Puzzle Corner

INTRODUCTION

It has been a year since I specified the size of the backlogs for the various kinds of problems that are printed. Currently, I have a comfortable supply of regular and Bridge problems, but less than a year's worth of speed problems.

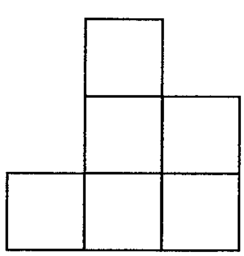
PROBLEMS

May 1. We begin with a fairly conventional (for him) Bridge problem from Larry Kells, who writes that this problem was solved at a tournament table by exactly one declarer, to the amazement of onlookers. Kells believes that he would never have solved it at the table, and wonders if you will be able to solve it away from the table assuming that after the opening lead the defenders play perfectly.

North	South
♠ AQ9	♠ J1085432
♥ AQ75	♥ K
♦ A87	♦ 3
♣ 743	♣ AK852

After a 1NT opening by North, the dealer, and a weak three-diamond jump by overcall by East you have arrived at six spades. Your side is vulnerable and the opening lead is the diamond king. Plan the play to give yourself the best possible chance of success assuming that East is neither overly cautious nor overly aggressive with his preemptive bids.

May 2. Richard Hess and Robert Wainwright want you to design a tile so that 5 of them cover at least 93 percent of the hexomino shown below. The 5 tiles must be identical in size and shape, but may be turned over so some are mirror images of the others. They must not overlap each other or the border of the hexomino.



May 3. Ken Rosato knows two climbers, Theta and Phi, who specialize in climbing square-based Egyptian-style pyramids. Theta always climbs straight up the middle of one of the pyramid's triangular faces, whereas Phi always climbs up an edge between two faces. For a given pyramid, Theta and Phi experience different angles of ascent. For which pyramids is the difference greatest and how great is that difference? Real Egyptian pyramids are constrained in their steepness due to stability considerations, but you should ignore this constraint.

SPEED DEPARTMENT

John Rudy wants to know, "What is aibohphobia?"

West	North	East
	♠ void	
	♥ 5432	
♠ void	♦ AK432	♠ KJ975432
♥ 10987	♣ A432	♥ KJ
♦ 10987		♦ QJ
♣ QJ1098	**South**	♣ K
	♠ AQ1086	
	♥ AQ2	
	♦ 65	
	♣ 765	

SOLUTIONS

N/D 1. Robert Bishop, MIT professor emeritus of economics, sent us the following solution:

No matter what West leads against South's four-spade contract (presumably a club), declarer wins the first five tricks in clubs, hearts (finessing the queen) and diamonds, ending in dummy.

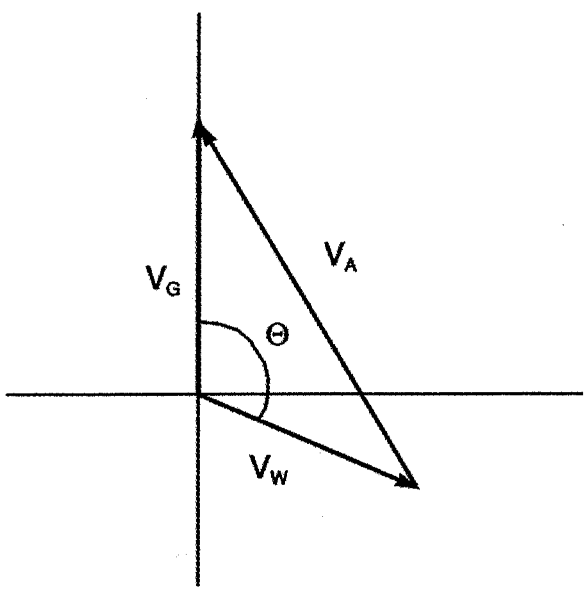
Another diamond is now led from dummy. East, reduced to just his eight trumps, is forced to ruff and suffer South's cheapest overruff.

The next six tricks consist of three successive end plays, as South leads a non-trump at each of his three opportunities and wins cheaply each of East's three forced trump returns. South then wins his remaining high trump at the end.

