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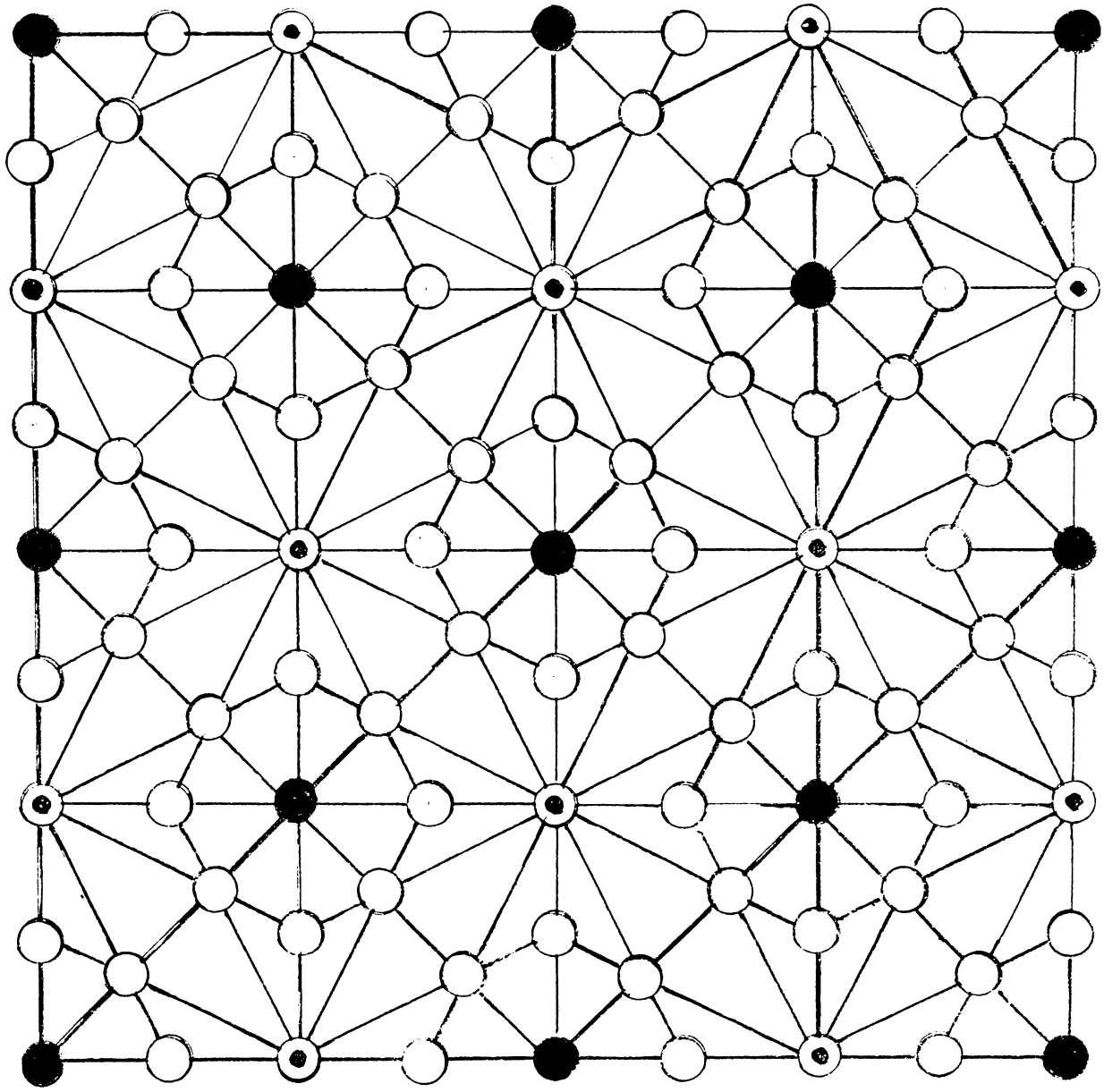


Contents

Zines & Mags

The Games and Puzzles Journal: Please note that I have had to increase the subscription rate to £6 for 6 issues. Those who have already paid are exempt from the extra.

World Game Review from Michael Keller, 3367-I North Chatham Road, Ellicott City, MD 21043, U.S.A. recently published its 8th issue. It began in November 1983, so has averaged one and a third issues per year, but though infrequent it has maintained an excellent standard of quality both in content and production. It is A4 size, averaging 33 pages, and subscription is $8 for four issues. Issues 9 and 10 will be specials, devoted to chess variants and to polyforms (i.e. polyominoes, polyhexes, etc) respectively.

A regular section is 'Cryptophile Cryptofile' by 'Fomalhaut', usually this deals with encrypted language, but in the current issue it provides a comprehensive survey of the history, theory and practice of Cryptarithms - with a competition to compose an original 'ideal doubly true' example, not using addition. (Ideal means using all the digits, a one-to-one correspondence between digits and letters, and a unique solution. Doubly true means true in words as well as figures.)

Another frequent contributor is Robert Abbott of Abbott's New Card Games (1963) which, despite its title, contained the chess multivariant 'Ultima' — which explored the use of alternative forms of capture in place of the 'eviction' capture of ortho-chess. I was interested to note that the name originally proposed for the game was 'Baroque', a term that is current in fairy chess to describe non-eviction captures. I still think this subject is one of the major lines for development of fairy chess in future.

Leonard Gordon's new version of peg solitaire in the current issue also caught my interest. He adds an extra cell to the end of each arm of the 33-cell cross.

Regular features of course, as the name of the journal implies, are reviews and analysis of games and books, both new and old.

Rianna Games Review edited by Anne Nock, 51 Parkland Road, Woodford Green, Essex, IG8 9AP, is a UK zine that didn't get into the list in issue 1 for some reason. It was formerly edited by David Watts, under the title Rostherne Games Review, and is mainly for postal play of his Railway Rivals game. It is one of a handful of zines that have reached or are about to reach the 100th issue (others are NMR and Ode).

Games Monthly was the first of the new professionally produced magazines that I came across in the newsagents. It is colourful and in large easy-to-read print, and looks as if it could be a stayer. To the jaundiced eye of this reviewer its main drawback is lack of original content - in fact a lot of the items so far are extremely old hat - Shogi, Pachisi, Chaturanga, Chinese Chess, Go, Mu Torere and Alfonso Xth are after all long out of copyright! And how can anyone hack out an article on 'Who was the all-time greatest' in Chess without even mentioning Steinitz? But of course there are a lot of young people out there who've never heard of any of these and may be thirsting to find out.

Of interest to me personally was an advertising article in the second (November) issue on 'Enochian Chess' by one 'Hodos Sphaenodon' whose name appears to mean 'Way of the Wedge-toothed'! I am unlikely to buy a set at the £50 asked for, especially as the pieces appear to be cardboard cut-outs such as are found on the back of cereal packets. However the patterns of the boards are evidently based on an arrangement of the I Ching hexagrams on the chessboard (as explained in Chessics 13, 1982) combined with all the four-colour four-sided oriented 'dominoes' totalling 4 to the 4th power = 4 x 64, just enough to cover the four boards provided - one for each season presumably!

Games Review Monthly has more pages, smaller type, and much more to read than Games Monthly but is almost entirely devoted to war-gaming and fantasy role-playing. The layout is tediously repetitive, with quotes from the text interspersed every few centimetres as headings, and full colour only on the outer covers. OK for enthusiasts perhaps, but I can't see it attracting the general public.

Neither magazine contains any puzzles, not even 'find the best continuation', and both October issues enthuse about the forthcoming London Games Fair, which never happened. Better investigative reporting in future I hope!

NEW GAME

Leapfrog

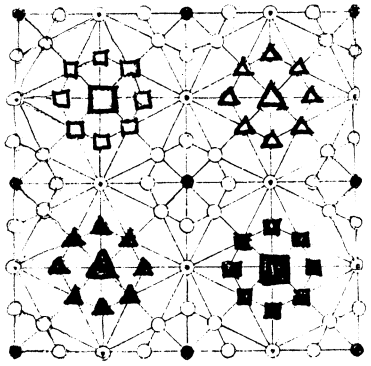
This game, published here for the first time, is played on a special board, illustrated on the front cover, on which it is possible to get from any point to any other by a series of 'leapfrog' moves, that is straight leaps along the lines of the board over one intervening spot (which may or may not be occupied). If you try such a series of leaps on most other boards employed for games you will find that there are some points that cannot be reached from others. For example, on a chessboard a leapfrog hopping along the ranks and files (i.e. a Dabbaba) can only reach a quarter of the squares - and it can do no better if it is allowed to leapfrog diagonally as well. All the moves in Leapfrog are of this type.

The object of the game is to get your King Frog onto the central spot (or lily-pad), where he becomes 'King of the Castle' - or should it be 'Potentate of the Pond'?

The ordinary Frogs - dare I call them Frog Pawns? - move by hopping over one point to the next beyond, along a marked line on the board, regardless of whether the intervening point is vacant or occupied. The King Frogs however are too lumbering to be able to get about unaided, so can only leap over occupied spots - the occupant can be any other piece of any colour.

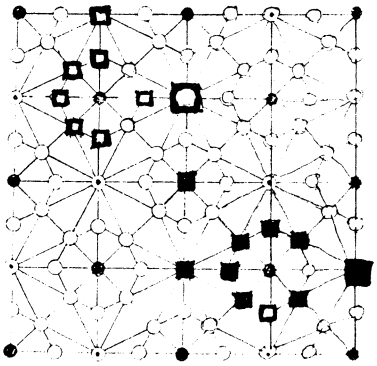
At his turn to play, a player may begin by moving any one of his Frogs any number of leaps. The only restriction is that no Frog may return to a spot it has already occupied or leapt over in that turn - in other words, no switchbacks or circuits - otherwise the move could go on neverendingly.

If the last of these leaps is over another Frog then that Frog is 'tagged' and must itself be moved, if possible. This applies even if it is an opposition Frog - the turn to play thus automatically passing to the opponent (in the multiplayer game this may result in deviation from the otherwise cyclicrotation of the turn to play. The 'tagged' Frog may move any number of leaps similarly, and if that one's last leap is over a Frog, that one must be moved next. Thus it is conceivable that in some special positions a player may be able to move all his Frogs in one turn of play.



Opening position for 4 players

Can you reach this position in one turn of play?



At the start of play each player has his King on one of the four 'lily-pads' surrounding the centre, and his eight acolytes all round him. Thus there is a balanced opening position for two or four players, but a less balanced one for three players - one being between the other two - which may or may not be a disadvantage.

