend the rules to increase the possibility of stratagems for both offense and defense.' (letter to Philip M.Cohen).

Directional Draughts. This is my own suggested set of rules for the game.

The pieces move one square at a time diagonally, and capture by series of short jumps along ranks or files - but there are restrictions on these, as follows. Moves may only be made directly towards or away from allied men, whereas captures may not be made towards or away from allied men. Thus, White can start by c3-b4 (away from d2) but not by a3-b4. Black can then follow with c6-b5 without fear of capture by b4-b6 etc (since this move is away from b2). If White now plays b2-c3 however, the capture b4-b6 is now threatened and Black can defend by b5-a4 (threat a4-c4) or b5-c6, retreating. If a piece (or more than one) finds itself on its side's turn to move occupying a square where it is not blocked in any of the four diagonal directions but is nevertheless unable to move or capture, then it promotes to 'hero', and is released from the above restrictions. The object is to capture or immobilise the opposition.
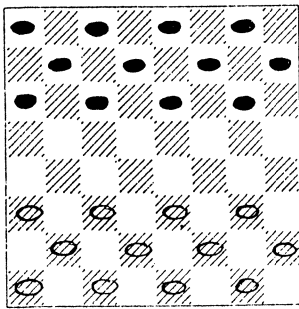
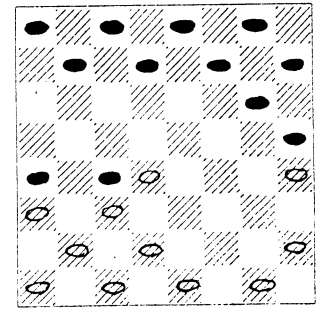| Opening position. all games	Shortest White win.	Shortest Black win.	Position after 5f2d4. see below
	Kentish Draughts		
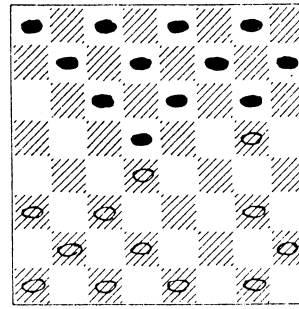
Kentish Draughts.   (Stephen Taylor's rules). The pieces move like Bishops, but the square on which a man finishes his move must be orthogonally adjacent to exactly one opposing piece - neither more nor less. (This stipulation provides the game with its essential character. Unlike similar board games, one has no need to pursue the enemy, as the rules force him to come to you!) Capturing: If, in consequence of a move, two of one's men orthogonally outflank an enemy piece, then the intervening piece is removed from the board. This removal is mandatory, but it is not compulsory to play a move which entails such a capture, unless of course none other is available. Since a man can only move adjacent to one opposing piece it is not possible to make more than one capture per turn. It will be deduced that no three consecutive squares on the board may ever be occupied simultaneously.

The fastest win for White that the author can find is the following: 1.c3a5 c6b5 2d2b4 e6c4 3e3g5 g6h5 4g5h4 wins. There being no vacant squares on the board adjacent to exactly one White piece, Black has no legal move available. White can lose far more rapidly! - 1e3g5 a6c4 2f2d4 c4d5 (0,1). To illustrate the flavour of the game Mr Taylor submits the following opening lines plus comments:

1e3g5 a6c4 2g3e5 e6g4[g5] Square brackets indicate the captured piece. 3e5g3 This sort of retreat is usually a good idea as the compact mass of White pieces restricts Black's choice of reply. 3...c6a4 4g3h4 g4h5 (4...g6h5 loses immediately to 5h4g3 but 4...g4f3 and 4...b7f3 both seem playable) 5f2d4 g6e4[d4] 6d2e3 h5f3 7h4f2 d7h3 8f2h4[h3] etc. (6...d7g4 7h4g3 1-0) (6...e4f3 7e3f2 d7g4 8f2e3 wins for White) (5...c4d5 6d4c5 d7b5[c5] 7c3d4 b5c4 8d4c3 wins for White whereas 6...d5c6 7c3b4 looks approximately equal, and with 6c3a5[a4] b7a6 7d4b6 d5b7 Black is winning) (5...b7d5 6d4e5 f7e6 7c3a5[a4] when White's chances look to be equal, and 6...g6f5[e5] 7h2f4 h5f3[f4] 8h4f2 where Black's limited mobility should offer White compensation for the sacrificed material. 7...d5f3[f4] 8e1g3 f3h1 9g1h2 also looks satisfactory for White.) Finally: 5f2c5[c4] a4c6; 0,1.

THE GAMES AND PUZZLES JOURNAL
Game Invention Competition 1989
I propose to make this competition an annual one.
This year's game is to be played on a board of the design shown on the front page
(or a larger or smaller board of the same design), there are no other restrictions.

Deadline: 1 Nov. 89

The circular board illustrated on the front cover is one that has potentialities for a number of new games, or variants of old ones. It is formed of equally spaced concentric circles. On the innermost circle, equally spaced, are 6 points, on the next 12, on the third 18, on the outer 24. The lines joining the points form a mosaic of approximate squares and regular triangles. The centre point is joined to the 6 points on the inner circle, forming 6 'triangles'. On each 'triangle' we then construct a 'square', and on each 'square', working outwards, a 'triangle'. Thus all of the points are the meets of 5 lines, except for the centre node, where 6 meet, and those on the outer circle (six with 4 and eighteen with 3). There are 61 points in all.

The process can be continued to produce larger boards of similar design. The nth circle has 6n points and is of radius n units, so that it is of circumference $2\pi n$, and the arc-distance between two adjacent points is $2\pi n/6n = \pi/3$ units (approx. 1.0472) the same for all circles. There are in all $3n(n+1) + 1$ points, and 6r outer nodes of order 4, where $2r = n-1$ or $n-2$.

The board could be used in two different ways - with the pieces placed on the points or in the spaces - games employing either of these rules (or both) would be admitted.

CARD PLAY

Soccer as a Card Game

By Alan PARR
Hopscotch, 6 Longfield Gardens, Tring, Herts, HP23 4DN

Just about ten years ago it occurred to me that there is no well known card game based upon soccer. It wouldn't have been difficult to come up with a fairly conventional game in which the taking of tricks represented the winning of tackles and consequent moving the ball upfield, but I wanted something which would be much more faithful to the spirit of the sport. A two-stage game, in which the two players would take the part of club managers, felt about right to me. In the first phase the managers would select their players and the tactics they would use, while in the second stage the match would be played out and the result determined. Naturally managers would be constrained by limited resources and so would be forced to decide how to make the best use of them – should they play an all-out attacking game and leave themselves with possible weaknesses in defence, or should they concentrate on not conceding any goals and hope they could sneak a winner? Perhaps packing midfield would give them general control with chances to score on the break? Of course, finding a mechanism which would do all this and still be simple enough to be playable might not be too easy, but that didn't seem to be any reason not to try.

In fact, the method I came up with is one of those things that after the event seems so obvious that you can't imagine why it hasn't been invented a dozen times over. For simplicity, I discarded the court cards from the pack and so was left with forty cards, four each of value one(Ace) to ten. Each manager is given eleven cards to represent the players in his team; the values of the cards are the skill levels of the players, so that the most valuable players are the 10s and the 1s and 2s are pretty useless (for a fair comparison of managerial skill in a Cup Final the two managers should be given identical collections of players, but in a run-of-the-mill League game they might not bother, relying on luck evening out over a number of games).

The managers arrange their players into team formation, putting the cards face down until both are happy with their formations, when the teams are turned face up. A team must have a goalkeeper, at least two defenders, at least two midfielders, and at least two forwards; it is up to the manager to decide on both the formation he wishes to use, and which players will operate in which positions. Complementary areas are then compared, so that a team whose forward line has an overall higher rating than its opponent's defenders will receive an appropriate number of shots, and the team with the stronger midfield will consequently receive a few shots (though proportionately not so many). To evaluate the shots, cards from the undealt portion of the pack are turned up and compared to the strength of the goalkeeper, scoring if the goalkeeper is not good enough to stop them.

This relatively simple mechanism has proved immensely robust; all sorts of extra chrome has been piled on top of it so that accommodation can be made for teams playing hard, advantages given to the team playing at home, and also methods provided for the away side playing ultradefensively and prepared to settle for a draw, and for different tactical styles such as using a sweeper or the offside trap. All these developments have resulted from the medium of playing the game by post, as outlined in my previous article (G&PJ 5+6, pp72-3).

United has become an absorbing hobby for myself and hundreds of others, so in these articles I have only been able to scratch the surface of the game. Details of the basic card game, and seven other card games on sporting themes can be found in Tournament, obtainable from myself at the address given above, for the cost of £1 and a stamped self-addressed envelope (A5 size). I can also supply a comprehensive guide to United in postal form in a booklet costing £2.50 (plus A5 SSAE). If you'd simply like to know a little about the postal games hobby – which offers not just United but almost every game under the sun – then send a large self-addressed envelope and a few stamps and I'll put in some sample 'zines' as well. My own zine, Hopscotch runs a 60-team United league and many other games besides. It appears every 6 weeks and costs 40p plus postage If you play in United there is a game fee of £1.50 to cover the whole season

2-(5)-8-J-A

My brother Edward tells me that he learnt this game under the name 'Twitch' and that it should be played as fast as possible. Anyone making a mistake is penalised by having to take two cards. John Beasley writes: "We used to play a game similar to '2-8-J-A' at English Electric around 1968. The essential differences were as follows: (i) we used two packs; (ii) your score was doubled for every 2 left in your hand; (iii) if you played a 10 you interchanged hands with the next player. An entertaining though risky strategy was therefore to build up a large hand, hoping to pass it on just before somebody got out. It made an excellent afterlunch office game for six or seven players, and I suggest a similar role for your 5." This is the best suggestion for use of the 5s that has been proposed - better than my own ideas, and well in keeping with the lively spirit of the game. The mention of lunch-time card playing reminds me of one of my father's stories of when he was a foreman in a large engineering works and a group of men used to spend over-long playing cards in an area hidden among the boilerwork and other large engineering constructions on the shop-floor, thinking he was not aware of what was going on. One day he spotted a large crate of just the right size for a practical joke, with the help of a driver of one of the overhead gantry cranes. When the group assembled for their game they found their bolt-hole plugged by the crate - What a spoil-sport!

Car Park Patience
By E.J.JELLISS

Having recently put a dent in my car whilst trying to manoeuvre out of a badly designed car park, it reminded me of a game of patience I used to play. The cards are laid out face up, alternately horizontal and vertical, to form a rectangle 7x5. The remainder of the pack is held by the player. The cards on the table now represent cars parked in a very silly car park. Like cars the cards can only be 'driven' out of the park forwards or backwards, not sideways!

For some strange reason a car (card) will only start when it has a clear path out of the park, that is to say vehicles (cards) cannot be manoeuvred about the car park to enable a particular car (card) to drive out.

arrows show permitted moves

The object of the game is to end up with the usual four piles of four suits, Ace at the bottom, King on top. After laying the cards out, check around the periphery of the car park for any Ace which may be driven out. If so, check for the Two of the same suit, and so on. When no more cards can be driven from the park, remove the top three cards from the remainder of the pack and turn them face up so only one card is showing to form a nearby 'garage'. Further cards may now be driven out of the car park and placed at the head of the queue in the garage, but they must be either the same value or the next highest or the next lowest of the same suit as the garage card (i.e. on 10 of Diamonds you put 9 of Diamonds, Jack of Diamonds or any Ten). If possible, continue to drive cards from the park to the garage or the sorted piles (the 'show room' presumably). When no more cards can be driven out, the next three cards are taken from the pack in the same manner and play continues.

When all of the remainder of the pack is 'garaged' the garage pack is turned over and the car park is mysteriously refilled from this pack, starting at the top left hand corner. Play continues until: (1) The car park is empty and all cards are in the show room. (You win). (2) An immovable traffic jam occurs and no more cards can be driven out. (You lose). (3) A kind of stalemate may occur, where play is only between car park and garage. (You lose, I think).

Notes: (1) Cards can be transferred from garage to show rooms. (2) It is best to mark the position of the top left-hand corner of the car park, as sometimes when there are only a few cards left, it is difficult to know where to start refilling. (3) The lose/win ratio seems to be about 2 to 1.

DISSECTIONS

There are four pages of Dissections in this double issue - mainly on polyominoes. I hope my request for some original results on p.124, and Mr Mabey's beautiful results on p.125 will lead to further work, so that we can revive the FCR tradition of publishing a regular series of problems. We have the advantage nowadays of being able to illustrate the results without resorting to coding.

Pentominoes

Here are the solutions to Sivy FARHI's dissection problems on pages 57 and 109, and six further cases he has found. He evidently has the whole problem computerised. In each of these configurations, given the positions of the four holes and the 1x5 piece the positions of the other 11 pentominoes are determined uniquely.
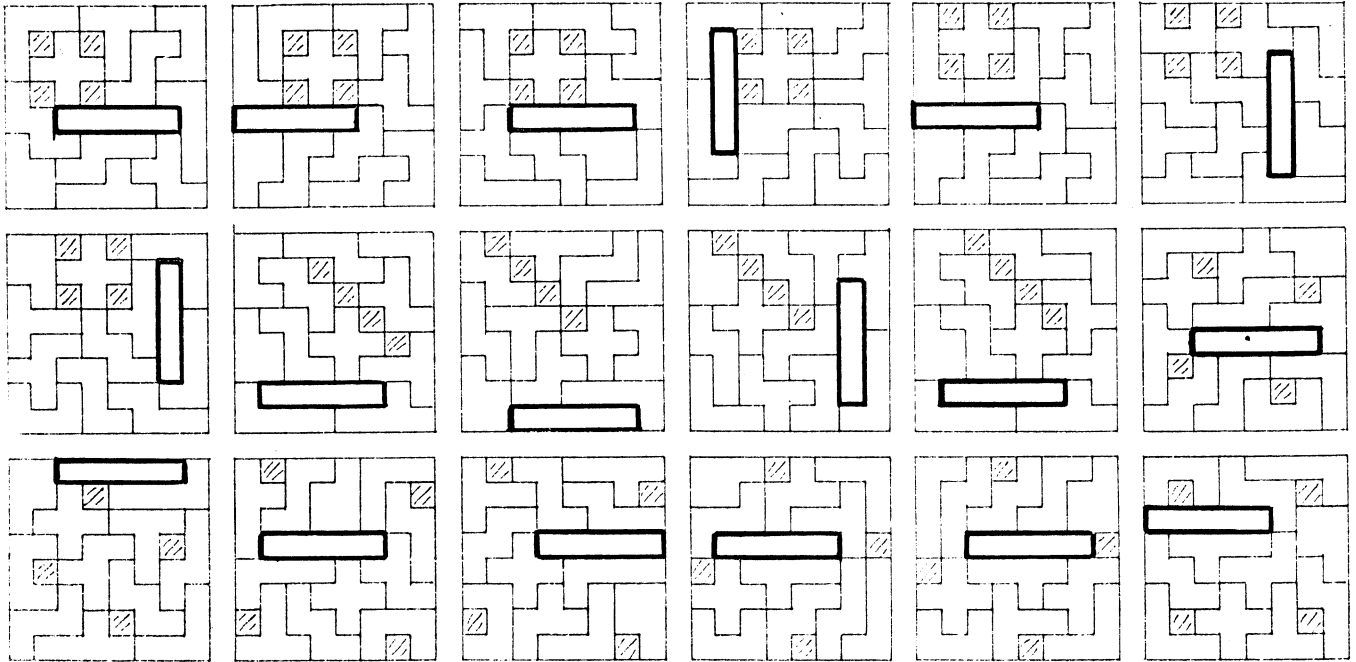
Geometric Jigsaws

Solutions to the three problems posed last time are as follows:

(c) edge and corner pieces only
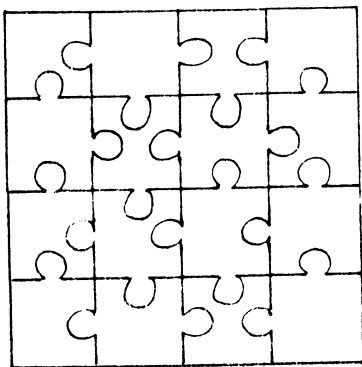
(a) omitting the two square-symmetric pieces
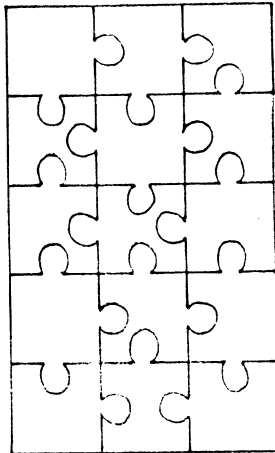
← (b) omitting the square-symmetric pieces and the standard piece

Michael Keller sent solutions of these. His results all differ from mine - the solutions are not unique. Len Gordon comments that 'Geometric Jigsaws' appear in Major Percy Alexander MacMahon's 1921 book New Mathematical Pastimes (Cambridge University Press). However, he did not consider shapes with bobbles and nibbles, and his selections of tiles to fit together are based on combinatorial rather than geometrical considerations.