N/D 2. Bruce Layton's solution is printed below. Eugene Sard notes that one solution on our almost spherical planet is the South Pole, Wake Island (166 degrees E, 19 degrees N), just off the west coast of Haiti (74W, 19N), and the middle of southern Saudi Arabia (46E, 19N). Avi Ornstein adds that if one weakens the requirements so that only neighboring points need be equidistant, four more solutions appear by embedding the other 4 regular polyhedra (embedding the tetrahedron gives a four-point solution). Layton writes:

The values of n for which all n points on a sphere are equidistant from each other are 1, 2, 3 and 4. For n = 1 or 2, all distances are equal because (n=1) there aren't any distances to be unequal, and (n=2) there's only one distance, so there's nothing to be unequal to it. To find a set of three equidistant points, start with two points. Consider the intersection of two equal spheres, each centered on one of the points and including the other point on its surface. [This intersection is a circle between the two points, in the plane perpendicular to the line connecting the points. Meanwhile, the original sphere's surface includes both the points. —ed.] Any point where the two constructed spheres intersect the original sphere satisfies the original requirement. There can be one or two such points (so n can be 3 or 4, but cannot exceed 4). If the two such points are the same distance apart as the radii of the two equal spheres, forming the vertices of a regular tetrahedron, the four points satisfy the requirement and n=4. If not, then one of the intersection points, with the two original points, satisfies the requirement for n=3.

N/D 3. Art Delagrange, the proposer, offers the following analysis. In the diagram below, V_W is the wind speed, V_A is the airspeed, V_G is the ground speed and Θ is the wind angle.



The fuel consumed is

$$kTV_A^2 = k\frac{D}{V_G}V_A^2$$

where k is constant and T is the flight time, which is the distance divided by the ground speed. To minimize consumption, we need to minimize V_A^2 / V_G.

The law of cosines gives

$$V_A^2 = V_G^2 + V_W^2 - 2V_GV_W\cos(\Theta)$$

Thus we need to minimize

$$V_G + (V_W^2/V_G) - 2V_W\cos(\Theta)$$

Setting the derivative with respect to G equal to zero gives $V_G = V_W$, i.e., the ground speed should equal the wind speed (independent of the wind angle).

Delagrange notes the impracticality of the solution, pointing out that with a tailwind, the recommendation is to coast, and with no wind, the recommendation is not to travel. John Prussing notes that for real airplanes one must have lift equal to weight for constant altitude.

BETTER LATE THAN NEVER

2000 J/A 1. Bob Sackheim notes that if East takes the ninth trick with the spade queen and leads the king, South must take with the ace, and thus he does not take his ninth trick with the ace still in his hand as required. Bruce Layton writes:

As the bidding was described, the Rueful Rabbit (RR), his team's only spade bidder, should have been declarer. He would have gone set had Karapet opened the play with a trump lead. For the play to have gone as described, an irregularity must have occurred, and should have been mentioned. I suggest it went something like this:

Papa, accustomed to making opening leads (since the Hideous Hog (HH) played most of the hands), and enamored of the cleverness and deceit of the lead he could make, led out of turn. HH knew better, but he said to his partner, "Let's see it!" and RR (accustomed to being dummy, and thinking his partner had bid the suit first) laid down his hand. Karapet, who had almost made up his mind to lead a trump, took exception, but, when an impartial arbiter could not be located, he found that the rules of bridge required that, once RR had faced his hand, the lead stood, making HH declarer. The rest is history, as described in the November/December issue.

OTHER RESPONDERS

Responses have also been received from J. Boynton, R. Bird, R. Bishop, A. Cangahuala, L. Feldman, E. Friedman, R. Sackheim, M. Seidel, and Q. Watkins.

PROPOSER'S SOLUTION TO SPEED PROBLEM

The fear of palindromes.

Send problems, solutions and comments to Allan Gottlieb, New York University, 715 Broadway, 10th floor, New York, NY 10012, or to gottlieb@nyu.edu.

—Edited by Owen W. Ozier '98