Two players may start with one team each, and these may be placed on adjacent lily pads or on opposite lily pads; alternatively each player may control two teams, which may be placed adjacent to each other or opposite to each other - thus there are four different opening positions to choose from in the two-player game.

There are no captures in Leapfrog, but there are 'displacements'. The last Frog to move in any turn may make displacements - in other words displacing forfeits the right to tag another of one's own pieces. The attacking Frog must leap over an occupied spot on to an opposing Frog which is then displaced - one leap away in any direction the displacer chooses, provided only that the destination spot is vacant. The displacement may be to the spot just vacated by the displacer - so that the two pieces change places. The attacking piece may make several displacements in one turn, and may displace another piece several times. A tempting trick is to displace the opposing King to a spot where it is immobilised because it has no other Frog to leap over.

Strategy Patience

By Philip M.COHEN

My favourite patience (haven't played much lately) is from a book by Geoffrey Mott-Smith and probably invented by him; I think it's called Strategy. Ultimate simplicity. Turn up cards one at a time and place each on any of six initially empty piles. I keep the piles spread downwards so the game is pure strategy, with no remembering what went where. When all 52 cards are down, take cards from the tops of the piles, starting with Aces, and build four piles up in suit to Kings. (In practice, one usually knpws already whether or not this second stage is possible, but blockages - like putting S7 on H5 and later H6 on S6 - can sometimes be missed.) Mott-Smith recommends eight piles, but that may be squared-off piles; without memorization involved, I almost never lose with seven piles., and I recall that I win 25-60% of the time with six, about 2% of the time with five, and twice in my life (on the way to a goal of five or more) with four. So the difficulty is nicely parametrizable.

Following up the above note: I find I have the statistics here from an orgy of play 10-20 years ago. I played 727 games, considering it a loss if I had to go beyond 7 piles. The result was 584 wins (81.3%) at the 7-pile level, 213 (29.3%) at 6 piles, 22 (3.0%) at 5 piles, and 1 (0.1%) at 4 piles. Naturally, if I were playing for 6 piles I would take more chances and the number of wins at 5 and 4 piles would go up a little.

2 - (5) - 8 - Jack - Ace

This is a slightly modified version of another card game that was introduced into my family circles by my youngest brother, from his days at sea. He learnt it under the name of 'On the Dole' but I do not suppose this was the inventor's original name for it. Each player starts with four pennies (or higher denominations if you can afford it) and puts one of these into the central kitty. The loser in each round pays one coin into the kitty (or if there are two or more losers, each puts in one coin). When a player has no coin left he is 'on the dole' and is allowed to play on until he loses again, when he has to drop out - it may be that he can hold on to win. The winner takes all.

For the first round each player receives seven cards (a usual 52 card pack is used) but in the next round only six cards each are dealt, in the third round only five, and so on to the seventh round when each player receives only one. Thereafter the number of cards each receives increases one by one until in round 13 it is back to 7 again, and the cycle is repeated. The turn to deal rotates clockwise. The undealt cards are placed as a face-down pile in the centre, and the dealer turns up the top card, placing it face-up alongside the main pile.

Play normally consists in either placing a card from your hand onto the face-up card in the centre, to match it by rank or suit, or else taking the top card from the face-down pile to add to your hand - the turn then passing to the player to your left. The round ends when one player gets rid of all cards from his hand (when each player has only one card a 'round' may consist of the placement of a single card). The loser is the player whose cards add to the highest total. Aces count 20 for this purpose.

The cards 2, 8, Jack, Ace however modify the play as follows:
2 - forces the next player to 'take two' unless he can also play a 2, which forces his neighbour in turn to 'take four' - and so on to 'take six' and 'take eight' if all the four twos come out together. **8** - instructs the next player to 'miss a go'. **J** - reverses the direction of play to anticlockwise, so that your right-hand neighbour has the next go, and his right-hand neighbour follows, and so on, until another Jack is played (this can be very giddying). **A** - is wild. It may be played on any other card, and may be nominated to be of any suit - only cards of that suit may be played on to it. This is useful for getting out, but carries the danger of being caught with the 20 points.

I've long thought that there ought to be a special use for the 5's also in this game, thus completing the arithmetical progression of special cards, but instead of putting forward my own proposals for its special function I've decided to put it out to tender - in other words I would like to receive your suggestions for its best role.

Sorcerer's Cave

By Stuart McINTYRE

This game is a fairly old fantasy board game (it originally came out about ten years ago!).* It is quite simple but also enjoyable and can be played solitaire. The main advantage is that it has a short set-up time, but does require a lot of space.

Basically, players lay out 'tiles' with various rooms, corridors, etc. on them as they move about in the Sorcerer's Cave, so creating a different cave each time. In rooms, cards are taken showing the various monsters, treasures and events encountered in the cave. Some encounters can be profitable (some allies or treasure gained for the party) or not so profitable (traps, fights and so on). Usually the winner of the game is the player whose party escaped with the most treasure at the end, but other scenarios are suggested. A Lord of the Rings one appealed to me, but the party with the ring were too weak to reach the Deep Pool where they had to dispose of the Ring, even before the party of Trolls caught up with them!

Because of the similarity, it is inevitable that Sorcerer's Cave will be compared with Dungeonquest by Games Workshop, which is also a fantasy game using tiles in the same way (but the Dungeonquest tiles are a lot smaller than the ones in Sorcerer's Cave so less room is required). I think Dungeonquest is the best game for experienced gamers, but Sorcerer's Cave is better for novices or solo play (which is not very good in Dungeonquest), and is also about half the price.

For those of you who have already got Sorcerer's Cave, here are some new rules. I was going to put new designs on the blank cards, but as there were only eight I thought of numbering them and allowing the cards to mean different things on different levels. Numbering them 1 to 8 I then use the appropriate table below to see what I find:

	LEVEL 1-2	LEVEL 3-4	LEVEL 5+
1	U (H1-3, I4-5, F6) Three goblins S2 each carrying one sack of random treasure.	U (H1-4, I5-6) Three orcs, S3 each one has a random item.	U (H1-5, I6) Hydra with 5 heads each (S3) must be killed. Guards 3 sacks of gold.
2	Slime on floor: one party member treads on it and drops all heavy treasure, which is dissolved.	(H1-2, I4-6) Spider, S4, not seen if indifferent, else has free attack.	(H1-5, F6) Vampire, S5/Magic5, Discard non-human strangers, others are zombies.
3	U (H1-4, I5-6) two orcs, S3 each carrying random item each.	U (H1-3, I4-6) Poisonous snake: after combat 50;50 chance.	(H1-3, I4-5, F6) Salamander, S6.
4	(H1-6) Zombies: Any creature drawn with this card, or next.	U (F1-6) Werewolf: appears man but changes sides in next fight.	AC Ancient tomb: 4 skeletons, S4, guard armour (25kg, throw 1-4 saves).
5	AC Shield, saving throw 1-2.	AC Armour, saving throw 1-3 but weighs 25kg	C Soul gem, traps a creature and releases it at any time into the same room or adjacent room.
6	C Bow and arrows: free attack at S2.	C Lightning conductor: free attack at S4.	C Displacer cloak: warps light so wearer not killed on first round.
7	C Magic platform: commanded by wizard or priest, carries 100kg	C left-hand dagger: add one to S, but cannot use shield.	C Fireball gems: free attack on all creatures in a room, S4.
8	C Hypnotic medallion: allows the party to roll all reactions twice, taking best result.	C Wheelbarrow: doubles the users carrying capacity.	C Magic boots: cause earthquake in an adjacent room.

KEY: A = Armour: a saving throw is rolled after a creature is killed and if the right number is rolled the creature is saved by the armour. C = Card or marker needed to show who holds the item. H, I, F = Hostile, Indifferent or Friendly reactions. Free attack = Roll for combat as usual, but if free attacker is killed ignore the result.

[*Terence Donnelly, the game's inventor, had an article on it in Games & Puzzles in 1980. His Mystic Wood game is also still available. It works on similar lines but takes up considerably less room, and is more quick-moving. An extension kit was available for the Sorcerer's Cave but appears to have been discontinued.]

Civilisation

A game that seeks to reconstruct the history of the world would seem to be the ultimate ambition of the Simulationist branch of games philosophy - and this game seeks to do just that - or at least, the history of the Eastern Mediterranean region 'From the Dawn of History to 250BC', and succeeds quite well - though any such project is inevitably open to criticism for being neither didactically sound history nor tactically pure game.

The game was issued in September by H.P.Gibson & Sons Ltd, but appears to have been published previously in 1980 by a Northampton company. The designer, F.G.Tresham, is acknowledged, together with a test and development team. I note also that the game was tried out for postal play in TROG (now ceased). It is currently on offer in Rianna Games Review. It would need careful adaptation for this method of play.

The board, as produced by Gibson's, consists of four parts that fit together in the fashion of a jigsaw. There are seven players (or fewer in special versions) and each is provided with 50+ tokens, these are printed on thick card, ready to be pushed out.

The rules of play, as might be expected, are extensive so only a sketch can be given here. War-gaming is only a part of the strategy - 'the object of the game is to gain a level of overall advancement involving cultural, economic and political factors so that such conflicts as arise are due to rivalry and land shortage' - the level of advancement is measured by accumulation of points. At the start each player has one token valued at one point - representing a nomadic tribe. The tribes expand into nations, form cities, accumulate trading commodities, and acquire arts, crafts, science and law.

The materials traded in, the number of cards of each, and their individual values are as follows: Gold (3) 9, Gems (4) 8, Spice (5) 7, Bronze (6) 6, Cloth (7) 5, Grain (8) 4, Salt (9) 3, Iron (5) 2, Papyrus (5) 2, Hides (7) 1, Ochre (7) 1. In addition, among the trade cards, are 8 catastrophe cards: Piracy, Iconoclasm & Heresy, Civil Disorder, Epidemic, Civil War, Famine, Flood, Volcanic Eruption or Earthquake. There are 74 cards in all.

Trade leads to civilisation, represented by exchange of trade cards for civilisation cards. There are 72 of these in four 'suits': Arts (blue), Sciences (green), Crafts (orange), Civics (pink); some cards belong to two suits. The distribution of these and their values are: Green: Medicine (4) 140, Coinage (4) 110, Astronomy (4) 80. Blue: Music (4) 60, Drama & Poetry (4) 60. Blue-green: Mysticism (3) 30. Blue-pink: Literacy (6) 110, Architecture (6) 80. Pink: Philosophy (5) 240, Democracy (5) 200, Law (7) 170. Orange: Agriculture (4) 110, Metalworking (4) 80, Cloth-making (4) 45, Pottery (4) 45. Orange-green: Engineering (4) 140.