A Super-Domino Tangram

By Leonard J.GORDON

The second part of MacMahon's book, New Mathematical Pastimes, 1921, is devoted to geometrical transformations of the coloured super-dominoes. Some of the most interesting and simple transformations are made with the square 3-colour super-dominoes, using the 1-to-1, 2-to-3 contact system. One such set of transformations is:
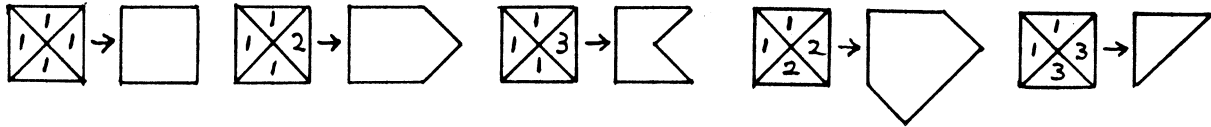
Noting that a tile with two adjacent 2's or two adjacent 3's produced a side angled at 45°, it was interesting to speculate if a practical 'tangram' could be produced in this way. The idea was to select a set of pieces to produce the best tangram, rather than use MacMahon's normal selection process.

Here is how one tangram was found. Arrange square super-dominoes with the 2 and 3 compartments as in diagram A. This produces a tilted rectangular shape when transformed. Then, choose colours for the other compartments so as to satisfy the contact rules, and also to have enough of colour 1 to allow forming a rectangle with an all colour 1 border. Also, choose the colours so all 12 pieces are different. Diagrams B and C show one set of tiles which satisfy these requirements. This 3x4 units rectangle can be rearranged to a $2\sqrt{2}\times3\sqrt{2}$ rectangle corresponding to the first diagram, A.
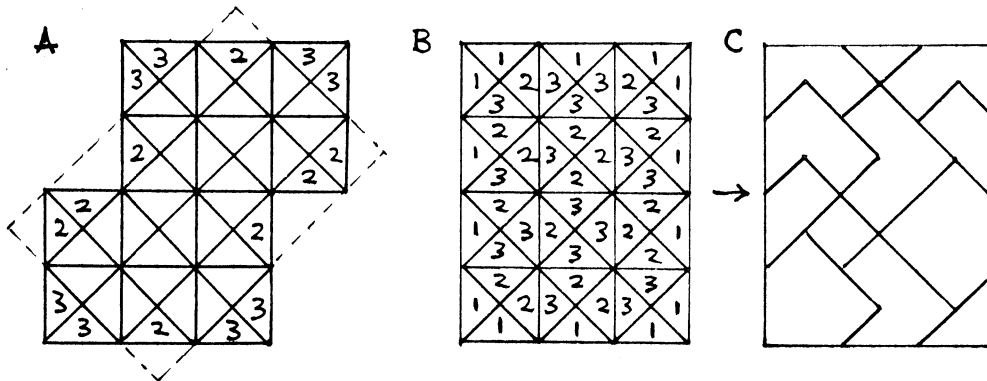
A second interesting tangram was made by transforming the tiles shown in diagram D. Two each of these six tiles also form either of the two above rectangles. A typical problem with the second set is to form the two crosses, as in diagram E.

In addition, either set allows for the fanciful designs made with the more common tangrams.
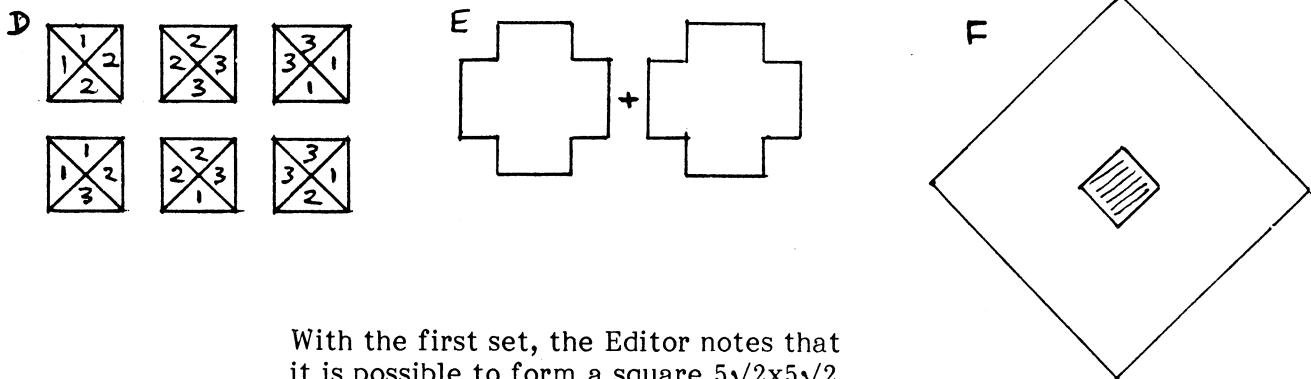
With the first set, the Editor notes that it is possible to form a square $5\sqrt{2}\times5\sqrt{2}$ with central hole $\sqrt{2}\times\sqrt{2}$ as in F.

Dissections in 'Fairy Chess Review'

As was noted in the special issue of Chessics on Chessboard Dissections much of the pioneering work on 'polyominoes' was done in the pages of Fairy Chess Review, but has not been fully appreciated because the results there were given in coded form instead of by means of diagrams. I have now tidied up my notes from FCR and drawn out all the results, and a copy of them is available to anyone who shows sufficient interest - preferably by sending me some original dissection results for publication in the G&P Journal. The notes cover about 50 A4 pages. I hope this will stimulate further work, by showing what has been done, and avoid duplication.

Pentominoes

1,2,5

3,4,6,7

8,9,10

2,7,8

3,6,9,10,14

4,5,16,18,21

10,13

11,12,17,20

18,19

15

4,5,16,21,23,28,39,40

2,7,37,42

3,6,9,10,11,12
14,17,19,20,24
27,30,32,33,35
38,41,42

10,13,31,34

15,26

7,14,22,25

8,18

29,36

T.R.Dawson showed in Fairy Chess Review that the four uncovered squares can form the O, T and L tetrominoes in all possible positions on the board (viz, 10 for O, 20 for T and 41 for L - there being one T and one L case that are obviously impossible) but he only partially solved the I case. I have added two diagrams to complete his work as below. There remains the S-case to solve (20 cases + 1 clearly impossible). The idea of course is to solve the problem in as few diagrams as possible, by use of areas that can be rotated or reflected (shown by the heavy lines) or pairs of pieces that can be transposed (shown by the dots).

1,2,5,6

5,6,9,10

5,7

1,4,9,12

3,8

11

Hexominoes: To fit the constructions opposite onto one page I had to solve the problem of fitting the 11 'unequally chequered' hexominoes into a small space - here a 7x10 rectangle with four holes, two of which are the 'bites' out of the F and h shaped pieces - there are no crossroads.

Hexominoes

By P.H.MABEY

The 11 cases of 34 hexominoes in a 6-fold replica of the 35th hexomino, with two holes also of the same shape, and in the same orientation. Alternatively the holes can be the 35th piece duplicated.
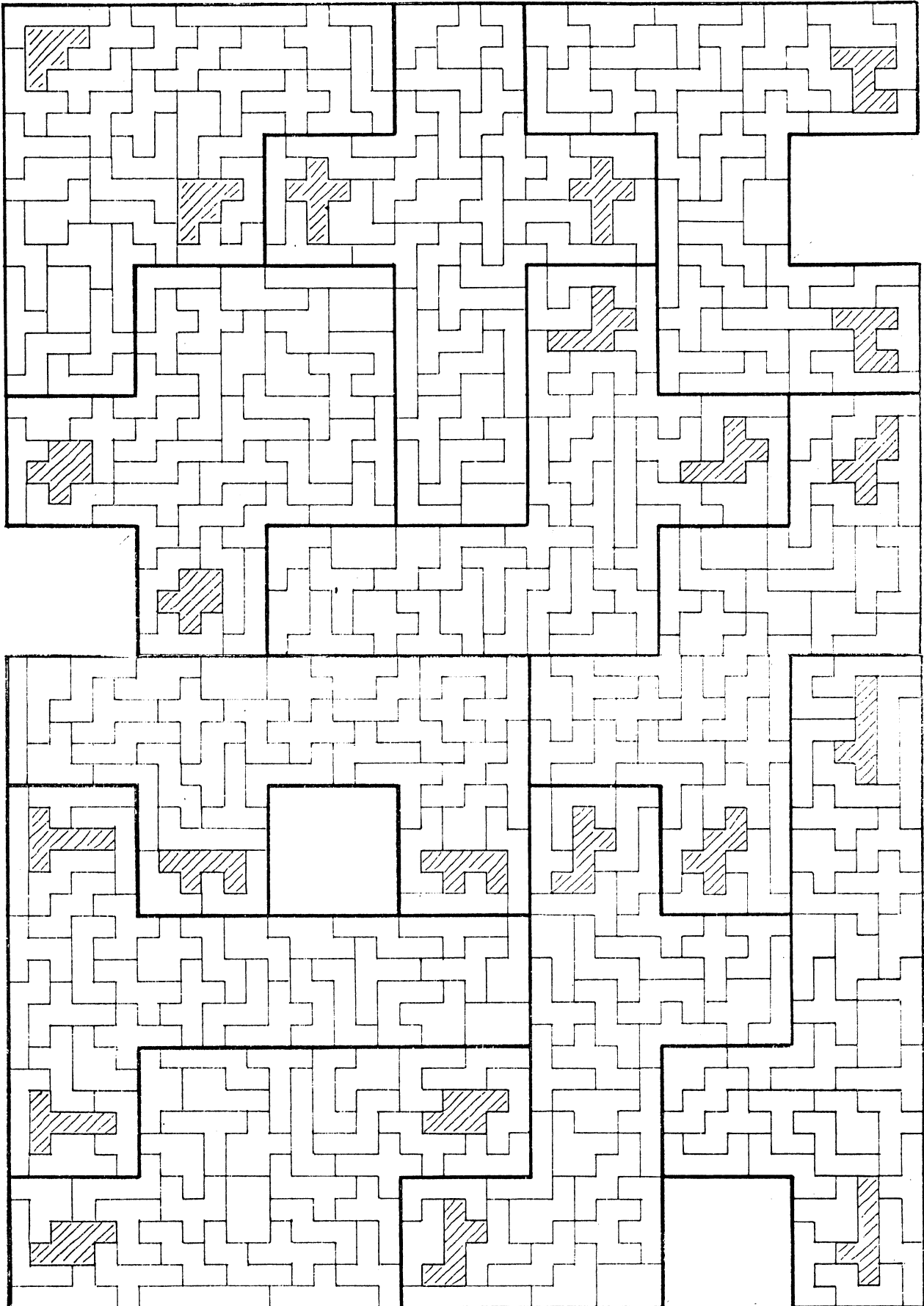
CHESS VARIANTS

There seems to be a sudden upsurge of interest in Chess Variants at present. Michael Keller is publishing a special issue of World Game Review on the subject, and I'm also working on a Chessay on the subject – this will be basically a collection of direct mate problems (and others) illustrating various different rules – excluded are major variants like Shogi, Chinese Chess, Ultima, etc where the changes in rules and pieces are substantial.

David Pritchard, former editor of Games & Puzzles, has also announced an ambitious project for an Encyclopaedia of Chess Variants (publication probably 1992), "covering origins/ history, rules, games-scores, problems, anecdotes, etc. about all games, past, present and world-wide, which are related to or which have obviously been inspired by chess". Excluded from his scope however are " 'games' that are really problem ideas – i.e. I shall want proof that a game has been played, preferably over a period of time by at least a few people." He comments also that "about 500 new games are invented every week in this country of which about 5% are clearly chess-derived; most are worthless of course, but not all"..."In particular, I intend to exclude variants that appear to have taken about 10 seconds to invent, are quite untested and are almost certainly worthless. I see a lot of these submitted to the big games companies. Example: 'Normal rules of chess, but once in a game every knight (including promoted knights) may move as a queen – I call my game Nightmares.' I am sure you know what I mean!"

Malcolm Horne (31 Caerau Road, Caerau, Maesteg, Bridgend, Mid-Glamorgan, CF34 0PB) is organising a Deviant Chess Week at Bournemouth in April, to include a Chinese Chess tournament and games of Shogi, Shogi variants, Refusal Chess, Progressive, Avalanche, Hexagonal, Pocket Knight, Two-Move, Dice, Knightrider Bouncy, etc. chesses.

All this is additional to the current Heterochess Olympics. My own games in this seem to have run to a halt. Having completed my games against three opponents in quick time (won 3, lost 3) games against two other opponents are going extremely slowly, and from the two other opponents I have received only one move in toto. I give some games from this match below.

Perhaps I could also mention here that entry forms are available for the British Speed Chess Championships, to be held at Leeds in July, sponsored by NatWest Bank. Contact: Dominic McGonigal, Leeds Leisure Services, 19 Wellington Street, Leeds, LS1 4DG. This is more a variant on the regulations for play than on the rules of the game.

Games from the Heterochess Olympics

No doubt some good lines have been missed in some of these games – let me know if you spot what should have been played. My aim is always to send a move by return of post. Games that drag on for years – as some correspondence games are supposed to – are not for me.

I hope correspondents will send me other games in chess variants to publish from now on, whether in the Heterochess Olympics or in other venues. We can make this a regular feature. Of the other players in the UK team, I have heard from Patrick Donovan, Jed Stone and John Sturgess though not in great detail. The other players are Mike Saul. Paul Novak and Stuart Mullage. It would be nice to know how everything is going – or has gone. I expect a tournament book will eventually be produced by the organisers in Italy, but have no details.

Progressive Circe Chess

This is of course a combination of Progressive Chess, in which each player gets a extra move at each turn of play, and Circe Chess, in which captured men return 'home' unless their home square is occupied. Patrick Donovan has sent an example from his games, with notes:

White: Mario Simoncini (Italy 1) v. Black: Patrick Donovan (UK).
1. Sc3
2. d5, Qd7 getting the Q off its start square and threatening 4.Qh3,Qxg2,Bh3,Qxf1‡
3. e4, Bb5, Qe2 threatening to get his Q to c8 vis b7 or c7
4. Sc6, d4, e5, Be7 so that the B can block on d8 after, say 5. any,Qc4,Qxc6(b8),Qxc7,Qxc8+
5. Sh3, Qd3, Ke2, Sd5, Sxc7+ Now Black mates by:
6. Kf8, Sb4, Sxd3(Qd1), Qxb5(Bf1), Qc6, Qxe4‡

Mutation Chess

This is also a variant of Progressive Chess; invented by John E. Bosley of New Zealand specially for the Heterochess Olympics. When a piece captures it 'mutates' into a piece of the same value as the piece captured, but of opposite colour. Mutation takes priority over promotion and a Queen may not directly check – though it still pins and prevents the K moving to the squares it guards. At first I thought this restriction on the Queen rather artificial, but in practice it produces some interesting effects, as some of my games show. I started off rather badly, not realising the magnitude of the danger inherent in Progressive play.

White: Alessandro Castelli (Italy 1). Black: G.P.Jelliss (UK)
1. e4 2. e6, b6 3. Bb5, Sf3, d4 4. a6, axb5=B, d5, Bb4+ 5. c3, cxb4=B, Se5, Qf3, Qxf7=P‡
This type of capture of the King's Bishop's Pawn is the main hazard in the opening.

White: G.P.Jelliss (UK). Black: Alessandro Castelli (Italy 1)
1. e3 2. d5, Sf6 3. g4, Sf3, Se5 4. Sc6, Sxe5, Sxg4=P, e5 5. Rg1, Rg3, d4, dxe, exS=S+
The idea being that the R blocks advance of the P and the check saves a move, but:
6. gxS=S, Se4, d4, dxe3, Qd3, exf2‡ The KBP again.

The experience gained from these two defeats helped against another opponent new to the game:

White: G.P.Jelliss (UK). Black: Michael Keller (U.S.A.)
1. e4 2. b6, e6 3. Sc3, Sd5, Se7 the Nightrider gambit! with the idea of slowing the opponent's development to allow me more scope with the extra two moves on turn 5 to come.
4. Sxe7, Sf5, Sg3, Sxh1=R not realising the dangers 5. Qf3, Qf6, Be2, Bh5, Bxf7=P‡
"These progressive variants are quite treacherous!" [M.K.]

White: Michael Keller (U.S.A.). Black: G.P.Jelliss (UK).
1. e4 2. d5, Sh6 3. exd, d3, Bxh6=S 4. gxh=S, e5, Qg5, Kd8 so that capture of the Q checks.
5. dxe6 (e.p.), exf7, Qe2, Sf3, Sc3 these inward Knight moves look sensible but are suicidal
6. Bb4, Bxc3=S, Re8, Qxg2=P, Bg4, Bxf3=S‡ both Knights turn traitor!

Experience in solving seriesplay problems is very useful in these Progressive games. The mates reached are often almost problem positions, as the next two games also illustrate.

White: G.P.Jelliss (UK). Black: Josef Zima (Czechoslovakia)
1. e4 2. e5, Sc6 3. Qf3, Bc4, Bxf7=P+ trying out a frontal attack 4. Ke7, Sd4, SxQ=Q, KxP
The Queen cannot be recaptured immediately because a check would end the series, so:
5. d4, Bf4, PxQ=Q, Qe3, Bg3 again the Queen must be cut off from the King before it can be recaptured: 6. d5, Bg4, Be2, exd, exQ=Q, Bb4+ almost mate but not quite – and that's enough!
7. c3, fxQ=Q, exd, Bh4, BxQ=Q, Sf3, Se5‡ pure mate! The first Queen is captured only to stop it coming to the defence – it plays no part in the mate.

White: G.P.Jelliss (UK). Black: Gianluca Scovero (Italy 3)
1. e3 2. e5, Sf6 3. f4, fxe, Sh3 4. d6, dxe, Qe7, Sa6 5. Sa3, b4, b5, bxd=S, Sxc7=P
6. Bxh3=S, Sf2, Sxh1=R, Kd7, Kxc7, Qd7 next to the King the Queen is invulnerable, but blocks.
Here I almost gave up and thought of playing defensively, but then the light dawned:
7. Qe2, Qa6, Rb1, Rxb7=P, Pb8=S!, Sc6, Sb5‡ another pure mate, with nice interferences.

Finally, here is the longest game I have played.   Not many Progressive games get so far!

White: Josef Zima (Czechoslovakia). Black: G.P.Jelliss (UK)
1. e4 2. e6, d5 3. exd, d3, Sf3 4. c6, Qb6, Bc5, Bxf2=P+ headstrong attack again
5. Ke2, Be3, BxQ=Q, Kxf2, a4 6. c5, axb=Q, Qb3, Qxc2=P, PxQ=Q, Qxf3=S
The threat of Knight f3-e5 and Qxf7 etc was too strong, they had to go.
7. gxf=S, Rg1, Rxg7=P, Pxh8=R, dxe, b4, bxc. Now there are numerous threats with Rd8 etc.
8. fxe, Ke7, b6, bxc, c4, c3, Bb7, Bxf3=S the P goes to c3 to stop Sc3 or promotion of Pd3.
9. Kxf3, Sxc3=P! a5, a6, a7, axb=S, RxR=R, Rxh7=P, Pxg8=S+ where did all my pieces go!
I could have resigned here of course, but I wanted to see if an ideal mate could be reached!
10. Kd6, Kc7, Kb7, KxR, KxS, Kc7, Kd6, Kd5, e5, e4+ stopping two pawns, but one is free.
11. Ke3, h4, h5, h6, h7, h8=Q, Qf6, d4, Ke2, Ke1, Se7‡ the King goes home and leaves his men to tidy up.

NEWS & REVIEWS

Computer Solving

Programs for solving chess problems of a wide range of types, suitable for Apple, Commodore and IBM machines are available from Ilkka Blom, Salmikatu 27 A 16, SF-65200, Vaasa, FINLAND. Called 'ALYBADIX' there are 16 types, for solving (1) direct mates, (2) board-edge direct mates, (3) selfmates, (4) reflexmates, (5) helpmates, (6) miniature helpmates without castling (7), maxi and minimummer direct mates, (8) maxi and mini selfmates, (9) seriesmates, (10) seriesselfmates, (11) seriesreflexmates, (12) serieshelpmates, (13) reciprocal helpmates, (14) circe direct mates, (15) circe selfmates, (16) circehelpmates. Price per program is 200 FMk (about $47 or £27). If the solving times quoted for examples are representative then the programs seem quite practical for most stipulations (one to ten minutes) but for helpmates in 3 or more they are still pretty hopeless (hours or days) – but I suppose this means that all possibilities are exhaustively checked, to ensure soundness, rather than just finding one line. Write to Ilkka for full details – a specimen 'Diskette' for 1 or 2 movers is offered for $3 or 6 international stamp coupons (I presume that in a 1-mover this just finds the White mate, and doesn't retranalyse to check whose move it is! -though I should have thought that retroanalysis was very suitable for computer application, being largely a matter of pure logic).

Chess Holiday in Austria

Elizabeth and David Deane are organising a special chess holiday to Mayrhofen in Tirol, 15-22 October 1989 (cost £410 single). It will include friendly play with the local club and on their open-air chess set. Details: Austrian Heritage, 1 Jarvis Hall, Steyning, W.Sussex BN4 3GL.

A Compendium of Checkerboard Puzzles

This is a straightforward collection by Jerry SLOCUM, dated April 1983, of 33 dissections of the 8x8 chequered board that have been manufactured, patented or published over the years, with at least one solution of each case and photocopied illustrations of the packaging, advertising, etc, accompanying them. The earliest example is from a US patent of 1880 by H.Luers. This has duplicate pieces and alternative solutions. The most interesting puzzles are those in which the pieces are all different - either in shape or colouring - and the solution is unique. I've proved the uniqueness for the first two shown below, but the others remain to be tested.
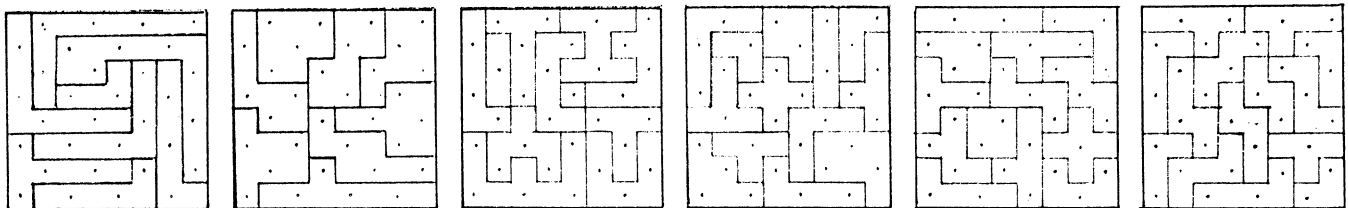
| Sam Loyd 1908 | S.S.Adams undated | J.F.Fransen 1929 | 'Scrubb's Cloudy Ammonia' | Gary Foshee collection | E.M.Wyatt 1946 |

Sam Loyd's pioneer first appeared in Our Puzzle Magazine, Vol 2, No 1, July 1908, problem 451 (this is an earlier reference than that given in the Compendium).

The Adams solution is remarkable for being composed of 8 pieces of 8 squares.

The Fransen example is an improved solution of Dudeney's "Chessboard Sentence" problem. The pieces read: "CUT THY LIFE." Dudeney's result had three more single squares and has a group of pieces that can be rotated. The remaining dot could be combined with the F to give an all-letter dissection.

The author has not noticed that puzzle 13.6 in the Compendium is just a reflection of H.E.Dudeney's 13.5 'Broken Chessboard' from The Canterbury Puzzles. The solution quoted, due to Laurie Brokenshire, thus 'cooks' Dudeney's puzzle.

Copies of the Compendium may be purchased from Jerry SLOCUM, P.O.Box 1635, Beverly Hills, California, 90213, U.S.A., for payment of £7 or $12.50.

For further research the following questions need to be answered: (a) Are the other four examples shown here uniquely soluble? (b) Is a uniquely soluble dissection possible using the 12 pentomino shapes and a tetromino? (c) What is the maximum number of different pieces that will fit together uniquely to form a chessboard? That should keep you busy a few years!

SOLUTIONS TO CHESS PROBLEMS – 7

81. MOCHALKIN. No solution. Intended: 1Rg3 (threat Re5‡) Pao/Vao-e4 2Qg6(set Qh7)/Qg4‡ but 1...Vaoxf4 2Sg7 is not mate, and there is no mate after Pao-e7. Any try other than Rg3 is met by 1...Rg5. Apologies to solvers.

82. MOCHALKIN. (a) 1f8=N (threat Rf5‡) Bg3/Rxc7 2Qd4/Nb6‡. (b) 1f8=Rose ...2Qc5/Rose-b4‡. Clever twinning. I liked the long-range move by the Rose in (b) [RB] Piece a5 functions only as Knight in both parts but is needed to justify (conventionally) fairy promotions [AWI]. Neat changed mates [SJGT].

83. TAUBER. Set: 1...Bf1/Sd1 2Qc3/Qc4‡. Play: 1Rf5 (threat 2Qb1 Qxb1‡) Bf1/Sd1 2Qc4/Qc3 Bxc4‡/Sxc3‡.(also 1...Qxc1+ 2Ka2 Qb2‡). Curiosity! W forced mates reciprocate with W moves forcing mate [RB]. Another most attractive pair of changed W responses [SJGT]. Don't you think that Sd1/Bf1 should have the same status as 'unprovided' threats (mates even) in orthodox two-movers? [SP]. No doubt B.G.Laws (inventor of Reflex Chess) would not have approved, but there is a lot else nowadays that offends against his canons [GPJ]. Dentist-thema [Composer].

One solver notes that I have not defined 'set play' – it is whatever play could happen if it were the other player's turn to move (i.e. if the first player was allowed to 'pass').

84. TAYLOR. Set e4‡ Play 1-3g1=S 4Sh3 5Sf4 6Sd5 7Sf6 8Sg4 for e4‡ A long way back! [AWI]. This should be compared with C.Gaulin, _Feenschach_ 1961-2 (8/2p5/2P5/pp2pK2/k3P3/p1P5/ P7/8) Serieshelpmate in 10 by 1-4b1=S, 7Sb6, 10Sb5 Rc4‡ (107 in _The Serieshelpmate_ by J.M.Rice and A.S.M.Dickins, 1971).

85. INGLETON. 1Pao-d6 Se4 2Pao-c6+ Paoxc4‡ and 1Pao-e5 Sh5 2Pao-e7+ Paoxh7‡. A quite superb demonstration of the double unpins obtainable with 'chinese' pieces, excellent use being made of all three paos [SJGT]. Nice strategy [SP]. Well-matched pair [RB]. Fine two-toed unpinning of WS [E.B.]

86. BAKCSI. 1d1=Edgehog Ee3 2Ed5 Ee8‡ and 1d1=G Ed4 2Gd5 Ea4‡ and 1d1=N Eb7 2Nb5 Ea8‡. Nice Edgehog work-out but Gh6 seems lazy [SP] Gh6 has no role except to justify G-promotion [AWI]. BPc7 stops mate with Ka6 Eb6.

87. MOCHALKIN. Intended 1Rxa6 Rxb3 2Re6 Rxf3‡ and 1Gxf3 Ge6 2Rxe6 Rxf3‡. But many cooks, including in one move: (b) Gxf3 Rxf3‡, or in (a) 1...Kh3 2...Rxf3‡ Black idling. Sorry I let this one through. The intention is rather mesmerizing however?

88. MOCHALKIN. 1Rb2 Bd2 2Rc2 Be2‡ and 1Rf2 Be2+ 2Ke1 Bd2‡. To these Stefanos Pantazis notes that Bh6-c1 would add a third solution: 1Kc2 Bb2 2Kb1 Bd3‡ but not an echo. A classic Circe Echo! [E.B.]

89. GRUBERT. (a) 1Rc4 Kb1 2Kc3 Kc1 3Bd4 Bd2‡ (b) 1Bd6 e4 2Rc6 Kb3 3Kc5 Be3‡. Elegant little tempo manoeuvre by WK in (a) [SJGT]. Ideal mates. Fine echo. [D.N.]

90. GRUBERT. 1Gg4 Gf5 2Ge6 Gd7 3Bd6 Bc3‡ and 1Kd6 Ke4 2Gd7 Gc8 3Bc7 Bb4‡. Grasshoppers with a real spring in their legs! [SJGT]. Snap! [TGP]. Ideal mate exact echo.

91. MIHALEK. Composer's stipulation was '(a) all men one square to the left' which is the same as removing the a-file (if the b-file then becomes the a-file, etc). So: (a) 1Ba5 d4 2Bc7 Kc3 3Bd6 Be4‡ (b) 1Bd3 Bf1 2Bf5 d4+ 3Ke4 Bg2‡. Ideal mates. Rather drastic dual-avoidance condition at (a) [RB] others similarly.

92. INGLETON. (a) 1Kd3 Rg5 2Kc2 Gh6 3Gb1 Rh5 4Kb2 Rh2+ 5Ka1 Gh1‡ (b) 1Kd5 Rf2 2Kc6 Gg1 3Kh7 Rf1 4Ga7 Rb1+ 5Ka8 Ga1‡ (c) 1Kd4 Gd3 2Ke5 Gb1 3Kf6 Rc1 4Kg7 Rg1+ 5Kh8 Gh1‡ (d) 1Kf3 Rc7 2Gf2 Gb8 3Kg2 Rc8 4Gh2 Rg8+ 5Kh1 Gh8‡ Brilliant! WK not missed at all. [SJGT]. Difficult task – done before but always worthwhile [SP]. A very attractive minimal –

D.N. notes that the <u>diagram</u> position solves exactly as in (b), so zeroposition setting unnecessary.

93. BARTEL. (a) b1=B a8=Q 2Ba2 Qxa2‡ (b) 1bxc1=S(Sb8) a8=R+ 2Sa2 Rxa2(Sb1)‡ One of the miniatures of the year for me [SJGT]. Nicest of the smallwares – (b) is quite pointed for the amazing economy [SP]. Familiar circe mate cleverly woven into split auw [RB].

94. BARTEL. 1b1=R a8=B 2Th1 Bxh1= and 1b1=Q Td1 2Qb8 axb8=S=. Four promotions economically engineered – a brilliant conception [TGP]. Split auw in attractively original fashion [RB].

95. STEUDEL. 1exf1=R(Rh1) fxe8=T(Bc8) 2gxh1=R bxc8=R =. Sly use of circe to determine order of four R-promotion captures [AWI]. Entertaining case of 'anything you can do'...[SJGT].

96. STEUDEL. 1a8=B b1=B 2fxg8=B gxh1=B 3Bg2 =. A pleasing convocation of Bishops! Move order neatly forced by blocking home squares [TGP]. Even greater subtlety [AWI]. Impressive exploitation of circe to produce startling promotion effects (95 &96) [RB]. Tricky. [D.N.]

Two fine problems with four-time promotions. [E.B.]

AWARDS FOR CHESS COMPOSITIONS

The Games and Puzzles Journal, First Informal Tourney (1987-88)

Award by Hans GRUBER

I was very pleased to be asked to act as a judge in the first G&PJ tournament; I hope my award will appear reasonable. G.P.J. proposed to include the problems 1 - 96 in this tourney (issues 1 - 7) because of a greater break in publication after G&PJ 7. Out of the 96 problems nine (23, 24, 28, 41, 62, 72, 76, 81, 87) remained uncorrected; 48 was not an original problem, 13 was anticipated. Problem 19 has a strong predecessor: M. Caillaud, Rex Multiplex 1982, Helpmate in 4 [16, 2pS1K2, 2Pk2P1, 3p4, 24] - solution: 3d1=R g8=R 4Rd4 Rg5‡. So 84 problems remained to be judged.

I enjoyed solving and studying the problems very much. Many of them are attractive problems of quite different kinds, e.g. shape problems, 'Bohemians', demonstrations of specific fairy effects. However, a lot of those problems have only one line of play, which usually is not enough to be placed in an award nowadays. Furthermore, since E. Albert started publishing his Ideal Mate Review we have enjoyed a lot of perfect echo problems, among them many multi-phase problems. This makes it difficult to put echo problems into an award; such problems ought to be really outstanding. Finally I decided to honour ten problems.

1st Prize
92. A.W.INGLETON
H‡5. (a) c2-f5 (b) c2-f6
(c) e3-d6 (d) h7-f5 in (c)
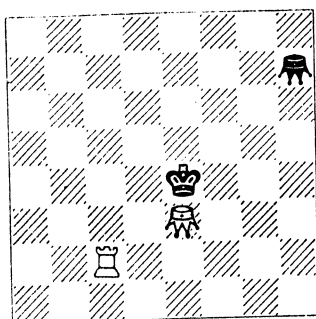
2nd Prize
83. Theodor TAUBER
Reflexmate in 2
with set play
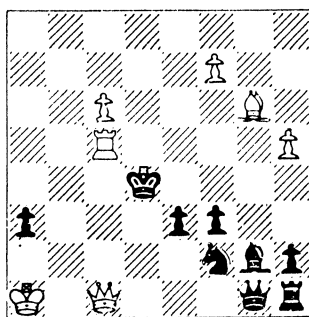
1st Prize: 92 (Ingleton)
A delicious 'Wenigsteiner'! I like problems with very few men very much if they show rich content, as here; the minimanner form is something like the basis of chess problems. This problem is more, of course: it is a really mature chess composition. Very few problems are known in which the BK walks into the four corners in four phases. Even rarer are 'Wenigsteiner' showing this theme. A great rarity are minimanners in which the BK is NOT moved by the twinning. This is a tremendous achievement, which is flavoured by the dual avoidance in the third move. Another remarkable feature is that the WG enters three different corners (of course, it would have been even more fantastic if ...).

2nd Prize: 83 (Tauber)
The idea is as original as I hardly had expected any idea could be. In something like a setplay in this reflexmate Black's two defences unpin the WQ which afterwards has to mate. The key gives two flights and unguards the squares where the WQ had to mate in the set play. The same two Black defences are answered by a reciprocal change of the WQ-moves which now do not deliver mate, but allow (and therefore force) Black to mate. This combination of White and Black mates is absolutely new in my opinion and should be used extensively in future, because it is THE incarnation of the reflexmate spirit!

SOLUTIONS
92. (INGLETON). (a) 1Kd3 Rg5 2Kc2 Gh6 3Gb1 Rh5 4Kb2 Rh2+ 5Ka1 Gh1‡ (b) 1Kd5 Rf2 2Kc6 Gg1 3Kh7 Rf1 4Ga7 Rb1+ 5Ka8 Ga1‡ (c) 1Kd4 Gd3 2Ke5 Gb1 3Kf6 Rc1 4Kg7 Rg1+ 5Kh8 Gh1‡ (d) 1Kf3 Rc7 2Gf2 Gb8 3Kg2 Rc8 4Gh2 Rg8+ 5Kh1 Gh8‡
83. (TAUBER). Set: 1...Bf1/Sd1 2Qc3/Qc4‡. Play: 1Rf5 (threat 2Qb1 Qxb1‡) Bf1/Sd1 2Qc4/Qc3 Bxc4/Sxc3‡ (1...Qxc1+ 2Ka2 Qb2‡)

1st Hon. Mention: 69 (Bartel)
A relatively small idea, but in a perfect construction. Using the set play probably is the best kind of setting to show this double exchange of promotions: promotion into 2WBs in the set play and into 2WSs in the solution. The WK's position is used cleverly to prevent the BQ from making a tempo move in order to keep the set play. The long BQ moves are very fine.