The progress of each player towards civilisation is in five 'epochs', recorded on a progress chart in one corner of the board. To pass into the 2nd epoch one must have built two cities, to pass into the third one must have civilisation cards from three suits. The 4th epoch requires 7 civilisation cards, and the 5th epoch civilisation cards totalling 1000 points. After these hurdles it is then a race for the finish line.

There is no dice play. Each round the population of each zone is increased by two units (or by one in the case of a zone of one unit) and each unit may move across one boundary. Population movement is forced because each zone has a specified maximum population it can support. Population pressure can also be eased by bringing six units together to form a city, on one of the city sites marked on the map. Conflict results when two, or more, players try to occupy the same zone and exceed the limit it can support. The basic rule is that both combatants reduce their population in the area by equal amounts, but possession of metalworking craft will give extra advantage.

There is also provision for ship-building, to permit faster migration. A ship costs two units, plus regular maintenance, and carries up to 5 tokens a distance of 4 zones along the coast. Possession of cloth-making for sails speeds the vessels, and astronomy enables sea navigation. This is perhaps the most original aspect of the game.

Possession of civilisation cards gives advantages against calamities, e.g. medicine against epidemic, engineering against flood, agriculture against famine. law democracy and philosophy against civil war or disorder.

An ambitious game, difficult to evaluate without extensive playing experience. If it is all too much to take in at one gulp, the simplified versions, Nomads and Seafarers, or Farmers and Citizens, can be played on the same board.

CHESSAYS

The series of Chessays is at last back in print. I was unable to keep numbers 1 and 2 in print because the price was set too low to cover the increasing costs of production, and difficulties in printing the card covers; and the larger size for number 3 proved too ambitious, so the new editions (and others planned) are all in the A5 format, and all with green paper covers. The text has been reset throughout in justified type. The Power of the Pieces has lost it's Appendix of fairy examples, but most of these will appear again in All the King's Men. John Driver's MS has waited ten years to get into print and it has not been possible to include the solutions in detail with individual comments on each one, instead selected comments on particular themes have been edited together into an introductory commentary. Some of the more mathematical topics that I was planning as 'chessays' will now be issued as a separate 'Puzzle Box' series. The titles listed will be based on the special issues of Chessics (22, 24, 26, 28) with amendments.

1. **Deceptive Chess Problems**
   C.C.LYTTON
2. **Schiffs with Everything**
   R.C.McWILLIAM
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   J.F.LING
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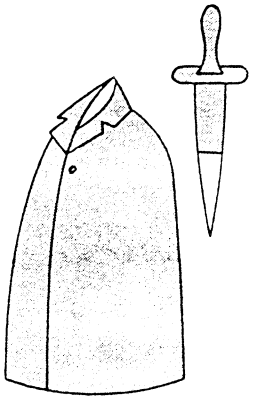


CHESSICS

Did Chess Originate in China or India?

This is the question posed in a book privately published by Pavle Bidev at Igalo, Yugoslavia in 1986. The author sent a copy to me via John Nunn in February 1987 and I sent it to Anthony Dickins to review, but he was too ill to do so and died later that year. I have since learnt that Professor Bidev has also died - possibly still disappointed at the lack of attention of the chess world to his theories - though articles by him, and a review of the book did at least appear in the British Chess Magazine before he died. The book is mainly a collage of previously published articles poorly photocopied and bound together and is not available for sale. It is in two parts - 304 pages of German text and 88 of English, with considerable overlap between the two.

Anthony Dickins had long supported the theory of the Chinese origin of Chess, as expounded in his 1973 article in the BCM and in A Short History of Fairy Chess (1975). He wrote in March 1987: "Personally I have little doubt about the Chinese origins of Chess; at least in the sense that the original 'proto-chess' was the Chinese 'divination' board, which travelled westward and was modified on reaching India to become the 64-square 'modern chess', a modification of protochess, about the end of the 6th century. I would agree therefore that the modern game on the 64-square board (the Indian ashtapada board adapted) with standing pieces as opposed to flat discs, began in India. But I feel sure that it was only a modification of the Chinese proto-chess of many centuries earlier date."

My own view, from the limited evidence available in print, and not having access to original sources, is that there is really very little evidence to point to any one origin of chess, but plenty of room for speculation. I am content to accept that chess originated in the 'Far East' and that chess ideas manifested themselves in India, Burma, Siam and China in a range of similar but varied forms; but why should all of the ideas have come from one place, let alone one man? Could not some of the ideas have originated in India and some in China and have come together, say in Siam, and have passed back and forth, both ways - each people casting the same building blocks together in their own distinctive way to suit their own predilections? The speculations concerning astromantic and divinatory practices in relation to games pieces (magnetised or not) cast upon a board, seem to me to have no certain relation to chess at all - perhaps to Go or Pachisi. The problem with such accounts is that it is very difficult for a modern mind to try to think in the same mystical-magical-superstitious way that presumably was prevalent in those pre-scientific times. Bidev's attempts to explain chess moves, etc, as arising out of the structure of magic squares, 3x3 or 8x8 or 9x9, seems to me to be a case of putting the cart before the horse - of explaining the simple in terms of the complex. Possibly the Chinese were influenced in casting their chess in the 9-file form by their devotion to the 3x3 magic square, and the Indians influenced to use the 8x8 board by their (much later) discovery of pandiagonal squares of this size - but this again is pure speculation.

Notes for Solvers

In the problems in this issue: Paos move like Rooks and capture along Rook lines but only after hopping over one man. Vaos similarly move like Bishops and capture diagonally by hopping over one man to land on the victim. The Pao is the Cannon in Chinese Chess. e.g. in **85** Pao h1 pins h2 and h3, Vao h2 pins g3 and c7. The Nightrider is analogous to Rook or Bishop but acts along straight lines of Knight moves. The Rose similarly acts along bent lines of Knight moves. e.g. in **82** Rose a5 guards f7 via c4 and e5 and guards e1 via c6, e5 and f3. In Reflex Chess, **83**, if either player can mate he must do so. Reflexmate is Selfmate in Reflex Chess. i.e. White has to play so Black is obliged to checkmate.

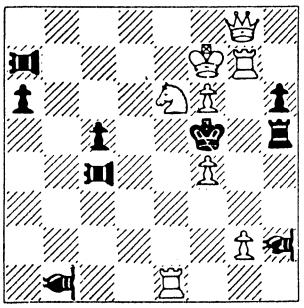
For Seriesplay, Helpmate, Grasshoppers and Circe Chess, see earlier issues of the journal. The Edgehog in **86** is a Queen that can only move from edge to non-edge square, or vice versa. **91** and **92** are 'zeropositions', i.e. you do not solve from the diagram position but make a change first. There is no WK in **92.** In Circe Malefique the captured pieces are replaced on the home squares of the other player (but do not change colour). The aim in **94 - 96** is Stalemate.

Solvers Scores for last issue: R.Brain, S.Pantazis and T.G.Pollard 36, A.W.Ingleton 32, Erich Bartel and D.Nixon 26. Apologies for delay in sending out overseas copies.

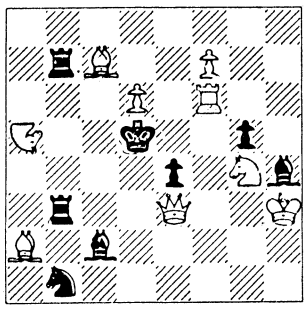
Caissa's Kaleidoscope

Judge for 1987-8: Hans Gruber

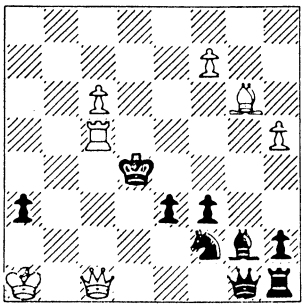
81. A.MOCHALKIN
Paos & Vaos
Mate in 2



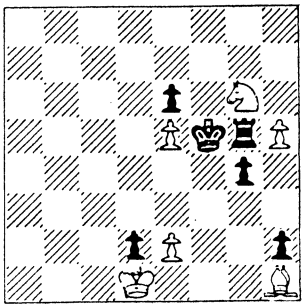
82. A.MOCHALKIN
(a) Nightrider a5
(b) Rose a5. Mate in 2



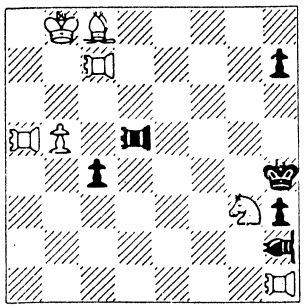
83. Th.TAUBER
Reflexmate in 2
with set play



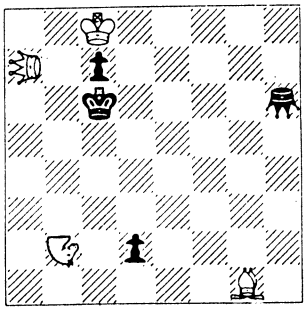
84. S.J.G.TAYLOR
Serieshelpmate
in 8



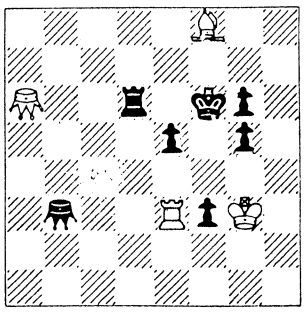
85. A.W.INGLETON
Paos & Vaos
Help‡2, two ways



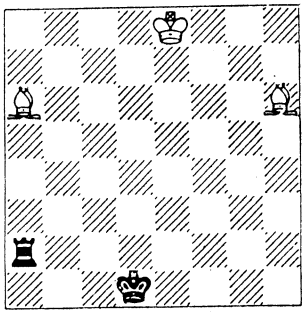
86. G.BAKCSI
Edgehog a7, N & G
Help‡2, three ways



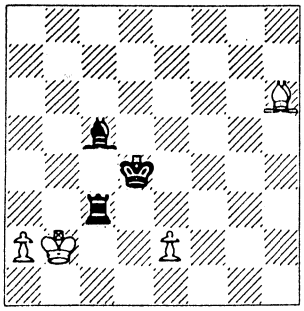
87. A.MOCHALKIN
Grasshoppers H‡2
(b) White Pawn f3.