2nd Hon. Mention: 61 (Shanahan)
Intuitively it is an absurd thought to use the BQ to block the BK's home square, because the BQ itself needs five blocks. In a very CIRCE-specific solution the WK has to plan the capturing sequence very exactly after he is set into a rather funny quadruple check.

3rd Hon. Mention: 49 (Nettheim)
A rather conventional problem which deserves its place by reason of the hesitation of several White pieces when approaching their goals. So White needs 12 moves, while apparently much less are necessary.

SOLUTIONS

69. (BARTEL). Set: 1...b8(B) 2Qf8 gf(B)=. Play: 1Qa2! g8(S) 2Qa8 ba(S)=
61. (SHANAHAN). 1Qe8(Ke1)++++ Ke2(Ra8) 2Rd8 Kf2(Pf7) 3Kd1 Ke3(Sb8) 4Sd7 Kd3(Sg8) 5Se7 Kd2(Bf8)‡.
49. (NETTHEIM). 1Bb2 2Sa3 3OOO 406Qa1 7Kb1 8-9Bd2 10Kc1 11Sb1 12Qb2+ for Bxb2‡

1st Commend: 18 (Grubert). A perfect and beautiful ideal-mate echo. By its elegance it surpasses most other echoes which have been seen recently.

2nd Commend: 85 (Ingleton). In spite of some constructional weaknesses (WPao a5, WPb5, WBc8; also the BPs c4 and h7 are not elegant, but of course necessary) the problem is commendable, because the theme is very fairy-specific. Unpin - pseudo battery preparation - 'capture permission7 - Pao/Vao-typical cross-checks, all in great analogy!

3rd Commend: 34 (Taylor). An economic setting, well constructed and ending in model mates. A direct unpin followed by block + interference (= unpin by Grimshaw) in two phases compensates for the rather uninteresting White moves.

4th Commend: 64 (Jelliss). Fine demonstration of Antipodean effects both in the solution and in the final position.

5th Commend: 46 (Jelliss). Good echo solutions demonstrating the Moose properties with some surprising moves (e.g. 3Bd4!).

1st Hon. Mention
69. Erich BARTEL
HP2 with set play
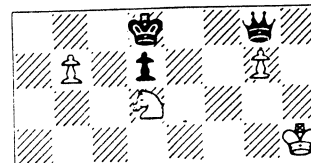
2nd Hon. Mention
61. Ian SHANAHAN
H‡5 Circe
Rex inclusive
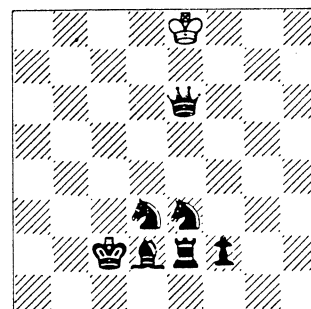
3rd Hon. Mention
49. Nigel NETTHEIM
Seriesselfmate in 12
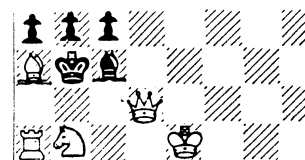
My congratulations to the authors of these ten problems, especially to A.W.Ingleton and Th. Tauber for their outstanding prize-winners. Thanks to G.P.J. for inviting me to act as judge in this first G&PJ tourney.   Hans Gruber, Munich, West Germany, March 1989.

Chessics Exact Echoes Tourney (1984-85)

When the award for this tourney was published in Chessics 23, p83, in Autumn 1985 there was insufficient space to diagram the prize-winners. I take the opportunity to publish them again here.

1st Prize
M.HANAZAWA
Chessics 17, p8 (#16)
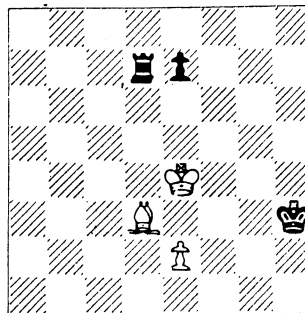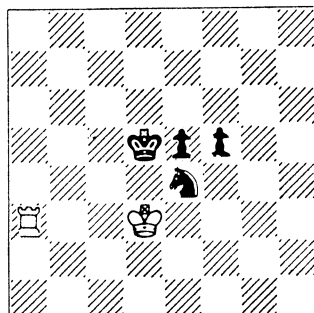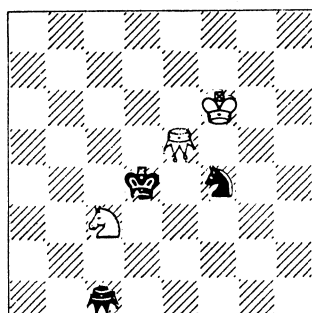Spring 1984
Grasshoppers
H‡4 with set play

2nd Prize
E.HOLLADAY &
E.ALBERT
Chessics 17, p7 (#10)
Spring 1984
H‡3 multiplet

3rd Prize
A.KALOTAY
Chessics 18, p17
Summer 1984 (#30-33)
Helpmate in 5
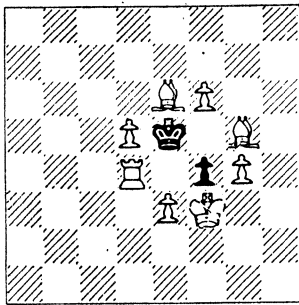Fox family

#10 (b)a3-h2
(c) f5-d6
(d) f5-e6
(e) d3-f7

#30-33 all have WPe2 and BP e7 other 4 men arranged as follows:

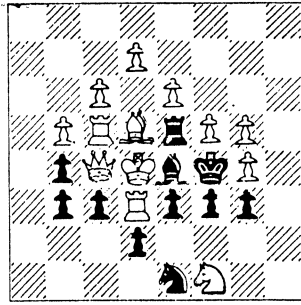|	BK	WK	BR	WB
#30(b)	h3	e4	c3	d3
#31(a)	c2	d5	f6	d2
(b)	c2	c5	f6	d2
#32(a)	c2	d5	h2	h5
(b)	c2	b4	d2	h5
#33(a)	g1	g3	b4	a3
(b)	g1	g3	d8	a5

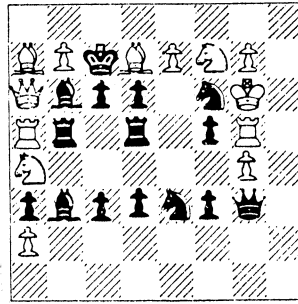For SOLUTIONS see page 133.

CAISSA'S KALEIDOSCOPE

97. L.N.BORODATOV
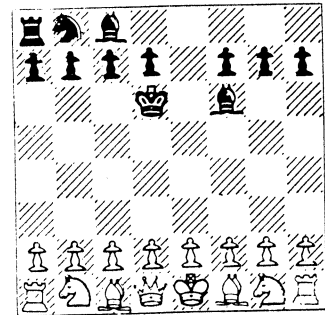"Road Signs - 2"
‡4 (b) turn 90° left

98. L.N.BORODATOV
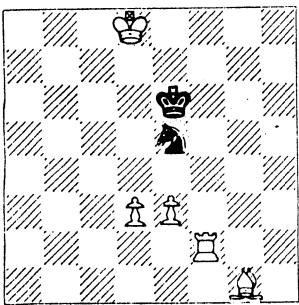Last 14 moves?
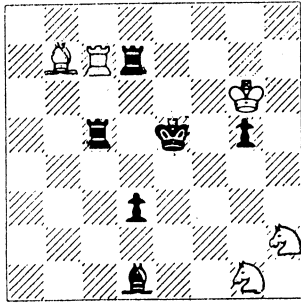And next one?

99. L.N.BORODATOV
"Flag"
Mate in 2

100. Peter WONG
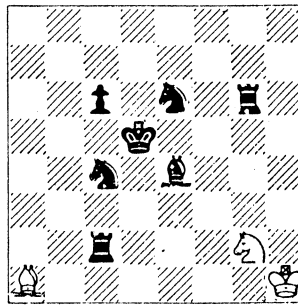Position after Bl 8th move.
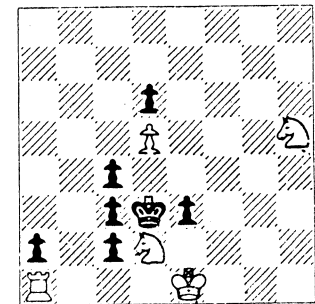Game Score? 2 solutions.

101. Torsten LINSS
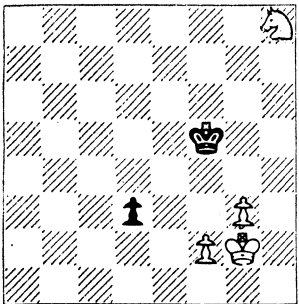HM2 (two ways)

102. E.BOGDANOV &
V.VLADIMIROV

103. V.VLADIMIROV &
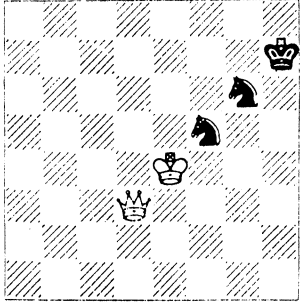HM2(2 ways)A.OSHEVNEV

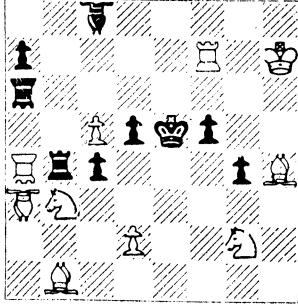**104.** G.BAKCSI
HM2½ (two ways)

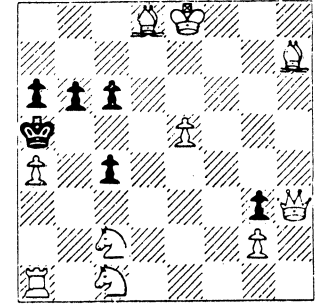**105.** F.M.MIHALEK
HM4 (b),(c) see text

106. G.P.JELLISS
HM3½ Antipodean Ks

107. A.MOCHALKIN
‡2 Paos and Vaos

108. A.MOCHALKIN
Mate in 2, Patrol Chess

109. Th.STEUDEL
HM2 (a).captureless
(b) checkless
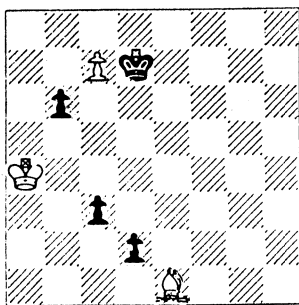
110. V.PRIBYLINEC
HM2 Grasshoppers
(two problems)
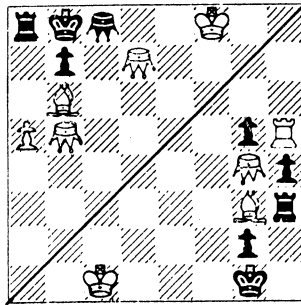
111. Erich BARTEL
HM2 with set play
Neutral Ps and Lion
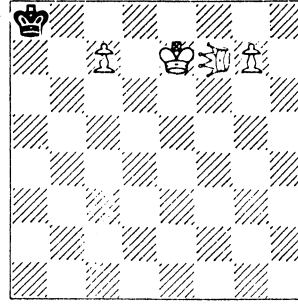
112. A.MOCHALKIN
HM2 (two ways)
Total Madrasi Chess

Solvers – issue 7. R.BRAIN, A.W.INGLETON, S.PANTAZIS & T.G.POLLARD score 31 maximum,
S.J.G.TAYLOR scores 30, D.NIXON (who got his copy late) scores 22, Erich BARTEL scores 16.
Solutions to this issue to reach me by mid-June

113. Erich BARTEL
SeriesHP3 (4 ways)
Circe Malefique·

114. Paul VALOIS
Series Mousse-mate
in 4 (see text!)

115. C.POISSON
SeriesHP 392, Circe
Exchange (see text)

116. G.P.JELLISS
Helpcompel‡ in 6½
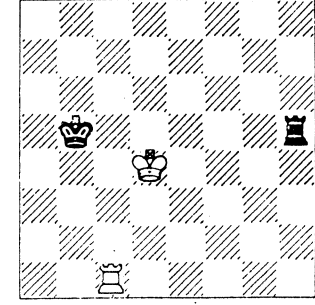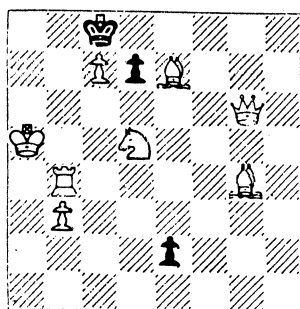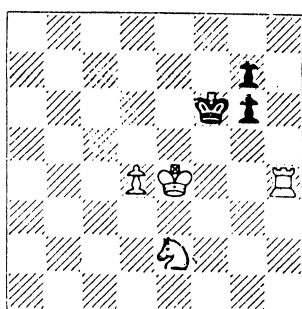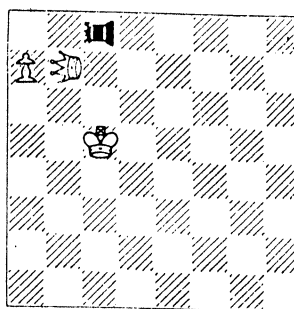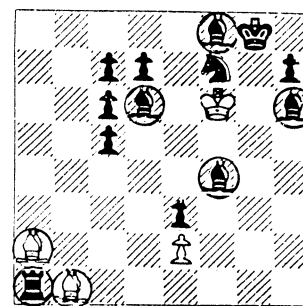R/B and B/R (see text)

Notes for Solvers

We begin with three pictorial problems. Your views as to what **98** represents are invited. The retracted moves form part of the picture. For Helpmate and Grasshopper see earlier issues. In HM2½ there are 5 single moves and White goes first. In **105** the twins are: (b) d3-c3, (c) g2-e1 and f5-e4. In **106** the Antipodean Kings can be captured and reappear a (4,4) leap away, they are only in check if the reappearance square is occupied. The other pieces are normal. In **107** Pao and Vao move, respectively, on Rook and Bishop lines, but capture by hopping over one man, along the same lines, to any distance beyond. In **108** Patrol Chess means that a piece that is not 'backed up' (i.e. guarded by one of its own colour) does not capture or check - thus without WRa1, BK could play to b5 since Pa4 does not check. In **109** the prohibitions still apply in the final positions (i.e. fairy mates). The checkless condition prohibits checks that are not checkmate. In **110** the whole board is available in each part (but may not be needed). In **111** Neutral men may be regarded as White or Black by the player whose turn it is to move - thus W could not promote either P to Knight because Black would nominate them Black - checking the WK. A Lion hops over one man to any distance beyond, along Queen lines. NLf7 can hop to h7 (checking WK) or to d7, or can capture NPc7. In **112** like pieces guarding each other are paralysed, and this applies to Kings as well as Rooks, so Ks can stand on adjacent squares. Can a sound Duplex version be composed?

In Circe Malefique the captured pieces are replaced on the home squares of the other player, but do not change colour. In **113** and **115** Black plays the series of moves to reach a position where White can stalemate in one move. Mousse-mate in **114** was invented as a response to my Moose problem sent as a Christmas/New Year Greeting. In Mousse chess, after each completed move, all pieces move down one rank. "This is because as mousse thaws out, it softens and sinks (well, I couldn't think of any other usable property)" explains the composer. The diagram was supplied appropriately on the lid of a mousse tub. The number of moves in **115** should not be feared - they are all by the Royal Wazir c8, the slowest-moving piece in existence, and with a Locust about (at b7) it is forced to keep its back to the wall most of the time. The Locust moves like a grasshopper but captures the man it hops over. In Circe Exchange the captured piece reappears on the square just vacated by its capturer; in other words they change places. It is assumed in this composition that a Pawn displaced to the first rank has no powers

The circled pieces in **116** can change from Rook to Bishop, or from Bishop to Rook, at will - the transformation being considered a 'move' (i.e. they are Jekyll & Hyde pieces - see Chessics 15 p14). Helpcompelmate in 6½ means 6 pairs of help-moves (Black first) to reach a position where Black's next move <u>must</u> give mate.

Many thanks for the Christmas and New Year Wishes with these problems.
MORE ORIGINAL COMPOSITIONS URGENTLY REQUIRED!

SOLUTIONS to Exact Echo Problems, p.131.