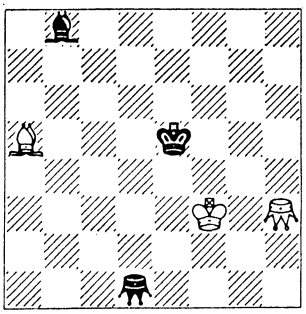
88. A.MOCHALKIN
Circe Chess
Help‡2, two ways



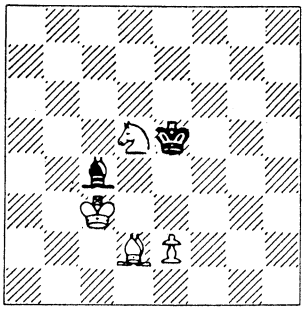
89. H.GRUBERT
Helpmate in 3
(b) a2 - a4



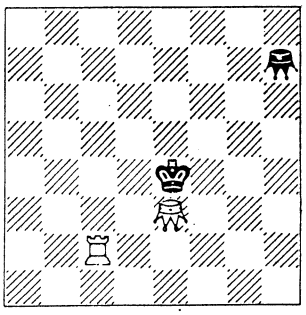
90. H.GRUBERT
Helpmate in 3
two ways



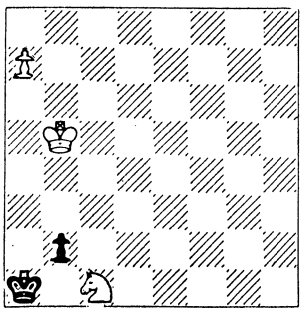
91. F.M.MIHALEK
H‡3 (a) Remove a-file
(b) d2 ↔ e2



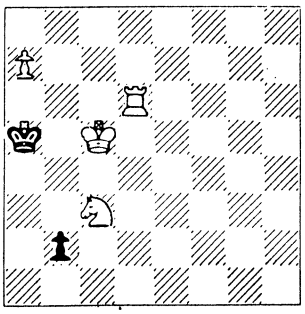
92. A.W.INGLETON
H‡5 (a) c2-f5 (b) c2-f6
(c) e3-d6 (d) h7-f5 in (c)



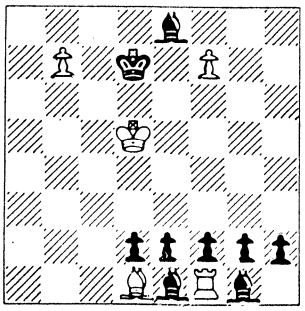
93. Erich BARTEL
H‡2 (a) Orthodox
(b) Circe Malefique



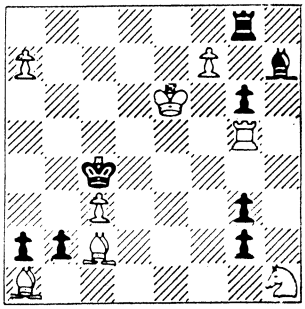
94. Erich BARTEL
Circe Malefique
HP2, two ways



95. Th.STEUDEL
Circe Chess
Helpstalemate in 2



96. Th STEUDEL
Circe Chess
Helpstalemate in 2½



Solutions to reach me by 15th January 1989

Solutions and Comments on Chess Problems

Solutions to Issue 5+6

65. BORODATOV. (a) 'No Parking': White moved last so: 1...fe 2e8=Q/R‡
(b) 'End of Limitations': Black could have moved last (exd) so 1Bxd6‡

66. MIHALEK. Upper left: 1Qa3 (Kxb5 2Qb4+ Ka6 3Qb6‡) (Kd4 2Qe3+ Kc4 3Rc5‡)
Lower right: Ke5 Kg4 2Rh2 Kf3 3Be2‡ Nice R sacrifice in (a) [E.B.]

67. HOLLADAY. 1Sd6 Kb4 2Kc2 Ka5/Kc5 3Sbc4 (Ka4 4Bc6+ Kb4 5Ba3‡) (Kb4 4Ba3+ Ka4 5Bc6‡) and 1Bc6 Kb4 2Ba3+ Ka5 3Bc5 Ka6 4Sc7+ Ka5/Ka7 5Sc4/Sd7‡ Asymmetry.
Old fashioned mating net [S.P.] This was too 'orthodox' for most of our solvers.

68. BORODATOV. The last moves were: 1Qf3-c6+ Kc6-d7 2ed e.p.+ d7-d5 (earlier f7xSe6) 3e4-e5 + Kb7xSc6! 4Kb5-c4+ Ka8-b7 5Sb8-c6+ Kb7-a8. All missing Black men were captured by WPs. A puzzling sequence and VG [D.N.].

69. BARTEL. 1...b8=B 2Qf8 gf=B stalemate. 1Qa2! g8=S 2Qa8 ba=S stalemate.
A neat change of matched promotions. [D.N.] Elegant [R.B.]

70. MIHALEK. (a) 1g1=B Sf1 2Rh2 Sxg3‡ (b) 1g1=S+ Kxg3 2Rf2 Sxf2‡ (c) 1g1=R Sg4 2Bh2 Sf2‡.
Shape problem. Neat multi-promotion miniature [A.I.] (a) and (c) are orthodox twins but surely the third underpromotion in (b) is too good to refuse! [S.P.]

71. HOLLADAY. (a) 1Sf1 Sd5 2Ke2 Ke4 3Qf2 Sc3‡ (b) 1Qh1 Sd5 2Kg2 Kg4 3Rf2 Se3‡.
Remarkable twinning for a letter problem [D.N.] J - for jolly good! [R.B.]

72. JELLISS. Set Ge1‡. (a) Cooks in 6: 1Gxh2 2Ff2 3Fg3 4Gf4 5Ff2/h2 6Fg1 for Ge4‡
(b) 1Gxh2 2Ff2 3-5Ke2 6Fe3 7Gf2 8Gd2 9Kf2 10Gxg2 11Ke2 12Gd2 13Gf2 14-16Kh1 17Gd4 18Ff2 19Gg1 20Fg3 21Fh2 for Kg3‡ Royal precedence does seem to fix the move order in this solution. Most solvers didn't altogether approve of it however.

73. MIHALEK. 1Qh6 Sf2 2Kh5 Se4 stalemate. Two nice Circe pins [E.B.] The point is the dual avoidance in the guard of g5 [S.P.] Remarkable only one route available for S [A.I.]

74. HOLLADAY. (a) 1Rg1 Rf1 2Bb3 Ke1 3Ke3= and 1Re1 Rd1 2Kd4 Kc1+ 3Kc3=
(b) 1Bg3 Rxc1 (Ra1) 2Rb1 Kd1 3Kd3= and 1Re1+ Rxe1 (Ra1) 2Rd1 Kf1+ 3Kf3=
Wonderful fourfold echo [E.B.] Elegant harmony [A.I.] Two of five units move for twin, but content (two pairs of reflections) easily carries this [S.P.] The composer notes that: While the stalemates are symmetrically arranged theplay leading to them is not, and the strategy in the two parts is different.

75. BARTEL. 1e1=S Kc1 2Sc2 Kxc2= and 1e1=B Kc1 2Bd2+ Sxd2= and 1e1=R Sbd2 2Ra1 Kxa1 and 1e1=Q Sbc3 2Qd1 Sxd1= Easy but good [D.N.] Amusing AUW [A.I.]

76. JELLISS. Black: 1Ne3 2Nc2(Cg6) 3Na1 for 1Cd5 2Cg4‡ (Now Nxg4? Cc8 still checks).
White: 1Cf1(Nb5) 2Ce4 3Cd1 for 1Ka1 2Nf7‡ (Now Cxf7? Nb3 still checks). But there are cooks in both parts due to mobility of the knight. Also White: 1Nh5 2Nd7 3Na1 for 1Cf1 or d5 2Cg4‡ [S.P.] No elegant cure occurs to me as yet.

77. GRUBERT. Black: 1Kd6 Kd4 2Zc6 Zg4‡ White: 1Kd2 Kd4 2Ze2 Za4‡ Colour-reversing echo [A.I.] If WK started at c3 or BK at d5 the problem would be pseudo-duplex [G.P.J]

78. GRUBERT. (a) 1Kd6 Kc4 2Bc6 Zg4‡ (b) 1Ke5 Bc3 2Bd5 Zh3‡ Another perfect echo [A.I.]

79. JELLISS. 1...Kd3 2Fe5 Se7‡ 1Ke4 Ke2 2Fe5 Sd6‡ Lateral transflection exact echo.

80. PRIBYLINEC. Left: 1a3 Gb1 2Ka4 b4‡ Right: 1...Gd4 2Gf2 Kg3‡ 1Gf2 Kg3+ 2Kg1 Kh3‡
Contrasting mating moves - second half had me guessing for quite a while [A.I.]
Goes up a notch with the set play [S.P.] Author also had twin to (b) with BKh5 and play as in (a), but in this the WGf7 is redundant. (b) Model! [D.N.]

Heterochess Olympics

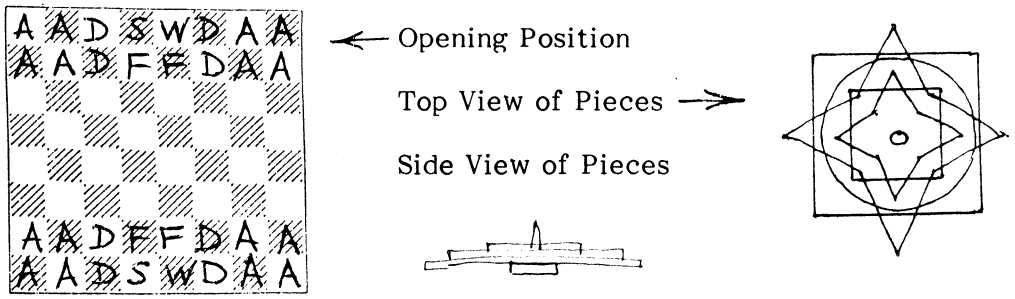
After many delays the Heterochess Olympics, organised by Italy, got under way at last at the end of October, with teams representing Canada, Czechoslovakia, New Zealand, UK, USA and three from Italy. Eight different variants are being played - mostly versions of Progressive chess, so the games should be finished quite quickly once they get going. At time of writing I still have to hear from three of my opponents, while some games have already reached move 4. The teams are of varying sizes - 3 to 7 - so that some players will have to work much harder than others. Michael Keller in the 3-man US team has to play 19 opponents in 5 different variants! Fortunately I only have to master one variant - Mutation chess - against 7 opponents. I hope to be able to print the moves of some of the games in due course.

Escalation

Escalation is an elaborate chess variant which I made a note of having invented as long ago as 10th June 1973! I've never previously published an account, mainly because I have never devised an entirely satisfactory practical method of representing all the many possible powers of the pieces. Escalation employs the most elementary pieces that are possible on the chessboard, but they expand their powers during the play as a result of captures and promotions. It is based on 'leapers' and 'riders'.

For readers not familiar with generalised chess jargon an (r,s) leaper is a piece that moves from square [a,b] to any of the squares [a±r,b±s] or [a±s,b±r] and an (r,s) rider is a piece that can make any number of (r,s) leaps in one go in a straight line, provided the intermediate squares the leaps enter are vacant. At the start of a game of Escalation the players have only single-pattern leapers of various sorts. As these capture opposing men they add the powers of these men to their own initial powers, thus becoming multi-pattern leapers. Furthermore, when any leaper reaches the opponent's back rank all its components promote to the corresponding rider. Hybrid pieces formed by leapers capturing riders or vice versa do not promote.

All the (r,s) leapers possible with r and s not greater than 2 are the five types: (0,1), (1,1), (0,2), (1,2), (2,2) named respectively Wazir, Fers, Dabbaba, Knight, Alfil. In Escalation, each player starts with a force of 16 men, consisting of: 1 Wazir, 1 Knight, 2 Fers, 4 Dabbaba, 8 Alfil, arranged as shown. The reason for these numbers of each type of piece lie in their respective mobilities: The Wazir and Knight are free-leapers, able to reach any square from any other in a series of moves. The Fers however is confined to squares of one colour, i.e. to half the squares of the board, so there are two - one on white squares and one on black. The Dabbaba is confined to alternate squares of one colour, i.e. to a quarter of the board, so there are 4 of them. An Alfil can reach only 8 different squares, so 8 are needed to command the whole board.



I have made a workable set in which the pieces are flat shapes, placed over drawing pins which stand on their heads. The card used is a different colour on the other side, so that when turned over the new colour indicates promotion to rider. Square shapes indicate Wazir and Dabbaba, Star shapes indicate Fers and Alfil, and the Knight is a Circle. The shapes can be piled on top of one another and still remain partially visible, so that all the components of the piece are indicated.

The Wazir, which is the only piece unable to move in the opening position, is royal, i.e. its loss signifies the end of the game. The Wazir retains its royalty when it captures or promotes. If it acquires riding powers however it is not allowed to ride through check. As in chess, checkmate where the royal piece is in check and cannot avoid capture is a win, but stalemate where capture is unavoidable but there is no check is a draw. A very short Fool's Mate is possible: 1g2-e4 idle move 2e4-g6 mate, but this is easily defended by freeing the royal Wazir to move away from check.

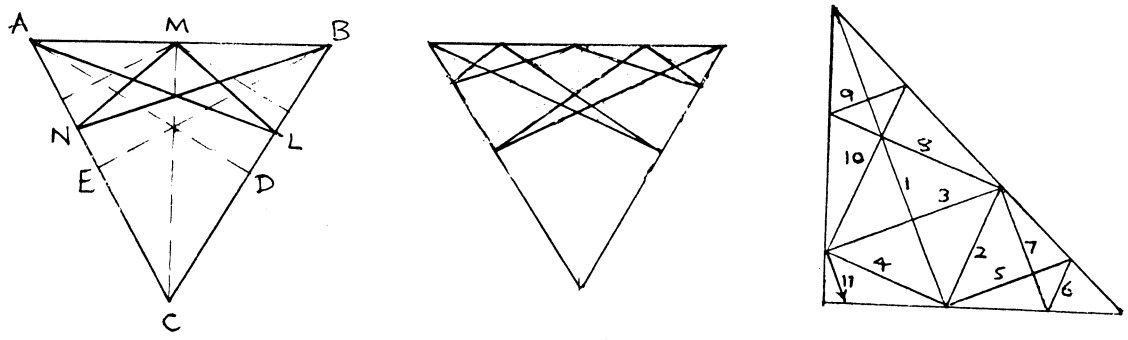
In all, 31 different types of leaper are possible, and the 31 corresponding riders. In addition there are 180 possible hybrid leaper/rider combinations.

A 12-page bulletin of the Speelman v Short World Championship Quarter Final held in August, is available from the BCF, 9a Grand Parade, St Leonards on Sea, TN38 0DD, for £2 (for an extra £1 you also get the 24-page programme, with portraits of the players).

Triangular Billiards

Problem 6. To cue a ball from one corner to another on a regular triangular table, not direct along the cushion, takes a minimum of 4 'moves' as shown, and the ball must be cued at 19.1° to the side joining the two corners. The triangles BLM and CLA are similar (same angles) and in ratio 1 to 2 (M being the mid-point of AB which equals AC), thus L is a point of trisection of BC (LC = 2LB). Angle LAB = 30° - angle LAD = 30° - $\tan^{-1}$ LD/DA = 30° - $\tan^{-1}$ (1/6)/($\sqrt{3}$/2) = 30° - $\tan^{-1}$ 0.19245 = 30° - 10.9° (approx.)

The next case takes 8 moves, as illustrated.



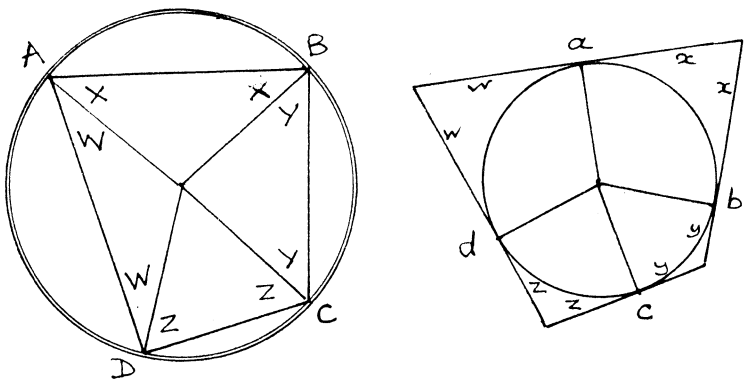
Problem 7. On a half-square triangular billiard table a ball is cued to bisect one of the 45° angles. The diagram shows its first 11 'moves'. The 7th move is parallel but in the opposite sense. The 11th move is parallel in the same sense. The next moves with this property are the 15th and 25th.

4-gon Conclusion?

A quadrilateral whose angles are A, B, C, D, and whose sides are a, b, c, d, named in cyclic order, has a circumcircle if and only if A+C = B+D and has an incircle if and only if a+c = b+d, thus a quadrilateral with both circumcircle and incircle must satisfy both these conditions. The usual term for such a quadrilateral is 'bicentric'.

The first of these propositions, taking account of the fact that A+B+C+D = 360°, so that A+C and B+D are both 180°,is Euclid III.22, but he does not seem to mention the analogous result for the incircle. It is given in N.A.Court, College Geometry, (Barnes & Noble, 1964) pp135-6.

If two angles and the side joining them are given, then a bicentric quadrilateral is determined: draw a circle to touch the three lines, then the fourth side is the tangent to this circle that is 'antiparallel' to the given side (i.e. it makes angles B, A with the other two sides, instead of A, B which a parallel would do). Similarly, given two sides and the included angle, the fourth point is on the circumcircle, and divides the arc between the two arms of the angle in the ratio of the two sides reversed; b to a.

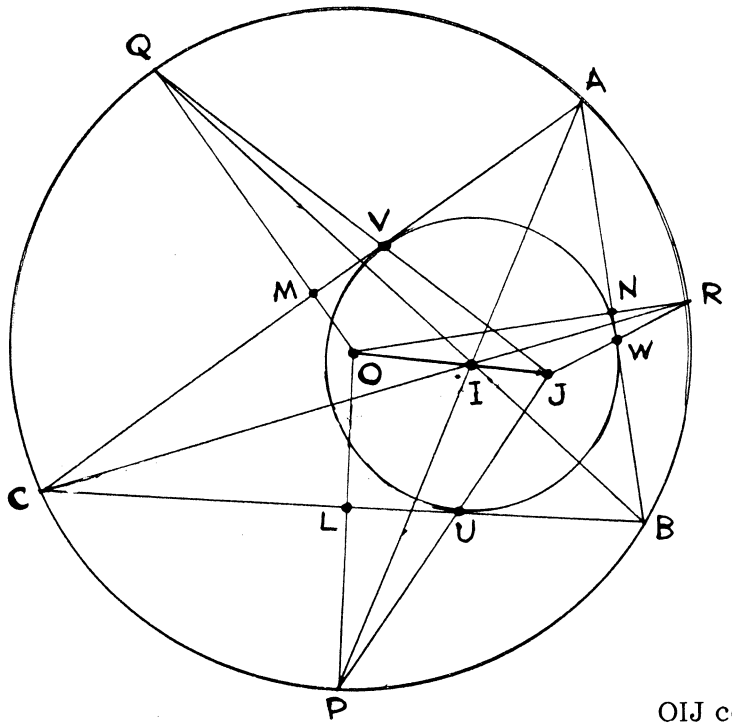


A + C = W + X + Y + Z = B + D a + c = w + x + y + z = b + d

Special cases are: Trapeziums (with A=B), Kites (with a=b) and Squares (satisfying both these conditions).

GEOMETRY

The Centres of a Triangle



Consider the figure formed by a triangle ABC together with its in-circle and circum-circle. The angle bisectors (through the incentre I) and the side bisectors (through the circumcentre O) meet at PQR on the circumcircle, bisecting the arcs BC, CA, AB [Angles subtended by equal arcs are equal - Euclid III.27]

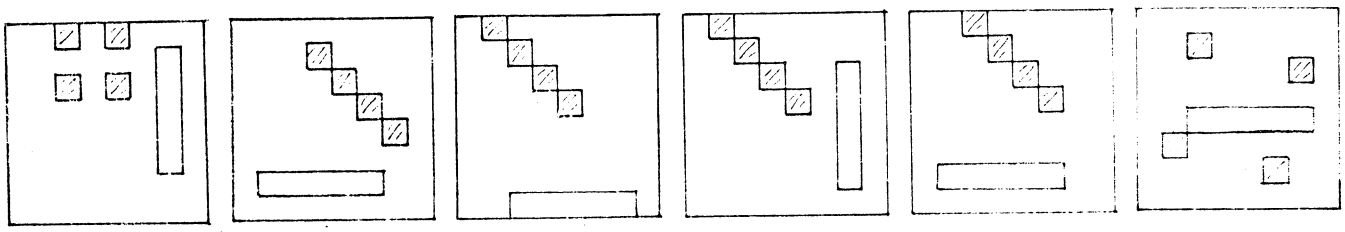
These points PQR, when joined to the points of contact, UVW, of the incircle with the triangle ABC, give lines PU, QV, RW that concur at the centre of similitude J of the two circles. J is of course on the line of centres OI, and JO/JI = R/r the ratio of circumradius to inradius. [e.g. OR/IW in the similar triangles JOR and JIW; OR being parallel to IW since both are perpendicular to AB].