16. HANAZAWA. Set 1...Ke7 2Gg5 Kd6 3Ge3 Ge2 4Sd3 Sb5‡ Play 1Gc4 Sb5 2Ke4 Kf7 3Kf5 Gg3 4Gg4 Sd6‡. **10. HOLLADAY & ALBERT.** (a) 1Sf6 Ke2 2Ke4 Rc3 3Sd5 Rc4‡ (b) 1Sg5 Ke2 2Ke4 Kf2 3Kf4 Rh4‡ (c) 1Sc5+ Kd2 2Kd4 Rb3 3d5 Rb4‡ (d) 1Kc6 Kc4 2Kd6 Kb5 3Kd5 Rd3‡ (e) 1Sg5+ Kf8 2Ke6 Rh3 3Kf6 Rh6‡ **30-33. KALOTAY.** 30(a) 1Kh4 Kf4 2Kh5 e4 3Kg6 e5 4Kf7 Bh7 5Ke6 Bg8‡ 30(b) 1Kg4 Ba6 2Rf3 Kd4 3Kf5 e4 4Ke6 e5 5Rf7 Bc8‡ 31(a) 1Rd6 Ke4 2e6 Bh6 3Kc3 Kf3 4Kd4 e4 5Ke5 Bg7‡ 31(b) 1e6 e4 2Kd3 Ba5 3Ke3 Kc4 4Kf4 Kd3 5Ke5 Bc7‡ 32(a) 1e5 e3 2Rd2 Ke4 3Rd5 Kf3 4Kd3 Kf2 5Ke4 Bg6‡ 33(a) 1e5 Kf3 2Rf4 Ke3 3e4 Kd2 4Kf2 Kd1 5Ke3 Bc5‡ 33(b) 1Rd4 Kh3 2Kf2 Bd8 3Ke3 Kg2 4e5 Kf1 5e4 Bg5‡.

REVIEWS
Survey of Current Chess Problem Periodicals

The following list is very incomplete and patchy - I can only review those periodicals that I subscribe to or receive on exchange, or that are sent from time to time for purpose of review. It is difficult to keep up with all that goes on - I hardly find time nowadays even to read the journal that I help to produce, The Problemist. There are important journals published in the USSR, and in Holland and Hungary, for example, that I have never seen but know of from quoted compositions. The list is confined in the main to periodicals specifically devoted to problems - there are also of course numerous chess journals that have problem pages, not to mention newspaper columns.
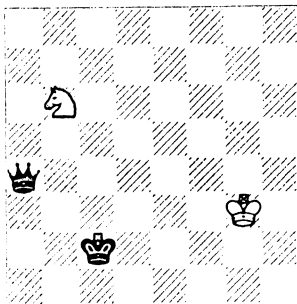
U.K.

The Problemist is the journal of the British Chess Problem Society (BCPS), membership of which is however international, not merely British. It covers everything that is going on in the world of chess problems, and has more than enough original problems in every issue to keep the most avid solver busy (87 in the current issue alone of all types) as well as articles on particular themes or composers. The Society is currently busy with preparations for the big FIDE meeting at Bournemouth, 19-26 August 1989, at which the World Chess Problem Solving Championship will be held. The event also coincides with the centenary of T.R.Dawson (who was first editor of The Problemist, 1926-31, among his many activities). Participants are asked to bring with them original problems showing any newly invented fairy piece to celebrate this centenary. (How new is new? - I leave that to the judges to decide.) Membership costs £10. Full details from the BCPS Secretary, Colin Russ, Darwin College, The University, Canterbury, Kent, CT2 7NZ.

Problem Observer is an ideal way for a beginner to get some idea of what the world of chess problems is about without being overwhelmed by the scale of it all. Each issue contains nine problems, usually 5 direct mates and 4 other types, for solving. Subscription is only 19p or 1 reply coupon per issue (£1.15, overseas £1.45, per year). The speciality of the editor, John Ling, is of course task problems, as expounded in his 'Chessay' The Power of the Pieces. Write to him at: 41 Tiverton Road, Loughborough, Leicestershire, LE11 2RU.

The Problemist		Problem Observer	
R.TURNBULL	M.RITTIRSCH	K.CAMERON	Erich BARTEL
May 1987	May 1988	July 1987 (2nd Pr.)	January 1989

HM3 (2 ways)	HM3½ (b) e7-f8	HM2 (2 ways)	Mate in 2
Ks in check move only as the checking piece.	Neutrals	Grasshoppers	Nightrider

R.TURNBULL (May 1987):
HM3 (2 ways)
Ks in check move only as the checking piece.

1Kb1 Sd5 2Qf4+ Kb3
3Qd2 Sc3‡ 1Qa3+ Ke5
2Kb2 Kd4 3Qa1 Sa4‡

M.RITTIRSCH (May 1988):
HM3½ (b) e7-f8
Neutrals
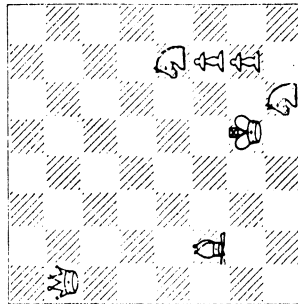
(a) 1Seg8 f5 2Kg6+
Kh7 3Bd4 g5 4fg(e.p.)
(b) 1Qb8 Kf6+ 2Ke7
g5 3Bh4 f5 4gf(e.p.)

K.CAMERON (July 1987, 2nd Pr.):
HM2 (2 ways)
Grasshoppers
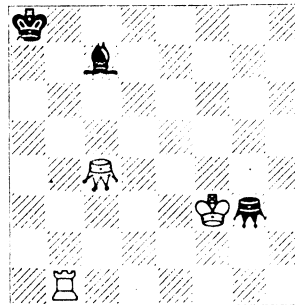
1Gb8 Rb7 2Be5 Rf7
3Bh8 Gg8‡ 1Ge3 Rb6
2Ga7 Rb5 3Ba5 Ga6‡

Erich BARTEL (January 1989):
Mate in 2
Nightrider
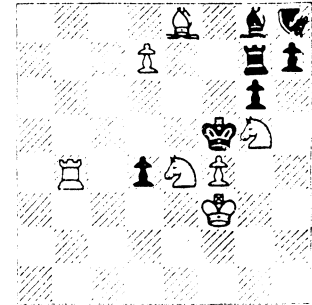
1P=N (thr. Nh6‡)
R/B/Nf7
2Rb5/Nb7/Bd7‡

Dawson set all aspects of this triple Grimshaw, but far less economically.

The Games and Puzzles Journal
T.R.DAWSON CENTENARY NIGHTRIDER TOURNEY

As part of the celebrations of T.R.Dawson's Centenary I am proposing a special chess problem composing tourney for Direct-mate Two-movers using Nightriders on Boards of Any Size. Other riders may also be used (Camelrider, Zebrarider, Girafferider, etc). This will be an Informal tourney, judged by the Editor (G.P.JELLISS) and entries will be published in the G&P Journal as received. Provisional deadline for final entries will be 28th November 1989 (the centenary of Dawson's birth).

U.S.A.

I've put this section here for the benefit of English-speaking readers, not because the USA is exceptionally active - on the contrary until quite recently it did not have a general problem 'zine.

U.S. Problem Bulletin has now been appearing regularly for over ten years, (time flies!) so my comment in the preceding line is not really fair. Despite lacking a journal for many years the U.S. nevertheless has a tradition of many strong active composers whose work appears all over the world. Each issue of the USPB is 16 pages with about 30 problems, original and selected. Editor is Eugene Rosner. Subscriptions $8 ($9 overseas) to Bob Sostack, 2484 Ramona Street, East Meadow, N.Y. 11554, U.S.A.

Ideal Mate Review edited by Eugene Albert, 3151 Eucalyptus Avenue, Long Beach, California, 90806, U.S.A. is one of the most fascinating publications in the chess problem world. It specialises solely in problems ending in ideal mates - i.e. pure mates involving all the forces on the board - a subject which, despite these apparently extremely restrictive conditions still produces an endless stream of beautiful and ingenious problems. Professor Albert has made this field of study his own since the fifties, or earlier. His 1966 book Ideal Mate Chess Problems surveyed what was then known, and now an Ideal Mate Encyclopedia is imminent (or at least Vol 1). Subscription to IMR is $5/year.
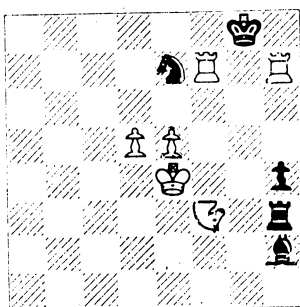
U.S. Problem Bulletin

G.BAKCSI
Jan-Feb 1986

G.A.CROES
Mar-Apr 1987
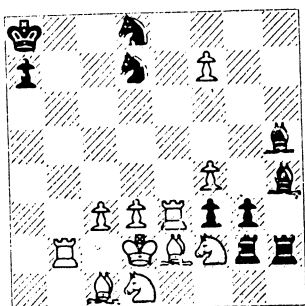
Reflex‡ 2 (Prize)

1Re7 (e8/e5? a5/Sf6!)
threat 2Se4 Rxe2‡
Pxe2 2Re3 Pxd1(Q)‡
Pxf2 2Rc2 Pf1(S)‡
Rxf2 2Rxd7 Rxe2‡

‡2 (4th Commend)

Nightrider
1Nd2 with 8 mates
by WK moves
Dawson gave a 13-
man setting of this
in 1927.

Ideal Mate Review

M. McDOWELL
Jan-Mar 1988

M.KIRTLEY
Apr-Jun 1988
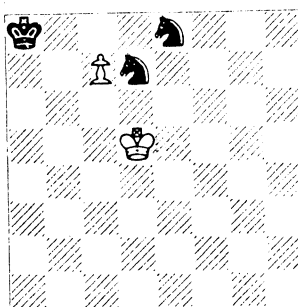
HP2½ (b) d7-d8
(c) further e8-b7
(d) further d8-b8

Mate in 4.

1c8(S)+ Qxc8+ 2bc(S)+
Kd7 3f8(S)+ Sxf8 gf(S)‡.

(a) 1Kc6 Sb8+ 2Pxb8(B) Sc7 3Kxc7=
(b) 1Pc8(S) Sc6 2Kxc6 Sc7 3Kxc7=
(c) 1Pxd8(Q)+ Ka7 2Qc8 Sc5 3Kxc5=
(d) 1Pxb8(R)+ Ka7 2Rxb7+ Ka8 3Kc6=

FRANCE

France seems currently to be the centre of the greatest activity in the chess problem world, at least that is my impression, taking over from the long-term dominance of Germany, though only a couple of years ago they seemed to be in the doldrums. Let's hope the impetus continues. Perhaps it has something to do with the bicentennial of the Revolution this year.

Diagrammes, which I hadn't actually seen for many years, has suddenly sent me the January-March 1989 issue, Number 88, together with a Number 1 'Special'. The latter is a celebration of the longer direct mate problems (4 or more moves) by the German expert Hans-Peter Rehm. The booklet is laid out in a very helpful manner, with sections on particular themes - Batteries, Interferences, Indians, Romans, Circuits, White King, and so on. Since this is a subject on which I am even more ignorant than two-movers I look forward to the chance to study it thoroughly. There is no better way to get to understand a subject than to study the best works of a master of the genre. The title of the supplement is Les Multicoups de Hans-Peter Rehm. The periodical Diagrammes itself is very well printed, and attractively laid out, with large diagrams in an attractive style, six to a page. There are 38 originals of all types, and some interesting articles - particularly three by Pierre Monreal on various fairy pieces, and part 39 of a series 'Le Supertask' by Jaques Fulpius on Schiffmann Defences. General editor is Claude Wiedenhoff, subscription 170 Francs/year, payable to 'Echecs & Compositions' at 13 avenue des Causses, 91940 Les Ulis, France.

Phenix is not one but three journals in a single package – Phenix, Rex Multiplex and Themes 64 – you can subscribe to Phenix by itself (it contains originals of all types for solving, solutions of previous issues, and other general matter) while Rex Multiplex and Themes 64 contain articles on fairy and orthodox problems respectively. Subscription rates are: 250 Francs complete, 200 for two parts or 150 for one. Director is Denis Blondel, 22 Allee des Bouleaux, 94510, La Queue en Brie, France, with co-editor Jean-Marc Loustau. No 1 appeared May 1988, No 2 October, and the latest issue, No 3/4 is dated December 1988. The latest Themes 64 consists mainly of a massive article by Jacques Rotenberg on Diagonal/Orthogonal Echoes in combination with other themes.

Diagrammes		Phenix	Rex Multiplex
A. GRUNENWALD 1987 H‡3 (set play)	J.C.DUMONT & P. MONREAL Jan-Mar 1989	J. ROTENBERG & J.M. LOUSTAU May 1988	K. SUKUMAR May 1988 ‡2 Sentinal Chess
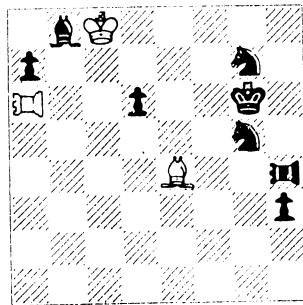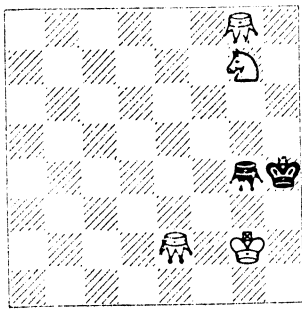
1...Sh5 2Kg5 Sf4 3Kh4
Sg6‡ 1Gxg8! Se6 2Gd5
Sg5 3Gh5 Sf3‡

H‡3. Cowboys.
1S5e6 Kd7 2Sc7
Kxd6 3Sge8 Ke5‡
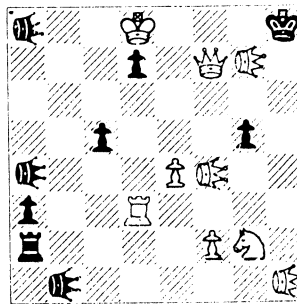
‡2 Lions
1e5! (thr. Li-c3‡)
d5/c4/Rc2
2Li-h6/Rh3/Sh4
(set Sh4/Li-h6/Rh3)
cyclic change
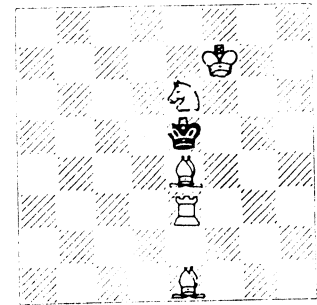
1Sc5(WPe6)
Kf4/d4/d6(BPe5)
2Rg3(WPe3)/Rc3(WPe3)/
Sa6(WPc5)‡

The Grunenwald problem from Diagrammes happens to be quoted in an article by him in Rex Multiplex on ideal mate problems containing mates with different numbers of pieces. One of Pierre Monreal's articles in Diagrammes on fairy pieces revives J.de A. Almay's 'Cowboy' from Fairy Chess Review (1940) – it 'lassoos', i.e. stalemates, any man on the same rank or file and with all eight squares round it vacant – it also moves like a Rook (but does not capture) along the board edge – a correction of the original problem, by J.P.Boyer and Monreal is given, plus this new composition in which the cowboy is also allowed to immobilise other pieces – that at h5 immobilises the WB e4 until it is rescued by the WK 'cutting' the lassoo. 'Echecs Sentinelle' is the subject of an article in Rex Multiplex. Any piece (not pawn) leaves a pawn behind (as a 'sentinal' or 'sentry') when it moves – except from a square on ranks 1 or 8. I am not clear if the pawn so left can move, it can certainly check. Other compositions add the restriction that not more than 8 pawns of one colour can exist – this allows some novel 'half-pinning' effects – where one piece moves, leaving a pawn to stop the check, but the other pinned piece cannot now move because there is no pawn to fill its shoes. This seems to be a fruitful idea. It is attributed to C.K.Ananthanarayanan in The Hindu 1984, but I have a vague recollection of seeing it before under the name of 'Planter' around 1976 but cannot trace an exact reference – at any rate the idea did not catch on at that time, as it now seems to have done.

EUROPE

World Chess Composition Tournament of the F.I.D.E. (3. WCCT) 1984-1988 is a joint production by Denis Blondel of Rex Multiplex and Bernd Ellinghoven of Feenschach for FIDE. It contains the complete award, 198 compositions in the ten sections, and is multi-lingual – each judge's award being given in his own language in the main. I have no details of price or availability.

WHAT'S IN A GAME?

Continued from p.75

13. Boards. If we represent the cells by dots and indicate the moves that are permitted in the game (by all or some of the pieces) by lines joining the dots we get a <u>network</u> diagram. In general moves need not be reversible and we would indicate this by arrowed lines. For the present, for simplicity, we will however consider only reversible moves, forming a non-directional network, which we will term just a <u>net</u>. A net is usually assumed to be <u>connected</u>; that is, it is possible to reach any cell from any other in a series of moves along the lines of the net. This however is not essential. For example, the moves of the white-square and black-square Bishops in Chess form two nets with no connecting move (by a Bishop) between them.

The <u>degree</u> (of connection) of a cell is the number of other cells to which it is connected by a single move. A cell of degree 0 is <u>isolated</u> (forming a mini-board all by itself - an isle). A cell of degree 1 is an <u>end-cell</u> (or cul-de-sac). A cell of degree 2 is a <u>passage cell</u>. A cell of degree 3 or more may be termed a <u>junction</u>. The largest degree of any cell to be found in a net may be termed the <u>degree</u> of the net as a whole. A net of degree 0 is thus a <u>set</u> (of unconnected isles). A net of degree 1 is a set of at least one pair of connected cells (o—o) possibly with some isles as well. A connected net of degree 2 we can call a <u>track</u>, and a connected net of degree 3 or more deserves the appellation of <u>board</u>. All connected nets of 1 to 4 cells:
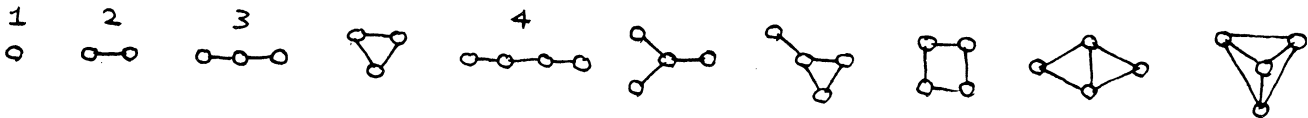
14. Planar Boards. We are at liberty to arrange the dots in the net diagrams as we please, as if they were, in H.E.Dudeney's phrase, button and string configurations [Amusements in Mathematics, 1917, pp229-230] - including untying a string and retying it after threading it differently through the other strings. Two such diagrams, one of which can be rearranged to give the other are (connectively) equivalent nets. (e.g. Diagram **A** below.)

It may be that in a net diagram some of the lines will cross one another at points that do not represent places where pieces may be placed (i.e. cells). If we can eliminate such crossovers by suitably redrawing the diagram then the net is called <u>planar</u>. An exact criterion to determine whether a net is planar or not is provided by the remarkable theorem of Kuratowski (1930) that may be stated as follows: <u>A net is planar provided it does not contain cells connected, either directly or via tracks of intermediate cells, in either of the fashions K5 or R3:</u> *

K5 is the <u>complete</u> net of 5 cells - each cell is connected to every other. R3 is the <u>complete bi-partite</u> net of order 3 - formed by connecting each of three cells to each of three others. The non-planarity of R3 is the basis of the well known puzzle of supplying three homes with water, gas and electricity without the supply lines crossing [H.E.Dudeney, <u>A in M</u>, problem 251, pp73, 200-201] which can be solved only by some such cheat as allowing one supply line to pass through one of the houses on the way to another. A K5 puzzle could be presented in the form of a tour by Arnold Bennett's <u>Anna of the Five Towns</u> (Burslem, Fenton, Hanley, Longton and Tunstall - now all in Stoke-on-Trent) showing that she must cross her path again on the way home after visiting every town twice (her home being near one town).

In the case of a planar net we can represent the cells by plane areas and the moves by boundary lines common to the areas connected. The following are all possible nets of 1 to 4 cells presented in this form:
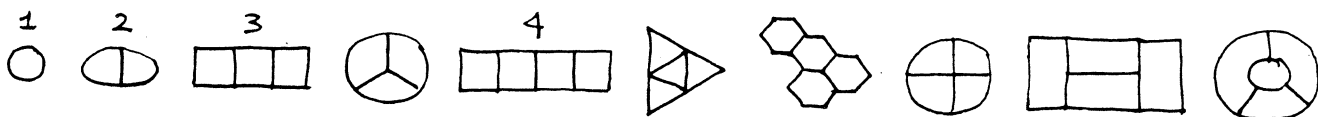
*C.Kuratowski, 'Sur le probleme des courbes gauches en topologie', <u>Fund. Math.</u> **15**, 271-83.

NUMEROLOGY & DIGITOLOGY

The term "numerology" literally translated means simply "the study of numbers", but unfortunately it has been misapplied to the use of numbers in fortune telling (for which the proper term should be "numeromancy") so that mathematicians tend to use clumsier phrases such as "theory of numbers" or "higher arithmetic" for this branch of study, which is a pity. (The same comments apply to "astrology" and "astromancy".)

Numerology, as I understand the term here, is concerned with properties of numbers per se; properties depending on the scale of notation, or otherwise using particular numbers, chosen for no special reason, are excluded from the exercise. The study of the properties of the expressions for numbers in particular systems of numeration I call "digitology". Exercises in this branch of number theory are given on the opposite page.

First, Last and Only Numbers

It is easy to define numbers that are the first of their kind, since any set of cardinal numbers has a first element (this is known as the "well-ordering principle"). Some numbers however are the last of their kind (and others are the only ones of their kind). Can readers provide further examples to add to the following?

0. The only number which added to any number does not alter it. $N + 0 = N$.

1. The only number which multiplying any number does not alter it. $N \times 1 = N$.

2. The only number such that any number is a sum of a set of its powers (i.e. no more than one of each). The powers of 2 are $2^0 = 1$, $2^1 = 2$, $2^2 = 4$, $2^3 = 8$, etc. Thus $3 = 2 + 1$, $5 = 4 + 1$, $6 = 4 + 2$, $7 = 4 + 2 + 1$, etc. This is the basis of the binary number system.

7. The largest prime number for which the Fermat quotient $(2^{p-1} - 1)/p$ is a square. Thus $(2^6 - 1)/7 = 63/7 = 9$. The only other case is 3, for which $(2^2 - 1)/3 = 1$. [A.H.Beiler, Recreations in the Theory of Numbers, 1966, p.308.]

24. The largest number that is divisible by all non-zero numbers less than its square root. $24 = 1 \times 24 = 2 \times 12 = 3 \times 8 = 4 \times 6$ [L.F.Taylor, Numbers, Faber & Faber 1970].

30. The largest number with the property that all numbers less than and relatively prime to it are unity or prime. 30 is co-prime with 1, 7, 11, 13, 19, 23, 29. The other, smaller numbers with this property are: 2, 3, 4, 6, 8, 12, 18, 24. [J.V.Uspensky & M.A.Heaslet, Elementary Number Theory, 1939].

70. The only number whose square is also pyramidal (i.e. the sum of successive squares, beginning with 1^2). $70^2 = 4900 = 1^2 + 2^2 + 3^2 + \cdots + 24^2$. [A.H.Beiler, p196].

140. The largest number whose square is also tetrahedral (i.e. the sum of successive triangular numbers, beginning with 1). $140^2 = 19600 = 1 + 3 + 6 + 10 + \cdots + 1176$. [Beiler, p197]. The only other number with this property is 2 for which $2^2 = 4 = 1 + 3$.

∞. (The first infinity.) The only number of things that can be matched to a subset of itself (i.e. is infinite) and can be circularly permuted. [See issue 5+6, p.90.]

I suspect that every number has some special property unique to itself if one searches enough.

Mersenne Primes

'C.C.Riter' writes concerning the listing of Mersenne Primes on page 90, noting that 81 should be 89 (as reported on page 112) and adding that: "Two others are now known. 216091 (see Journal of Recreational Mathematics, Vol 18, No 4, p.88) was 'discovered' in Sept. 1985. The exponent 110503 was somehow missed by earlier investigators (see Science News, Feb. 6, 1988). In fact the recently published The Book of Prime Number Records (Paulo Ribenboim, Springer Verlag, '88) states erroneously (p.79) that "(thanks to Bob Silverman!), a systematic search has now been completed up to 150000, which assures that 132049 provides indeed the 29th Mersenne prime (in increasing order)".".

Wanted: Numerical questions relating to games of any type - e.g. there must be many interesting problems involving the scoring in such games as Darts, Snooker, Cricket, etc. I have already collected a few with the idea of presenting a feature on the subject. Does anyone know Eddington's Cricket problem? I remember reading a glowing reference to it somewhere, but find it is not where my memory says it was! - Not an unusual occurrence.

Prime Permutability   By T.W.MARLOW

The question asked (p112) was: What is the maximum number of prime permutations in the case of numbers of 3, 4, 5, 6 or more digits, and for what numbers are they attained. The following seem to be the best results. [These have been confirmed by G. J. SUGGETT].

3 digits: 4 primes: 379, 397, 739, 937 / 179, 197, 719, 971 / 149, 419, 491, 941
4 digits: 11 primes: 1237, 1327, 1723, 2137, 2371, 2713, 2731, 3217, 3271, 7213, 7321
            1279, 1297, 2179, 2719, 2791, 2917, 2971, 7129, 7219, 9127, 9721
5 digits: 39 primes: 13789, 13879, 17389, 17839, 18379, 18397, 18793, 18973, 19387, 37189,
            38197, 38791, 38917, 38971, 71389, 71983, 73189, 73819, 78139, 78193,
            79813, 81937, 81973, 83719, 83791, 87931, 89137, 89317, 89371, 91387,
            91837, 91873, 93187, 93871, 97381, 97813, 98317, 98713, 98731
6 digits: 148 primes: 123479 and its permutes (list provided).

Cryptarithms

The inset cryptarithm in Italian was sent by T.H.WILLCOCKS as a Christmas and New Year Greeting (the result of a short holiday in Tuscany): It has the title: Aritmetica Elementare – Una Somma Vera. Each letter represents a different one of the ten digits: 0,1,2,3,4,5,6,7,8,9.

```
  Z E R O
    S E I
  S E T T E
  O T T O
  N O V E
T R E N T A
```

The best I can offer in English as response is the multiplication:

```
    T W O
    S I X  x
  T W E L V E
```

which has 3 solutions.

Fibonacci & Recurring Decimals

By R.J.NASH

With regard to the Fibonacci series, the most astonishing property that I know concerns the decimal formed from it as indicated on the right:

```
0.0112358
       13
       21
       34
       55
       89
      144
      ...
```

[This result (and others related) is given by L.F.Taylor in Numbers (1970) p.48, I have just noticed. Editor.]

0.01123595505617977528089887640449438202247191

Successive numbers of the series are added to give one extra decimal place every time, and amazingly the result recurs after 44 places to give the reciprocal of 89. This is the more surprising, as it depends on the scale of notation as well as the properties of the Fibonacci numbers.

I enclose the proof, for which I was indebted to Professor Lyness when I met him at a short course in Hull in 1970 (I had seen the result stated by Martin Gardner in the Scientific American). He presented me with the proof on the back of the proverbial envelope.

Let $S = a_1x + a_2x^2 + a_3x^3 + \cdots$ where $a_1 = 0$, $a_2 = 1$, $a_3 = 1$, ..., $a_n = a_{n-1} + a_{n-2}$ and $x = 1/10$

Calculate Sx, then $S + Sx = S(1+x)$, then $xS(1+x) = a_1x + a_3x^2 + a_4x^3 + \cdots + a_nx^{n+1} + \cdots = S - x^2$

Thus $x^2 = S - xS(1+x) = S(1-x-x^2)$ and so $S = x^2/(1-x-x^2) = (1/100)/(1 - 1/10 - 1/100) = 1/89$

Numerical Mnemonics

"C.C.Riter" (Pronounced Writer I think) sends a photocopy of a remarkable 'Self-referential Story' by Michael Keith, published in The Mathematical Intelligencer (Vol 8, No 3) 1986 which, in type set in the outline of a circle, gives the first 402 decimals of pi if you count the letters of the words. Any punctuation mark other than a full stop represents a zero digit. A word of 10 digits represents the two successive digits 1 and 0; and so on for longer words. One digit appears as itself. The story describes within itself the method of its construction!

T.H.Willcocks recalls this mnemonic for e, from about 1930: "We proffer a mnemonic to remember a standard or Naperian base". He comments: the penultimate word troubled me until I consulted my dictionary – there are alternative spellings. It pays to check!
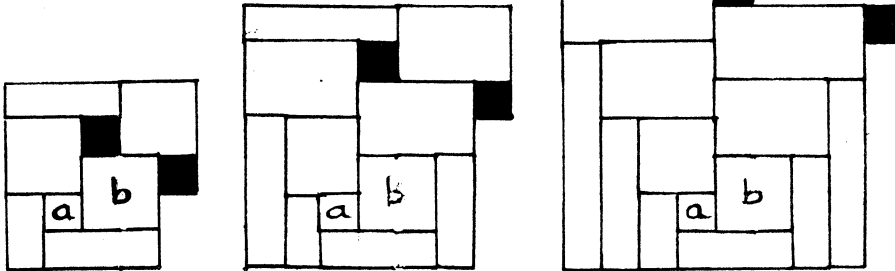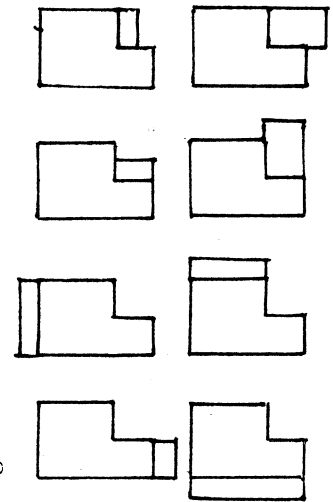
A Gnomonic Question
By T.H.WILLCOCKS

The diagrams show another series of solutions.
The series here are not arithmetical progressions, but are of the form

$$u_n = 3u_{n-1} + u_{n-2}$$

The eight ways of extending a gnomon to form a gnomon.

Bridge Auctions
By Rev. R.A.DEARMAN

There is a misprint, 2 instead of 22, in the number of bidding sequences on p.113. And the comment following is obscure, to say the least! To construct a list of all valid sequences, assuming no irregularities such as insufficient bids condoned, we can proceed as follows: – (1) For each level (1C to 7N) independently, choose any one of the 22 possibilities P^0, BP^i, BDP^i, BP^2DP^i, $BDRP^i$, BP^2DRP^i, BDP^2RP^i, $BP^2DP^2RP^i$, where i can be 0, 1 or 2, B=bid, P=pass, D=dbl, R=rdbl: this gives 22^{35} strings. (2) Remove P^0: this leaves $22^{35}-1$, all containing at least one bid and all ending in P^0, P^1 or P^2. (3) Make all these endings up to P^3: this gives only $(22^{35}-1)/3$ distinct strings. (4) Precede each by P^0, P^1, P^2 or P^3: this makes $4(22^{35}-1)/3$. (5) Append the string P^4: this gives $(4\times22^{35}-1)/3$ as required.

I submitted the conclusion, without any working, to <u>Games & Puzzles</u>: it was in No.29, October 1974, p.27. As it says there, the problem was aroused by a puzzle in No.25, June 1974, p.29, which came in two parts, one identical to Ainley's second question [What is the shortest possible bridge auction?], the other (surprisingly <u>not</u> asked by Ainley) asking for the <u>longest</u> auction. The answers given (No.25, p.40), like Ainley's, assume that after 7Nxx no more calls are made since each player has no legal alternative to a pass. I wrote to quibble that according to the rules the auction terminates after three (or four) consecutive passes*, so the shortest auctions consist of 4 calls and the longest of 319 (including three forced passes at the end): nearly 80 rounds! While I was at it I worked out the number of legal auctions and gave the answer in the form $(4/3)(22^{35}-1)+1$ [approx. $1\cdot3\times10^{47}$]. As far as I know nobody confirmed this or took issue with it.

The 'shortest auction' problem raises a question. Often at bridge you think there was nothing you could effectively have done to avert a bad result. But of course there are usually things you <u>could</u> have done, like bidding 3NT, which might or might not have led to an even worse result. In what circumstances can an individual player say that (even with hindsight) there was absolutely nothing he could legally do? As far as I can see the only answer is when the player on his left deals and opens 7NT, which is immediately doubled and redoubled, his partner makes a lead, and declarer claims 13 top tricks. This is nearly as bad as a snooker player watching his opponent break off and clear the table – 'nearly', because bridge is a partnership game and the partner very definitely contributed to the debacle.

*An analogy is when a player has only one card in the suit led. He has no choice legally but to play it. Nevertheless he <u>plays</u> it! Similarly a player obliged to pass after an irregularity (or after 7Nxx) <u>passes</u>! The more I think about this the more I am convinced. The answer 316 given in <u>G&P</u> includes two passes in which the player has no discretion in the matter: 7NT, Pass, <u>Pass</u>, Double / Pass, <u>Pass</u>, Redouble. By their reasoning they might as well take them as read so that only 314 calls are made. Of course these are mere technicalities, but the vast majority of the possible sequences (including this one) are unimaginable in practice, so we <u>are</u> dealing with technicalities. Sometimes the technicality matters, e.g. declarer leads a spade and dummy has only the queen. Left-hand opponent hesitates, unsure whether it is better for self or partner to win. His partner is not allowed to decide the matter. The queen <u>will</u> have to be played but has not yet been played, even if dummy (annoyingly) 'plays' it.

ON LIBRARY RESEARCH

For an amateur enthusiast who is an academic outsider - i.e. someone without a degree and not connected with some University Department, it is quite a difficult if not impossible feat to gain access to many of our Libraries - and having gained access it can be an extremely frustrating business to find the titles that you wish to consult. For instance there is apparently no catalogue in the UK to tell you which Libraries contain which books - the only way to find who has a particular book is to go to each establishment in turn. For example in my researches on Knight's Tours I sought a copy of C.F.de Jaenisch's book <u>Traite des Applications de L'Analyse Mathematique au Jeu des Echecs</u> (1862). With the help of a letter from Oxford University Press saying that I was researching the subject with a view to producing a book (I still am - but slowly) I was able to get a reader's ticket to the British Library - only to find that although Jaenisch is in their catalogue their copy was destroyed in the war. By similar means I was able to get a pass to the Bodleian Library at Oxford, allowing access on a limited number of days spread over five years. I was able to make good use of this, principally to consult the H.J.R.Murray manuscripts on Knight's Tours, but travelling there and staying over a few days can be expensive. I was not able to locate Jaenisch there either. From Cambridge University Library I was able to extract a ticket allowing a one-day visit specially to consult their copy - while there I went through their catalogue room looking for other titles on my list without success. The moment I put the book on my desk to read,the cover fell off with an embarrassing thump - I haven't dared go back there since incase I'm on their black-list as a vandal!