OIJ coincides with the Euler line OGH only when the triangle is isosceles.

DISSECTIONS

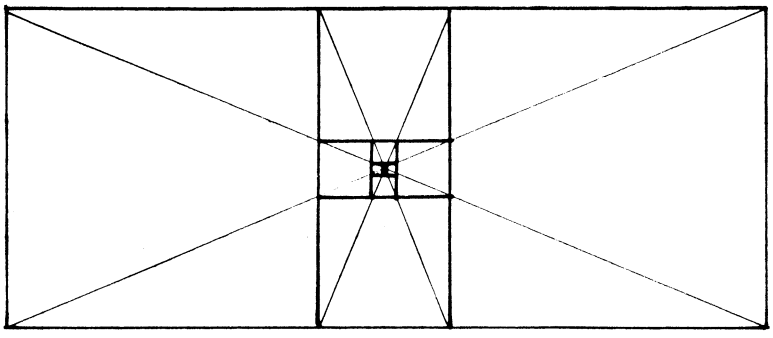
Pentominoes

Here are some more of Sivy FARHI's dissections: complete them by adding the missing 11 pentominoes in the only way possible. I have mislaid the solutions to the previous batch (p.57) and find they are more difficult to reconstruct than I thought!



Squaring the Rectangle

What shape of rectangle do we have if we can remove m squares at every stage of the dissection process? The rectangle produced at each stage of the process has the same ratio of sides as the original rectangle, and so we have the relation $s = 1/(m+s)$. Hence $s^2 + ms - 1 = 0$ and so $s = (\sqrt{(m^2-4)} - m)/2$. When $m = 2$ we have $s = \sqrt{2} - 1$. In this case we can take the two squares from opposite ends of the rectangle each time, to give the symmetrical pattern illustrated. A similar symmetrical pattern is possible whenever m is even. If $m = 2k$ then $s = \sqrt{(k^2+1)} - k$.



More dissections on the back page.

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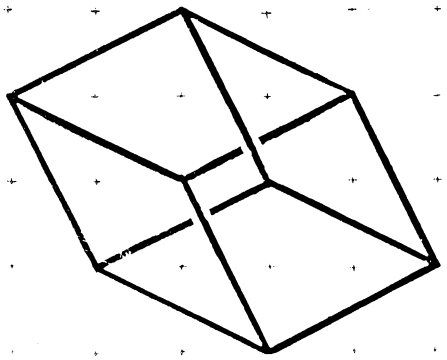

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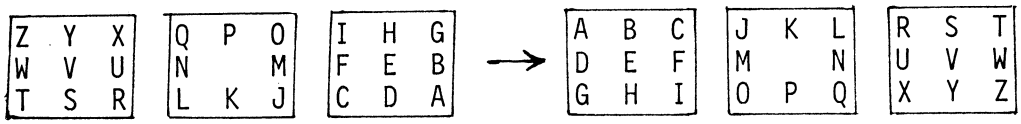
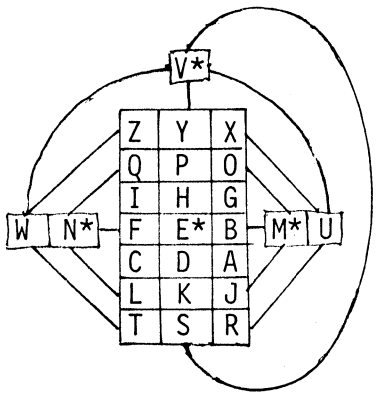
PUZZLE QUESTIONS AND ANSWERS

The Alphabetical Cube

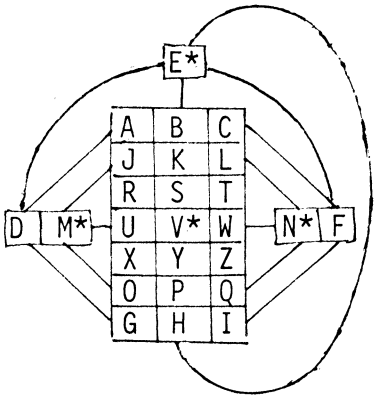
Len GORDON offers the following analysis of the problem posed on page 59, issue 4, concerning disordering and rearranging the 26 letters placed in the 27 cells of a 3 x 3 cube. "Clearly, an arrangement with every cube reflected about the centre will have the maximum total displacement. This however has an odd number of exchanges, 13. So let's make one additional exchange (BxD) which does not reduce the total displacement. I offer the following puzzle" (related to the problem stated):



The total displacement is: 8 cubes of type A, 6x8=48; 12 of type B, 4x12=48; 6 of type E, 2x6=12. In addition, types E and V interfere with each other getting home, which costs 2x3=6 moves. The least possible moves is therefore 48+48+12+6 = 114. The best I have achieved in practice is 156 moves as follows:



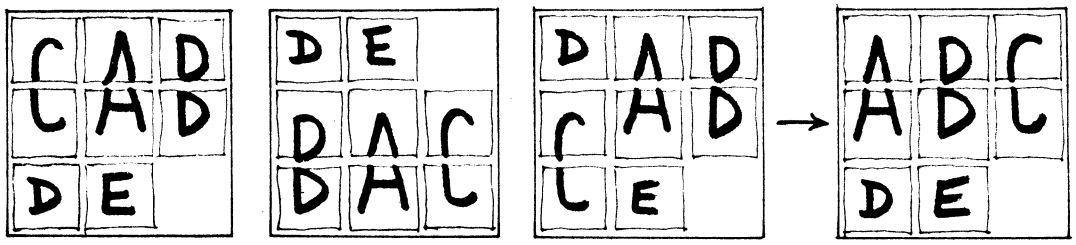
NFEDA BMUVW FEDMU VWFED MUVWF
EDMUD WN V ABWGH IUCBW
GHIUC BLKJG HIOPQ CBAWJ SRGHI
OPQYZ CBALK TRGHI OPQXZ CBALK
JSTRG HIOPQ XYUWS TOPQX YZCBA
LKJRO PQXYZ ULKJS TXYZU LKJSR
XYZUW TUWTS RU V



This solution was found by working with a 2-D equivalent of the Alphabetical cube. All the cells are shown except the central one, which is connected to the four cells marked with an asterisk. "I first slide those blocks needed to get an intermediate position which allows finishing with a 2-D 3x7 puzzle. Removing and replacing the V is equivalent to sliding V into and out of the central space of the cube." Mr Gordon comments that there is little that can be added in a 3-D puzzle that cannot be done by extending the 2-D game.

An ABC Sliding Block Puzzle

The solution to Jerry GORDON's puzzle is in 22 moves as follows: Numbering the unit square spaces 1 to 9 and giving the squares successively occupied by the space or hole: 65412 36985 21456 32145 89. He gives three other cases that solve uniquely in 22 moves and 19 other cases with shorter or multiple solutions.



Letter Zig-Zags

Dr PRIBYLINEC gave solutions to all three problems in 10 moves, but the first can be solved in fewer moves, as follows: (a) 1Sb5 2Ga4 3Ab4 4Mc4 5Ed4 6Sd5 7Se4 = GAMES. (b) 1Sg3 2Ef3 3Zc3 4Ld3 5Le3 6Uc2 7Ub3 8Zd3 9Pc5 10Pa3 = PUZZLES and (c) 1Ad5 2Jb3 3Ja2 4Uc2 5Rd1 6Ad2 7Af2 8Nd3 9Jd2 10Ne2 = JOURNAL.

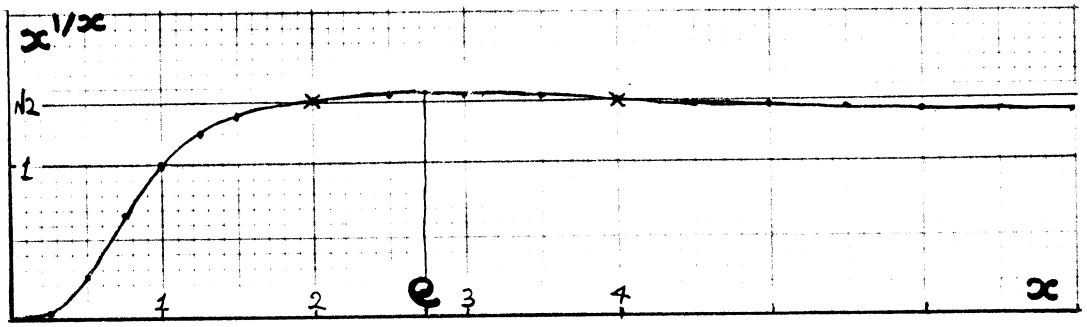
Unbalanced Magic Squares

The two unbalanced magic series are: 1, 9, 11, 13 and 4, 6, 8, 16 and a magic square using them in the diagonals is shown alongside.

1	14	15	4
12	9	6	7
5	8	11	10
16	3	2	13

Exponentiation

Clive GRIMSTONE provided a visualisation of the exponential number, e, by means of the graph of $x^{1/x}$ shown below. The maximum occurs at x = e and is $e^{1/e}$ = 1·4446678. For all values of x greater than 1, $x^{1/x}$ is greater than 1. The only solution to $x^y = y^x$ with x < y and x, y integers is x = 2, y = 4, since 2 is the only integer between 1 and e.



Prime Permutability

Tom MARLOW writes: "On the question of permutable primes there is a paper by C.K.CALDWELL in Journal of Recreational Maths 19(2) p135 1987 in which he mentions that 991 is the largest known such prime" not a repunit, and: "He goes on to establish that if there are others they have at least 476 digits."

"A related question I have looked at is this. Let p be the number of prime permutations of an integer (there may be other non-prime permutations) of n digits. What is the largest p for each value of n? The ideal is p = n! but apart from the trivial case of a single digit the only ideal permutable primes are 13, 17, 37 and 79 and their reverses." The longer permutable primes all have repeated digits which reduce the total of different numbers that result when they are permuted. What is the maximum value of p for numbers of 3, 4, 5, 6, ... digits? and for what numbers are they attained?

In the list of Mersenne powers on p90 81 is a misprint for 89.

Circular Primes

The primes of 3 to 6 digits that are circularly permutable but not in the list of permutable primes given previously are: 197, 1193, 3779, 11939, 19937, 193939, 199933, and their circular permutes (e.g. 197 gives 971 and 719). Gareth SUGGETT writes that these appear to be all within the integer limits of the BBC micro.

Golden Sequences

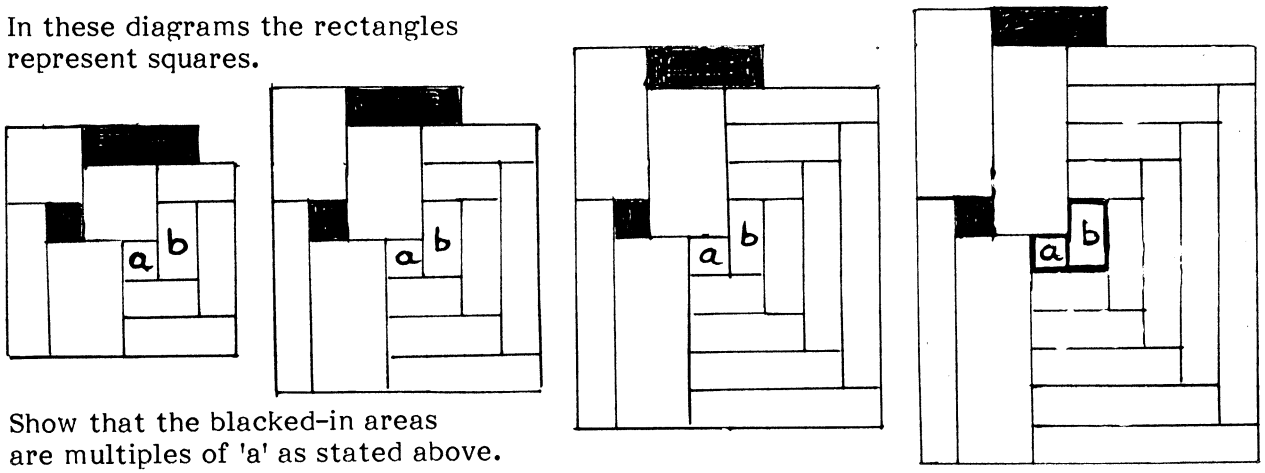
If we start with a rectangle a x b and add a square to its longest side, then a square to the longest side of the new rectangle, and so on, the sequence of lengths of sides of the rectangles will be: a, b, a+b, a+2b, 2a+3b, 3a+5b, 5a+8b, 8a+13b, 13a+21b and so on. The coefficients of a and b here are of course the successive numbers in the Fibonacci sequence, which is what we get if a = 1 and b = 2, viz: 1, 2, 3, 5, 8, 13, 21, ... where each term after the first two is the sum of the two preceeding.

A Gnomonic Question

By T.H.WILLCOCKS

Anyone attempting the problem will soon find that solutions for various numbers may be found in the form of series. The following procedure provides two arithmetic progressions: 5-6-7-8-··· and 19-23-27-31-··· and thus, in conjunction with the cases for 1 and 4 shown last time, solve all cases except 2 and 3. However, this procedure is prodigal with squares and probably in few cases would yield minimal solutions. More on this later.

In these diagrams the rectangles represent squares.



Show that the blacked-in areas are multiples of 'a' as stated above.

Bridge Auctions

T.H.WILLCOCKS recalled seeing John Beasley's Bridge Puzzle **1** previously in a book: Mathematical Puzzles by Stephen Ainley (G.Bell & Sons, 1977) pages 69, 74-75. Ainley gives a different total for the number of bidding sequences: $(4 \times 2^{35} - 1)/3$.

John BEASLEY responds: "Ainley is right. Very sorry. It took me quite a while to find the fallacy. My argument amounts to this: because the first bid can be preceded by three passes instead of two, there are 29 options for 'one club' instead of the usual 22. Put like this, the fallacy is obvious; there are actually 29 options for the first bid, even if it isn't 'one club'. If 'one club' isn't bid, 'one diamond' inherits the 29 options; if 'one diamond' isn't bid either, 'one heart' inherits; and so on. So my figure is a little low, an explicit calculation for n=1 confirms Ainley's."

The conclusion that there is always at least one bidding sequence that cannot occur is of course unaffected.

A Jigsaw Puzzle Puzzle

By K.A.L.ANDERSSON

If every part of the puzzle had had 0.5 gram of application stuff around it from the beginning, then every internal piece would have 1 gram of glue around it, as required. When there are 400 pieces the perimeter of the whole pattern (the same shape as one piece) will be $\sqrt{400} = 20$ times the perimeter of a single piece, so the total glue needed is $400 \times 0.5 - 20 \times 0.5 = 190$ (grams).

There's a Hole in my Bucket...

By K.A.L.ANDERSSON

The author claims the answer is 1h 42min 30s, but I make it 1h 36min, as follows: If filling rate is F and sinkback rate is S then time to fill to 1 unit is $1/(F-S)$ and time to empty is $1/S$, this takes 1 hour in all, so $1 = 1/(F-S) + 1/S$, whence $F=S^2/(S-1)$. We are told that doubling S gives the same time, so we also have $F=4S^2/(2S-1)$ and from these two expressions for F we find S = 1·5 units per hour, and F is 4·5. Halving the sink-back rate gives the time $1/(4{\cdot}5 - 0{\cdot}75) + 1/0{\cdot}75 = 1{\cdot}6$ hours = 1h 36 min

Self-Documenting Sentences

Tom MARLOW writes: "I can now almost guarantee to produce a self-documenting sentence containing specified words, given a day or two of computer time. I recently made one for the son of a friend reading '...was created for...to mark his twenty first birthday...'. So if you have any request I can probably oblige." Any requests?

Philip COHEN wrote that 'self-documenting sentences' is an index entry in Meta-magical Themas by Douglas Hofstadter.

Unscrabbleable Words

The universal opinion is that the shortest unscrabbleable word is PAZZAZZ, or the same with I for the first A (both are in Chambers 1983). More varied are nearly unscrabbleable words - i.e. those requiring the use of two blanks. Which is the shortest? [I should mention that 'Scrabble' is a registered trade mark of J.W.Spear & Sons plc.]

Elementary Words

For anyone who is not up to date with the symbols for the chemical elements (for purposes of the Prize Competition announced below) here is a symmetrical version of the periodic table as far as Nobellium (I'm not up to date with the artificial elements beyond that point). The coordinates are quantum numbers, but I've forgotten their meanings.

			57 La	89 Ac		
			58 Ce	90 Th		
			59 Pr	91 Pa		
			60 Nd	92 U		
			61 Pm	93 Np		
			62 Sm	94 Pu		
			63 Eu	95 Am		
			64 Gd	96 Cm		
			65 Tb	97 Bk		
			66 Dy	98 Cf		
			67 Ho	99 Es		
			68 Er	100 Fm		
			69 Tm	101 Md		
			70 Yb	102 No		
		21 Sc	39 Yt	71 Lu		
		22 Ti	40 Zr	72 Hf		
		23 V	41 Nb	73 Ta		
		24 Cr	42 Mo	74 W		
		25 Mn	43 Tc	75 Re		
		26 Fe	44 Ru	76 Os		
		27 Co	45 Rh	77 Ir		
		28 Ni	46 Pd	78 Pt		
		29 Cu	47 Ag	79 Au		
		30 Zn	48 Cd	80 Hg		
	5 B	13 Al	31 Ga	49 In	81 Tl	
	6 C	14 Si	32 Ge	50 Sn	82 Pb	
	7 N	15 P	33 As	51 Sb	83 Bi	
	8 O	16 S	34 Se	52 Te	84 Po	
	9 F	17 Cl	35 Br	53 I	85 At	
	10 Ne	18 A	36 Kr	54 Xe	86 Rn	
1 H	3 Li	11 Na	19 K	37 Rb	55 Cs	87 Fr
2 He	4 Be	12 Mg	20 Ca	38 Sr	56 Ba	88 Ra
1	2	3	4	5	6	7

4

3

2

1

Code Words

Another 5-letter 'code word' (see pages 59 and 92) if we allow repetitions, is ANANA (and hence also NANA and ANA). Len Gordon also claims TEPAL, but this is not in Chambers (1983) nor the C.O.D. He adds these 3-letter cases to those already given: BOB, BUN, CAY, CUM, ELS, ERE, FIL, GHI, HUH, HYP, INS, KOS, KUE, LAP, LEX, ODS, UTS, WAS.

Tangletongue

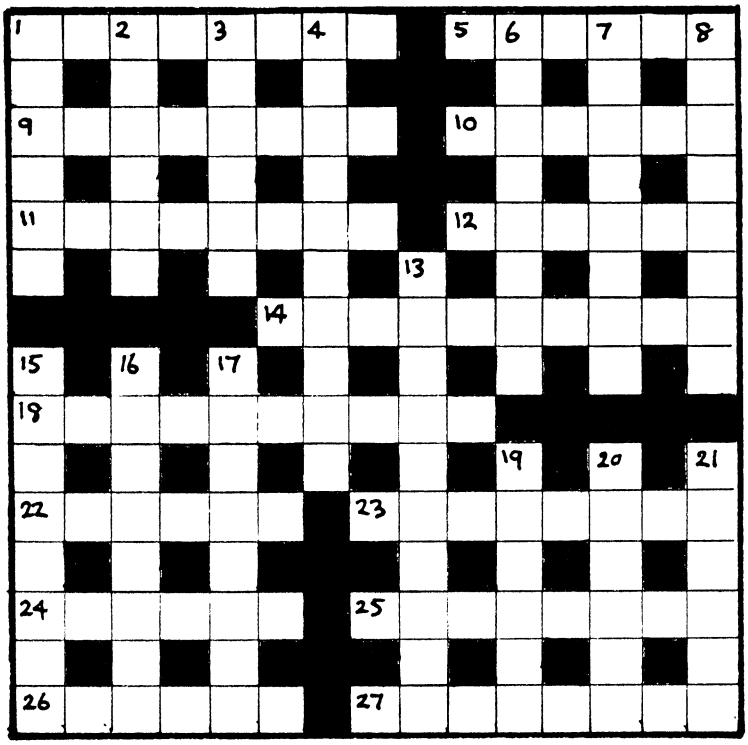
The following is a version of an old tongue-twister. You are asked to provide an appropriate answer!