The procedures for obtaining a book at these large libraries require one to first search through catalogue lists (which may occupy a room in themselves) and fill in forms and then wait - 2 hours or 2 days! - for the book to be obtained from the stores, which may be miles away. Such procedures are not practical unless you can spend days on end on the work.

The Mathematical Association Collection

My favourite Library so far is that at Leicester University, which houses the Mathematical Association's collection and is thus accessible to members of that body. The collection is housed in sliding racks in the basement, to which readers are allowed access - so that one can simply open the racks at the appropriate subject and browse along the shelves to see what books they have there on any particular subject. The collection however does not seem to have been kept regularly up to date. It would be a good idea if all reviewers of books in the <u>Mathematical Gazette</u> agreed to donate the books after review (or a year or so later) to the Library; it would then develop into a really fine collection.

The Strens Collection

The Eugene Strens Recreational Mathematics Collection: A Preliminary Inventory, published by the University of Calgary Libraries, Calgary, Alberta, Canada T2N 1N4 (price $8, July 1986) has reached me from Richard K. Guy (Professor at the Department of Mathematics and Statistics, 2500 University Drive N.W., Calgary). Eugene Strens (b. Roermond, Netherlands, 1899, d. Breda, 1980) assembled a collection of over 10,000 books, reflecting his wide-ranging interests, which included philately, chess, graphic art, meteorology, astronomy, and especially mathematical recreations. Following his death a new home for the collection was sought, and it (or at least the mathematical part - the catalogue is not clear on this) was acquired (partly by donation from the Strens family, partly through grants from the Province of Alberta) as a Special Collection by the University of Calgary Library. The two thousand or so entries in the inventory represent the original Strens Collection, but this is already beginning to grow through gifts from other collectors and the aim is that it should become and remain the definitive collection in the area of recreational mathematics throughout the world.

Chess Collections

There are three major collections of books on chess and chess problems that I know of, namely: The J.G.White collection at Cleveland Public Library, Cleveland, Ohio, USA. At his death in 1928 it contained 12000 books, this must have at least doubled by now I should think if it has been fully kept up to date. In Australia there is the M.V.Anderson collection at the State Library of Victoria, Melbourne (8500 volumes according to Bob Meadley's account in <u>The Chess Bookman</u> in 1979). And at the Royal Library in the Hague there is the Niemeijer /van der Linde collection, with some 6500 titles (1955). I would be glad of details of any other collections known to readers. Why is there no comparable collection in the UK? Or is there? The BCPS Library consists of a few bookcases in a corridor at University College London with, at a guess, some 300 titles and no room for expansion even to keep up to date.

GEOMETRY NOTES

Triangular Billiards

Problem 3. The question of what happens when a ball is cued into a corner without a pocket to hit both sides of the angle simultaneously has now been answered comprehensively in a paper, 'Analysis of a Collision Problem' by Professor A.G.MACKIE in the IMA Bulletin, Sept/Oct 1988, pp.130-134. 'Under the conventional assumptions of rigid, elastic cushions, the problem is indeterminate. A model is constructed in which the cushions are compressible and exert linear restoring forces on the ball.' [See G&PJ, p42].

Problem 8. Some example cases are illustrated. If the ball is projected to hit the base at a point m nths of the way along from the right angle (i.e. at a 'rational' point) then the ball will eventually reach a corner - the right angled corner if m and n are odd, the 45 degree corner if m and n are of opposite parity [m/n being in its lowest terms - i.e. hcf(m,n)=1].

1/2　　1/3　　2/3　　1/4　　3/4　　1/5　　2/5
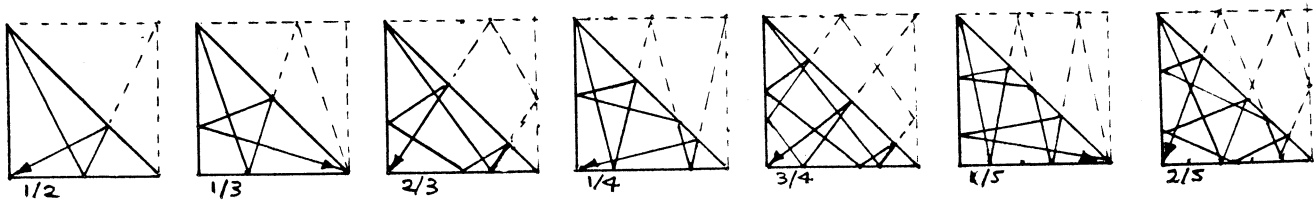
The dotted lines indicate how the paths are related to those the ball would follow on a square board. The general problem of a rectangular board is offered for consideration next time.

The Centres of a Triangle

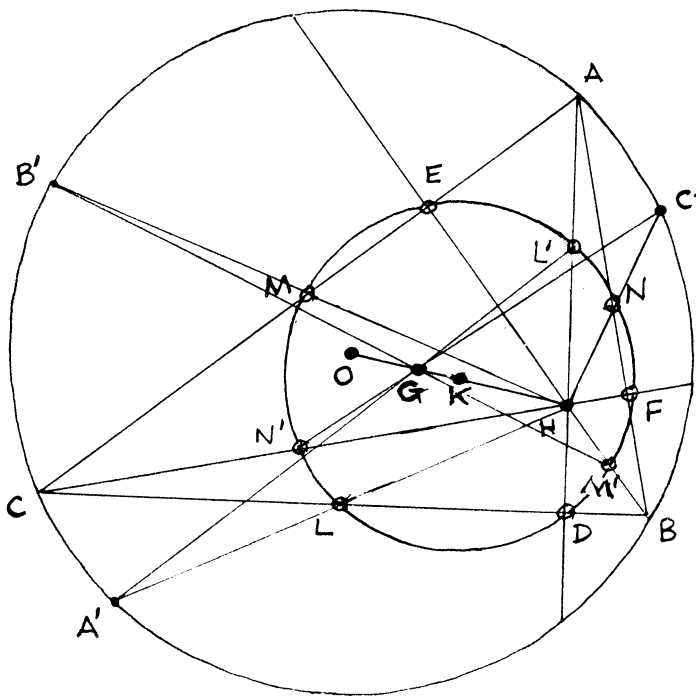The so-called 'Nine-Points' Centre of a triangle is the centre of the circle through the mid-points (L,M,N) of the sides. This circle also happens to pass through the feet of the altitudes (D,E,F) and the mid-points (L',M',N') of the upper parts (AH,BH,CH) of the altitudes, as well as L,M,N hence the name - but these nine points are not always distinct.

In an isosceles triangle there are only 8 distinct points, in a regular triangle 6, in a right-angled triangle 5, and in a right-angled isosceles only 4. A better name is 'Medial' Centre or Circle.

The fact that the medial circle bisects the lines HA,HB,HC is only a particular case of the general rule that it bisects all lines from H to the circumcircle. In other words, H (the orthocentre) is the centre of similitude of the Medial and Circum Circles.

Other observations on the figure: The medial centre, K, bisects OH, where O is the circumcentre and H the orthocentre. LL',MM',NN' are diameters of the medial circle, and AA',BB',CC' are diameters of the circumcircle. The centroid G (where AL,BM,CN meet) is also the centroid of the triangles AA'H,BB'H,CC'H, so that A'L',B'M',C'N' also meet at G, on the Euler line OGKH.

Now that we have found the centres of similitude of incircle and circumcircle (last issue) and of circumcircle and medial circle, the next question to ask is where is the centre of similitude of the medial circle and the incircle?

TOURS & PATHS

I hope to make this a regular section from now on. We begin with some Wazir paths. The endless Wazir tour, **A** gives a circular permutation of all the pairs (r,s) of numbers 1,2,3,... This goes some way towards solving the enumeration of the rational numbers asked for on p.90. In Chessics 21, p.56, Spring 1985, I seem to have been under the impression that the 10x10 Wazir Tour with square-numbers-in-a-row was unique, but in fact it can be varied slightly as shown here (tour **B**). The solution is unique in the 6x6 case but can be varied on larger boards.
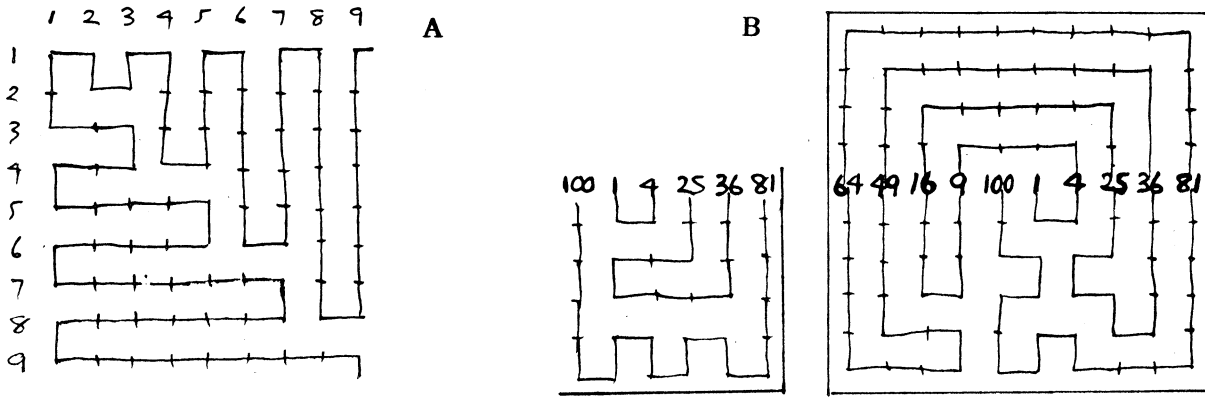
Rook around the Rocks: My discovery that four blocks suitably placed on the 8x8 board are sufficient to determine a unique closed Wazir tour of the remaining squares was published in The Problemist, November 1979. The numbers of blocks needed for smaller square boards were also mentioned there, but solutions were not diagrammed - they are as follows:
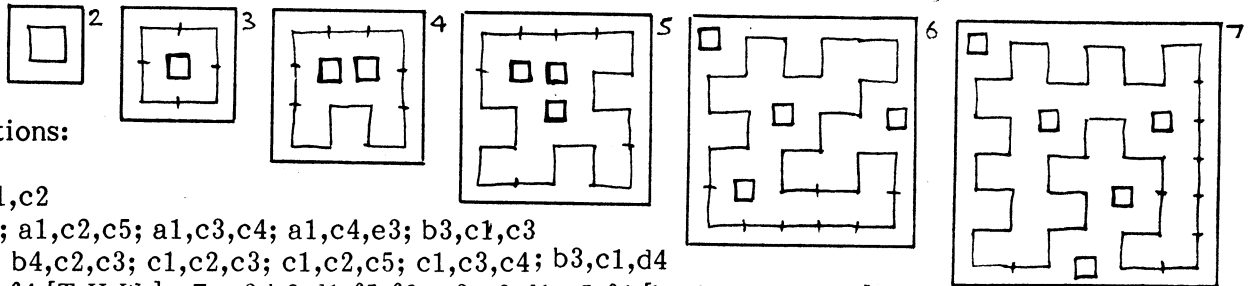
Other solutions:
3: a1
4: a1,d1; a1,c2
5: a1,c2,c3; a1,c2,c5; a1,c3,c4; a1,c4,e3; b3,c1,c3
b4,c1,c4; b4,c2,c3; c1,c2,c3; c1,c2,c5; c1,c3,c4; b3,c1,d4
6: a1,a4,d5,f4 [T.H.W.]   **7:** a3,b6,d1,f5,f6; c3,c6,d1,e5,f4 [both by T.H.W.]

This was followed up in Chessics 12, p12, 1981, where 14 solutions for the 8x8 case were given (7 by T.W.Marlow, 7 by. myself) and a proof was given that 4 blocks are necessary, and that one must occur in each quarter. I have not conclusively proved that 4 and 5 are the minima for the size 6 and 7 boards as yet - the proof was specific to the 8x8 board. The following are solutions for boards of sizes 9 (7 blocks), 10 (8 blocks) and 11 (9 blocks) by T.H.WILLCOCKS, sent on.17th May 1988, but reported first in a letter ten years previously (22 May 1978). How time flies! Mr Willcocks indicates how these,and an 8x8 solution,can be extended by insertion of extra central ranks and files, with appropriate blocks, to give solutions of sizes 12, 13, 14, 15 which can in turn be extended still further, thus providing solutions for all square cases - probably with fewest blocks.

The Rocks direct the Rook
across the open board in 'WAZIR WAVES'!

WORDS & LETTERS

Rune Games

Rune Games by Marijane Osborn and Stella Longland (Routledge & Kegan Paul, 1982, reprint 1987, £7.95 net) is not about Games as usually understood in this journal but about activities that are more like Exercises "designed to help the individual explore his psyche". "Runes are the angular letters of the earliest writing system of the Germanic tribes." "The shape of each rune is highly individual and cannot be changed into any other rune by changing the angle of viewing." (Unlike our letters b, d, p, q for example.) "Indeed in rune carvings runes are often inscribed upside-down or back-to-front." Besides having a phonetic interpretation, each is also an ideogram, representing some concept important in the life of those times, such as: man, horse, home, oak, bow, star. The 'games' depend on using staves or counters engraved with the rune symbols, selecting them in some random, or formalised manner, and meditating on the selection or arrangement thus found. The authors reinterpret 'divination' as meaning not finding out what Fate has in store for us, but seeking out or seeking to develop the divine within us. Besides this attempt to justify old pagan practices with modern psychology and with christian symbolism, there is also some attempt in the later games to relate the Runes to other mystical symbolisms such as Numerology of time, the Kabbalistic tree of life, and so on. While finding such symbolisms attractive in some ways as art of a kind, the reviewer, hard-bitten sceptic that he is, doubts the value of the whole thesis - sometimes it is better to cast off old theories - like phlogiston - and forget them rather than to recast them into a modern mould.

Other sources I have consulted give different numbers of letters and vary their shapes and names. No doubt there were variations over the years and from place to place. Evidently the signs tend to be formed of straight lines and are partly systematic in construction. For example, from the 'birch' rune we can derive a family of 10 symbols by deleting one or more of its sloping lines, as below. These, and pairings of them back to back or front to front, produce symbols that resemble the runes, or coincide with them, in many cases.

For recreational purposes we can apply the name "runes" to any set of symbols constructed in a systematic manner. Readers may like to try to construct their own systematic alphabet.

Alphabetical Topology

Of more mathematical interest is whether it is possible to count how many different "letter" shapes are possible. To do this we need to decide on exact criteria for considering two shapes distinguishable. To begin with we shall only use the most crude rules - subtle distinctions such as between 1 and l or between 0 and o which cause perpetual confusion to proof-readers of mathematical texts are well beyond our remit. Our rules will be as follows:

(a) We consider only letters formed with straight lines, and do not distinguish between similar shapes formed with lines of different lengths, e.g. $\neq$ = X . In the typical diagrams below we draw all lines as nearly equal as possible. (b) We do not make distinction between acute, right-angled and obtuse angles - thus a 'loose end' can be rotated freely, provided it does not pass beyond any point where it becomes a continuation of one of the other lines in the figure. (c) The figure formed must be connected. My results are as follows:

Even with these Draconian restrictions the number of 3-line possibilities is surprising (have I missed any?) Some of these shapes can be eliminated by further restrictions, e.g. that all the lines must be exactly the same length, or no line may be crossed twice. Enumerating the 4-line symbols is clearly a daunting task - any takers? It will probably be necessary to clarify some of the conditions or to introduce new conditions.

## Westbury – The Number Symbol Game

Alan Parr in Hopscotch 78 (July 1988) described a new game invented by ten-year old pupils at Westbury JMI School in 1988. It is based on the now familiar liquid-crystal digits seen on electronic equipment – but equally effective for display with old-fashioned matches:


The game begins with matches displayed in the form of the number 88. Each player in turn moves two matches to make a bigger number, of not more than three digits (e.g. by removing the middle lines of the 8s and using them to form a 1 the first player gets to 100, then by moving one match in each 0 the second player can get to 196). The first player unable to move loses. What is the best strategy?

    More recently Alan wrote with some further questions: "Some interesting Westbury sessions lately – e.g. If you remove the 3-column limitation, what is the highest number to be reachable in actual play? If you play to make a smaller number each time, what is the lowest number? (You need to use a decimal point in this version). The above versions refer to starting from 88. What happens starting with 89?

The idea of linear symbols for numbers is not new – the set of symbols shown here were proposed by Edouard Lucas in his L'Arithmetique Amusante (1895).
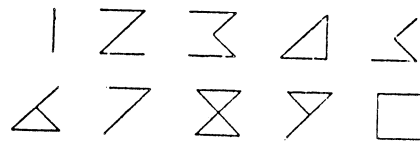
My chess correspondents in the USSR invariably have the following symbols printed on the backs of their envelopes: presumably for playing Eastbury?
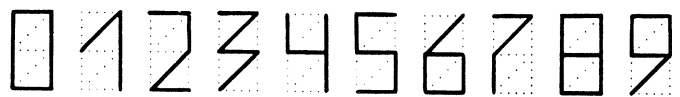
Pronounceable Codes

In Xanadu did Kubla Khan
A stately pleasure-dome decree
Where Alph the sacred river ran
Through caverns measureless to man
Down to a sunless sea.