Theophilus Entwistle, the thrifty official thistle-sifter, sifted a sieve-ful of unsifted thistles. Yet, where is the sieveful of erstwhile unsifted thistles that Theophilus Entwistle, the thrifty unsifted thistle sifter, officially sieved?

£10 PRIZE COMPETITION

A prize of up to £10 worth of games or puzzles of your choice from The Puzzle Box is offered for the best set of solutions received to the 4 word puzzles on page 93 of the last issue - i.e. 'Clock Words', 'Dart Words', 'Elementary Words' and 'Are You Game?' Answers to reach me before 15th January 1989. Editor's decision is final on what is thought 'best'.

A £5 prize will now be offered for the best set of answers to the word puzzles in each issue, excluding the cryptic crossword.



Cryptic Crossword - 6

by QUERCULUS

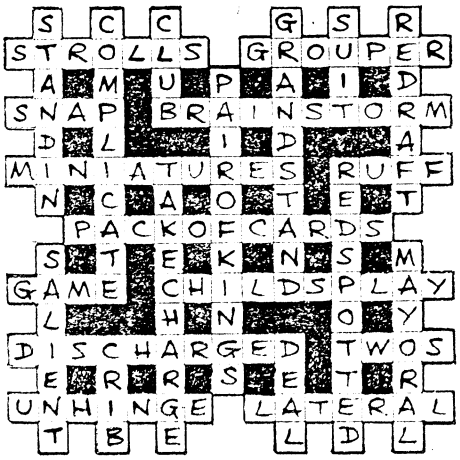
ACROSS

01. One way to travel swiftly: on a tortoise! (8)
05. Smother in dust if left alone. (6)
09. Strange patterns in church. (8)
10. Take a letter to Ted Heath on the food shortage. (6)
11. Err in egg-shape estimation. (8)
12. Refuse to allow Sir Percy back in the dungeon. (6)
14. Bisect pile as a test of opinion. (10)
18. Bert got back the sleeping gas completely. (10)
22. Adviser doubling up as torturor of employees. (6)
23. Throw fifty in gaol for a start for making dough. (8)
24. Bodily cast petty officer out of the cattle pen. (6)
25. Observe the negative charge position. (8)
26. Shaped up and went ahead after eye trouble. (6)
27. Bad temper, according to the Independent Television Yearbook. (8)

DOWN

01. Light sleeper, heavyweight material. (6)
02. Worker in farm area perhaps. (6)
03. Difficult questions about spores. (6)
04. Give in at apt clue I gave out..(10)
06. Thinker requiring French tea and gold first. (8)
07. Foes surrounding the king suffer in the rigging. (8)
08. Improved by turning each end north. (8)
13. Fawning old boys equal debts without a pound. (10)
15. Actor makes fun of naval hangings. (8)
16. Fish Street in Gateshead has slight illumination. (5-3)
17. An American soldier returning to grow old at the stock exchange. (8)
19. Oat and pie diet can be soporific. (6)
20. In short, bicycling ends differently on the beach. (6)
21. Encyclopaedia begins with A to G in the office. (6)

Crossword 5. SOLUTION



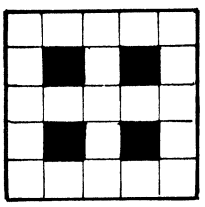
Word-Ladder Anagrams

Len GORDON has thought of what may be a new type of Carrollian word-ladder. He asks for examples where the two connected words, joined by a ladder of single-letter changes, are anagrams of each other. He offers the example:

TEACH to CHEAT

Shuffle-Link - 1

By Loretta BRUCE

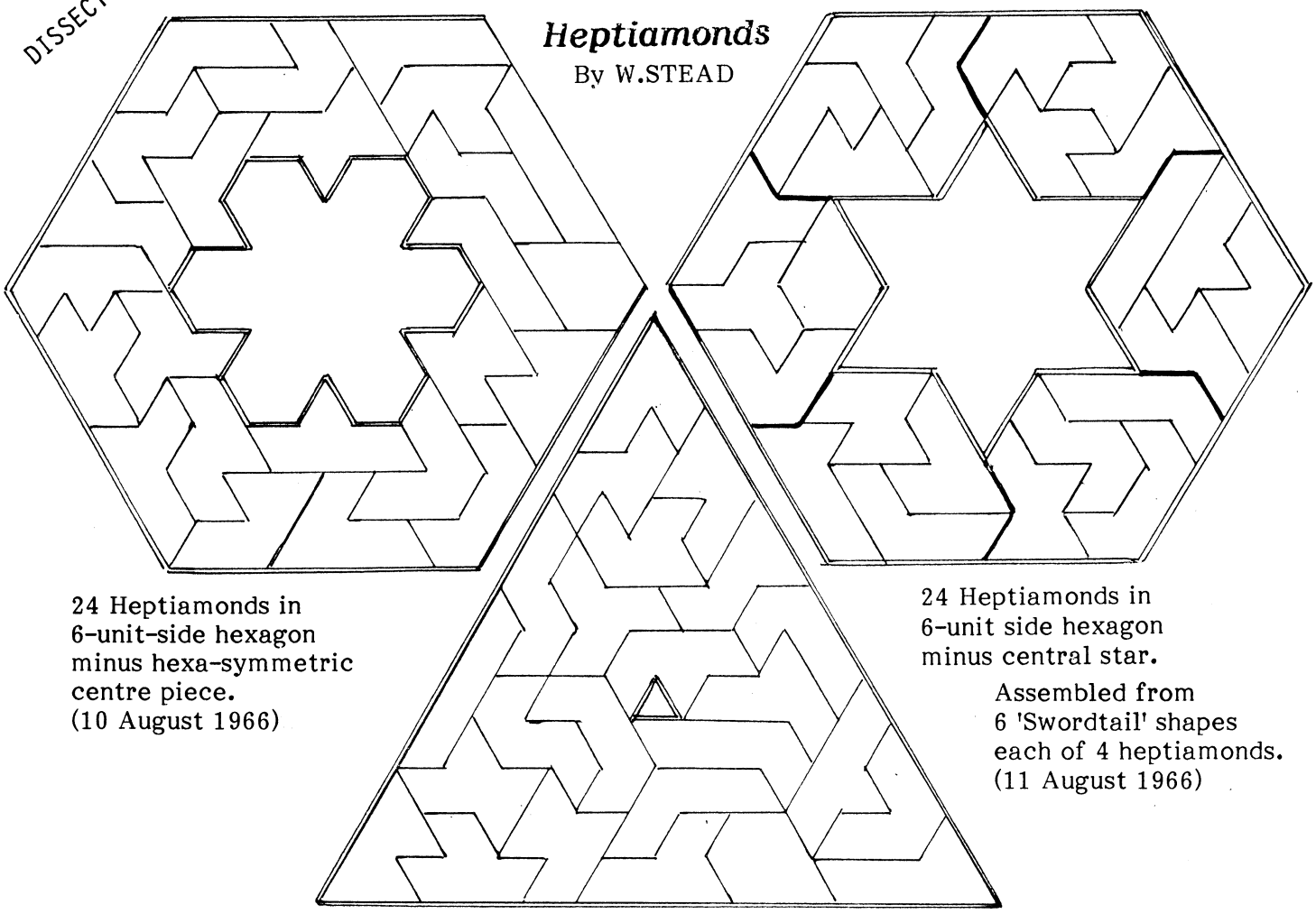


Shuffle round the letters of each of the six words listed below, to form six different words (anagrams). Then fit them into the grid, as in a normal crossword.

LIVED PRODS REGAL
ROUTE TROVE VERSE

Heptiamonds

By W.STEAD



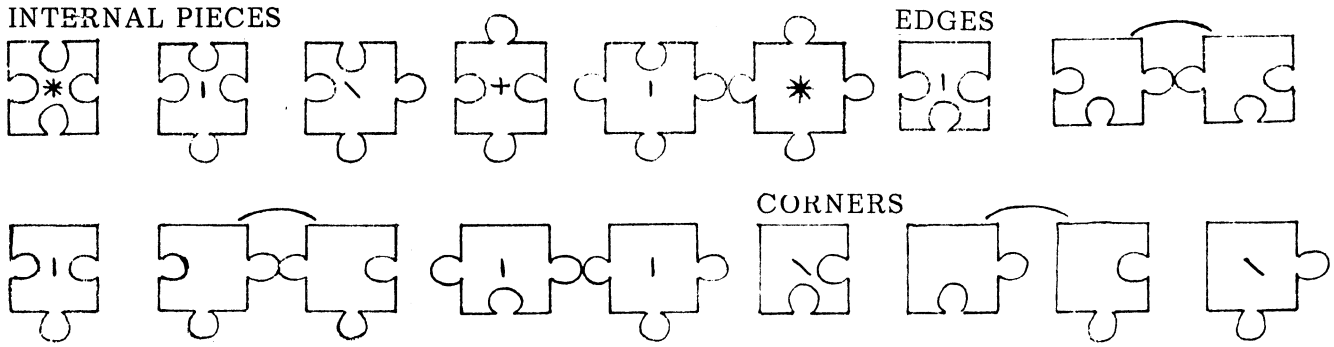
24 Heptiamonds in 6-unit-side hexagon minus hexa-symmetric centre piece. (10 August 1966)

24 Heptiamonds in 6-unit side hexagon minus central star. Assembled from 6 'Swordtail' shapes each of 4 heptiamonds. (11 August 1966)

24 Heptiamonds in 13-unit-side triangle minus central unit triangle (29 July 1966)

Geometric Jigsaws

There are 18 possible shapes for a jigsaw piece (assuming a square body, no more than one bobble or nibble per edge, and parallel straight edges not allowed) as follows:



Linked pairs are reversals of each other.

Some ways of fitting these together are as follows: (a) Omitting the completely symmetric pieces, marked ✳ arrange the other 16 to form a 4 by 4 square. (b) Omitting the other doubly axisymmetric piece (the "standard" design, marked +) the remaining 15 will form a 3 by 5 rectangle. (c) Using only the 12 edge and corner pieces, we can form a 2 by 6 rectangle. Solutions will be diagrammed in the next issue.