The coded verse on page 94 is of course the start of 'Kubla Khan' coded by shifting one vowel to the preceding vowel (a to u) and each consonant to the preceding one

(b to z). Michael KELLER comments that "Slightly better results might be gained by dividing phonetically into five or six groups, e.g. AEIOUY(vowels), BDGV(voiced), CSZ (sibilants), HLRW(semivowels), JQX(clusters) FKMNPT(unvoiced)" from this by the reverse process he codes:

Fli xyosm dwuhp kuj qyntz ubiw fli reca guv.

But says: "Still I doubt any system will give really good results – English is not a good language for this sort of thing."

Simply Strange   By Loretta BRUCE

    Some everyday three or four-letter words also have more obscure meanings. Such is the case of the thirteen words listed alphabetically below. Decide which of these words fit the definitions alongside, and write them in the spaces provided.

    There is one surplus word. When the diagram is correctly completed, the 12 letters in the column marked by an arrow, reading down from 1 to 12, will spell out the unusual meaning of the surplus word.

The Words:
BIKE, CAMP, DUB, ELF, ETA, FEY, GAL, LOG, MINT, SAM, SLEW, TRIP, WING.

1. Unit of acceleration
2. A lot
3. A penny
4. Football
5. Small flock
6. Attempt
7. A pint
8. Clear a ditch
9. A dirty pool
10. 8000
11. Entangle
12. Together
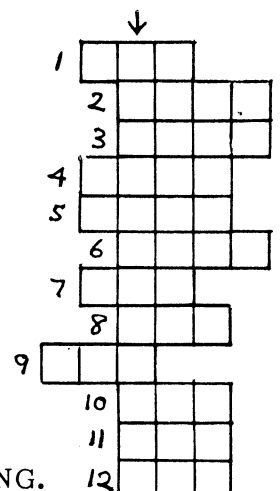
Solutions to the Prize Competition

The prize for the best solutions to the word puzzles on page 93 goes to S.J.G.Taylor.

Clock Words: The setter, Bob McWilliam, provided a sequence of 40 more or less familiar words, as follows: FEAR, DAM, NOISE, LAME, LANE, LAM, NOSE, LATE, LAND, FLAN, OIL, ANT, REST, RANT, RAT, ROT, REMIT, RENT, RELIT, RAM, NOR, DAMN, ODE, LAST, RAN, ORE, LARD, FEND, FED, FORD, FIST, REAM, NOTE, LORD, FLAIR, DAIS, TEA, MODEL, AND, FLAT, (etc.) as an example. Stephen Taylor finds a sequence of 155 words! All are sanctioned by Chambers (1988) but many are unfamiliar: FAD, FAND, FARD, FED, FEND, FEOD, FORD, FAIR, DEAR, DEN, OIL, AIL, ANIL, ARE, LADE, LAME, LANDE, LANE, LARE, LIE, LIFE, LIRE, LODE, LORE, LOSE, LOTE, LAM, NAM, NIM, NORM, NIL, AIR, DAMN, ODA, MNA, MOA, MORA, MORE, LAST, RAIT, RANT, RAT, REAST, REIST, REMIT, RENT, REST, RET, RIT, ROST, ROT, REAMS, TAIS, TAMIS, TAMS, TANS, TEAMS, TEAS, TELS, TEMS, TENS, TIS, TRAMS, TAI, SAI, SEMI, STAMNOI, SEA, MIRE, LAND, FEN, ORF, ELF, ERF, ELM, NIE, LAD, FLAIR, DEAN, ODE, LAID, FAR, DAM, NIRL, AIDE, LAIR, DAIS, TAM, NITRE, LAIRD, FEAR, DAMS, TAN, ODEA, MODE, LAR, DEMIT, RAS, TEA, MODEL, AMIDE, LARD, FLAM, NODE, LID, FLAN, OLM, NOEL, AMIR, DEIST, REAM, NOIL, ANODE, LIST, REAN, ORD, FAT, RAMS, TEAM, NOISE, LIT, REANS, TEL, ANTE, LOID, FELT, REIS, TELA, MITRE, LOIR, DENT, REM, NOSE, LOR, DOT, RAMI, SEL, ATE, LAMS, TEN, ORE, LORD, FOIST, REN, ORFE, LOST, RANI, STELA, MOTEL, ANISE, LIS, TRAM, NOTE, LOT, RAN.

Dart Words: The letters have values thus: A=9, B=14, C=13, D=5, E=18, F=8, H=6, I=16, L=12, N=4, O=2, P=10, Q=20, R=15, S=19, T=11, U=1, W=7, X=17, Y=3 and the words around the dart board are: QUENCH, PROXY, SWIFT, BALD.

Elementary Words: The longest word, found by Stephen Taylor, is PrOFEsSiONaLiSAtION (19 letters).

Are You Game: Rooks upon a3,b6,c8,d4,e5,f7,g1,h2 cover the letters ROULETTE reading downwards.

The £5 prize offered on page 114 is unfortunately cancelled for lack of interest.

Double Blanks

Words requiring the use of two blanks in Scrabble, and found in Chambers (1983) are: ZIGZAGGING (10), BEBLUBBERED (11), DISPOSSESSES (12) and no doubt others - I have not had time to do a very thorough search. Another word well known in these pages, but not yet in wider circulation is MINIMUMMER (and MAXIMUMMER of course) equalling the minimum of 10 letters. A good try, but not authorised by Chambers , is YUMYUMMY (8) probably to be found in the Bunter stories. It is tempting to coin ones own Double-Blank words. Some plausible examples are: HICK-COCK, JIGJOGGING, QUASI-QUIZZIQUE, EX-COXCOMBICAL.

Tangle-Tongue

There is of course no one answer to this sort of question, it is more of an exercise of imagination than reason. My answer is: *It was Left-handed Lofty, the shifty sifted thistle lifter who lifted the sieveful of erstwhile unsifted thistles that Theophilus Entwistle, the official unsifted thistle sifter sieved!* Back in G&P Journal - 1, p14, in discussing verse forms, I omitted to make the point that alliteration, assonance and rhyme are aural rather than visual - different letters can represent similar sounds. A 'verse-form' that employs alliteration and assonance, but may avoid rhythm and rhyme, i.e. regularity of structure, is the tongue-twister.

Word-Ladder Anagrams
By Len GORDON

The following are the word-ladder anagrams that L.G. has found, using a computer and an 8200 word list, made mostly from the Official Scrabble Players Dictionary.

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CHEAT-CLEAT-BLEAT-BLEST-BLAST-BEAST-LEAST-LEASH-LEACH-TEACH
ESTER-EATER-TATER-TATES-TARES-TARNS-TERNS-TERNE-TERSE
LARGE-MARGE-MERGE-VERGE-VENGE-VENAE-VENAL-RENAL-REGAL
TRIPS-TRIPE-TRINE-THINE-SHINE-SPINE-SPIRE-SPIRT
STOUT-SHOUT-SHOTT-SHOTS-SOOTS-TOOTS-TOUTS
PORTS-POUTS-POURS-SOURS-SPURS-SPURT-SPORT
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# Cryptic Crossword - 7 by QUERCULUS
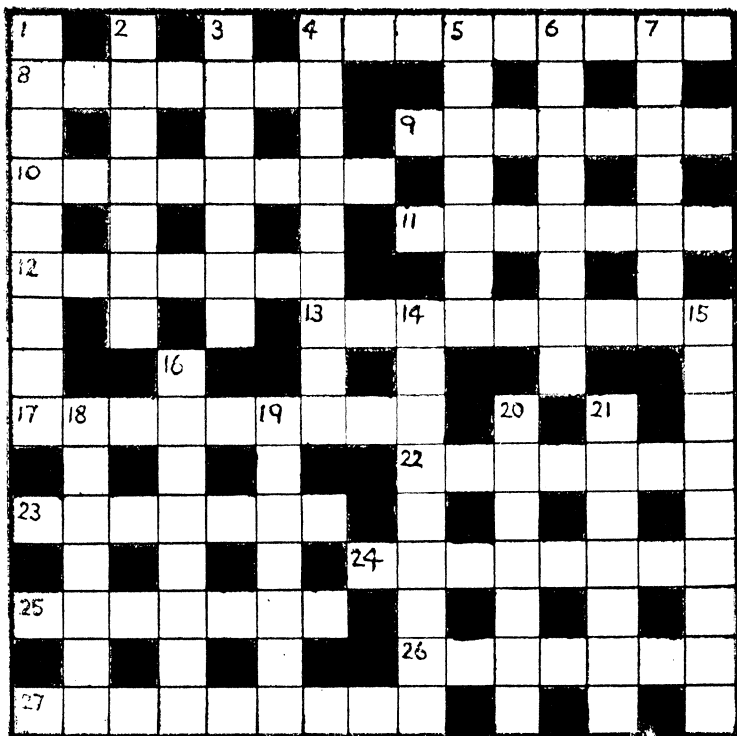
ACROSS
04. Attic wisdom I do without for a joke. (9)
08. Zoo's trichoptera gets the bird. (7)
09. First victory in rent-returns to merchant. (7)
10. Be unwholesome saint, related to father. (8)
11. In best Art - less shock. (7)
12. Coarsen all by display of weaponry. (7)
13. Complex in car city. (9)
17. Flung feet about, beaming brightly. (9)
22. Look in the face, aim whip, or just say 'heel'. (3-4)
23. Claud, R.A., out for the count. (7)
24. Unclassified and overcast. (8)
25. Engineer Amir led astray. (7)
26. Ant-like emitter. (7)
27. Sounds like a ticking off in the Zürich Underground? (9)

DOWN
01. See them oust a cheat for too much lip! (9)
02. Composer returning Arts to South America? (7)
03. Pub in transept can't fail. (7)
04. Crossed when baulked or out of touch. (5,4)
05. Upbraid thrice or chirp nervously. (7)
06. Gem's value got back in cat's-eye opacity. (8)
07. Surfacing, she will account for it shortly. (7)
14. ET back for a close encounter of the fourth kind? (4-1-4)
15. Sailors chest many waves. (9)
16. Note maker of lime curd. (8)
18. Fire pot in visage. (7)
19. No legal ale long ago Nell (lone gal): all gone
  -to sea, several times over! (7)
20. Fears of wrongdoing in backsliding saint. (7)
21. Place of shame linked with rat-pack. (7)

Crossword 6. SOLUTION
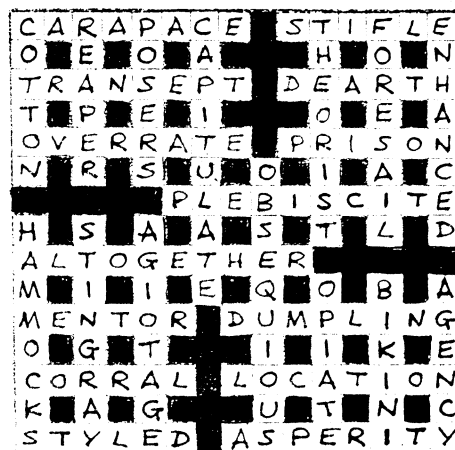
Edinburghisms

Roger MUSSON asks:
What have the following
four words got in common?

INDEFATIGABLE
HIJACK
HYMNODY
STUPID

And can you find any
higher-order examples?

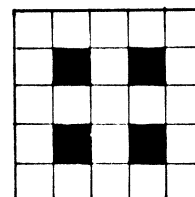## Shuffle-Link 1
SOLUTION

## Shuffle-Link 2
By Loretta BRUCE

Shuffle round the letters
of each of the six words
listed below, to form six
different words (anagrams).
Then fit them into the grid,
as in a normal crossword.

AIMED   CHEAT   DREAD
MELON   STEAL   THORN

MATHEMATICAL ART

The first two patterns here are given to show that the pattern resulting from the application of a growth-rule, proceeding step by step in stages, is not necessarily of the unpredictable or 'fractal' kind, such as were illustrated in earlier issues, but can be perfectly regular.
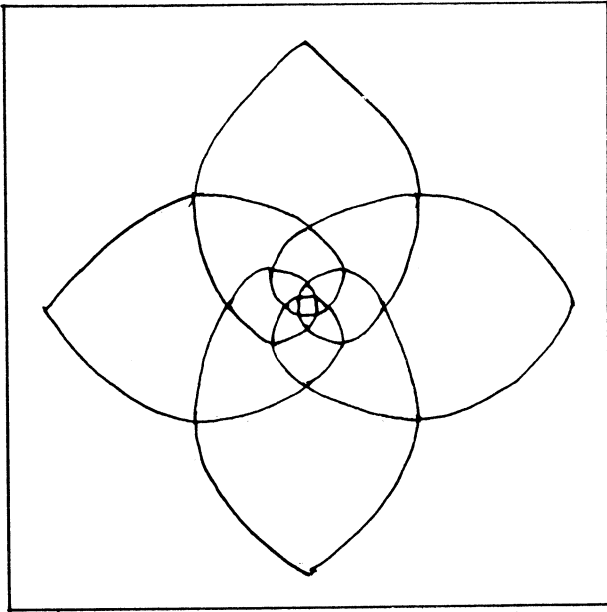

SQUARE FLOWER

Starting from a central square, the sides are extended, curving to meet at four new points that are the corners of a larger square - resulting in a type of octuple spiral - a pattern grown by a process of 'continuous extension'.
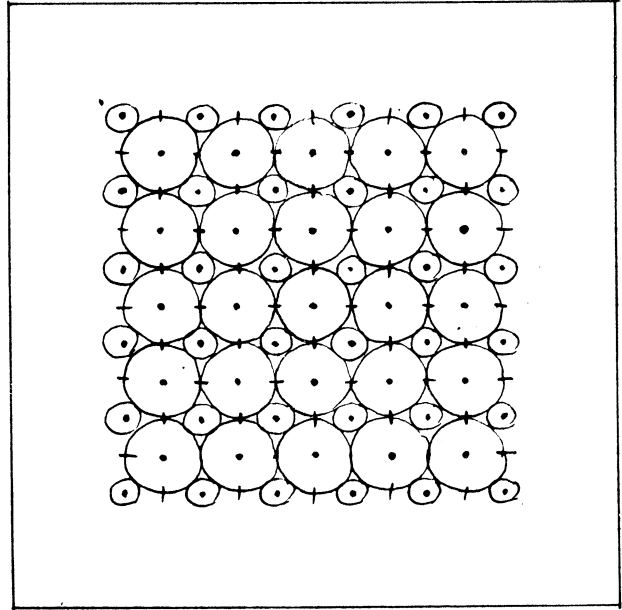

LATTICE OF CIRCLES

Starting from a central unit circle, at each stage circles are drawn centred at the nearest unused lattice points, to touch the existing pattern. The result is a very simple regular pattern, not at all complex or 'organic'.
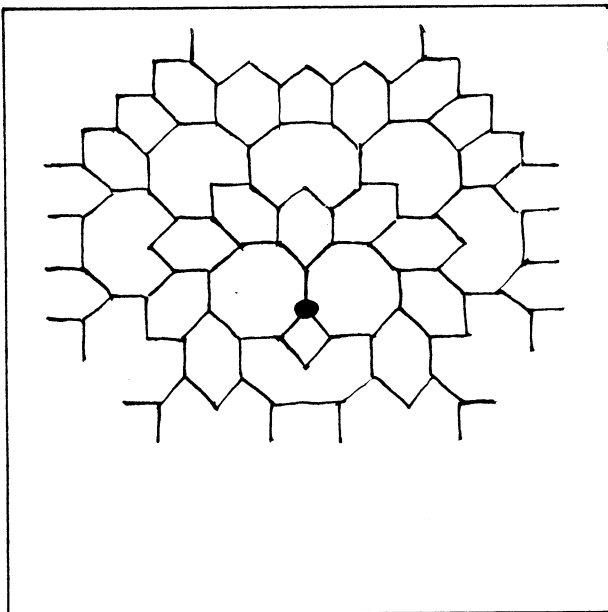
CROSS-EYED OWL

From a central spot a single 'twig' grows upwards. Thereafter from any free twig end two new twigs grow at right angles until they are of unit length or meet another part of the growth. Growth ends when the initial point is reached once again.
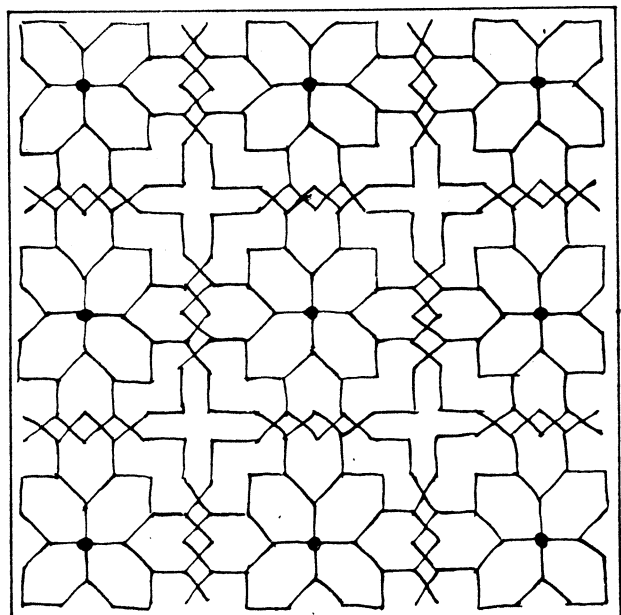
STREWBERRY FIELDS

Seeds are planted at regular intervals (of $4 + 3/\sqrt{2}$ units) apart. Each grows four shoots at right angles, then each of these branch out in pairs of shoots at right angles. Shoots only grow if they have room to reach full (unit) length, without meeting an existing part of the growth.