INTRODUCTION

I have received permission to post back issues of ''Puzzle Corner'' on my web site. Although I produce the column electronically, various figures, bug fixes, and other items are incorporated by some magical means at Technology Review itself. Thus to provide an accurate web presence, I will have to scan in my hard copies. Already present on the Puzzle Corner home page are a few items from the last few years that were omitted from the printed version due to space limits. Hopefully, by the time you read this I will have scanned in enough columns to make it worth your while to browse the home page, which is http://allan.ultra.nyu.edu/˜gottlieb/tr.

PROBLEMS

Dec 1. We begin with a Bridge problem from Larry Kells, who writes

I had an unfortunate occurrence at my bridge club. I got a hand which was so strong that I apparently only needed to know my partner's holding in diamonds to know whether to bid grand slam. We have a bidding convention for that very purpose; I found out that my partner had D-AKQ so I confidently bid 7NT. The Spade King was led, dummy appeared, and by freakish misfortune, the cards turned out to be aligned so that I went down! Then I realized that if my partner had held D-AQ only (or AK), 7NT would have been impregnable against any possible distribution of the rest of the cards among the other three hands. I have already told you all you need to know to determine my own exact hand and my partner's; what were they?

Dec 2. Kern Kenyon has three arbitrary mass points A, B, and C located in space and wants you to show that the following three related points are collinear: Point A, the center of mass of B and C, and the center of mass of A, B, and C.

Dec 3.

Alyssa, I can add more words to this problem if needed

John Regan has an interesting probability question couched, as is often the case, in terms of dice. If two contestants each roll one (6-sided) die, the odds are 1 in 6 that the values are equal. If instead they each roll two dice, the odds are 146 in 1296 that the sum of the two dice are equal. What happens if they each roll n dice, for n large? What if the dice have m, instead of 6, sides. We are assuming fair dice.

SPEED DEPARTMENT

Ermanno Signorelli writes that a patient is told to take a quarter of a standard aspirin tablet each day. He purchases a large (say 1000 or more tablets) bottle of whole aspirins. He starts out the first day by shaking out one whole tablet and breaking it into halves and one of the halves into quarters, putting the unused half and quarter back into the bottle. On succeeding days he continues in this manner until a half or a quarter tablet appears. If a half tablet appears, he breaks it into two quarter tablets and returns the remaining quarter tablet to the bottle; if it is a quarter tablet, he takes it. As the days go by, more and more half tablets and quarter tablets come out when he shakes out a tablet. The sizes of the tablets and tablet pieces do not affect the likelihood of their appearance. (Logically, there will be a time where it is equally likely that a whole tablet will appear as it is that a piece of a tablet will appear.) What is the approximate likelihood that the last tablet piece he takes out will be a half tablet?

SOLUTIONS

Jul 1. An update from Larry Kells. With the winter rains ending, I took a stroll in the park again and there I saw my friend with his new bride. They sure are a couple of lovebirds! They filled me in on her exploits at the bridge club since I last saw them.

It seems that they were playing against a couple who were good friends with his ex-wife; even though she no longer comes to the club, the bad blood was obvious. They kept trying to make his new wife as uncomfortable as possible. Well, with both vulnerable, my friend's left-hand opponent dealt and bid one heart. Right-hand opponent responded one spade. LHO bid two diamonds. RHO made an invitational jump to three hearts. LHO paused, then decided not to accept the invitation, and passed. ''So,'' my friend says, ''my sweetie decides to accept the invitation in his place, and bids four hearts!''

Naturally the opponents doubled, expecting a slaughter. But (and here my friends started laughing so hard I could hardly make out what they were saying) she made four hearts with the help of a trump coup, and in fact no defense could have beaten her. The opponents were dumbfounded because both of them had bid reasonably; they quickly walked out and haven't been seen since.

Unfortunately I couldn't elicit the details of the deal. Can you help me?

Larry Kells writes that one possibility (with East dealer is).

```
                S - xxxx
                H -
                D - KQJ10x
                C - xxxx
S - KQJ10x                      S - A
H - xxx                         H - 10xxxx
D - x                           D - xxxxx
C - QJ10x                       C - AK
                S - xxx
                H - AKQJ9
                D - Ax
                C - xxx
```

Suppose the defenders take their 3 black-suit tricks and shift to a diamond. Declarer wins, draws 3 rounds of trumps, then runs the diamonds as East follows. Finally dummy leads a black-suit card and declarer must make her 9 of trumps as well as the remaining high trump.

Note that regardless of the defense, declarer can make all of the diamonds after 3 rounds of hearts have been played, and scores the 9 of hearts by means of a direct finesse (if the opponents lead hearts,) a trump coup or an endplay.

Jul 2. Jerry Grossman asks about a normal round-robin tournament with thirteen contestants in which each player plays one game against each of the other twelve. He wants to consider the case in which each player wins 6 games and loses 6. Jerry wonders how many triples of three players (A, B, C) there are such that A beat B who beat C who beat A.

First we must decide whether to consider (A,B,H), (B,H,A), and (H,A,B) as three or one solution. Let's say one. Ken Rosato decided to first try smaller versions of this problem after noting that for n players there are $\binom{n}{3}$ possible triples. If there are only 3 players A,B,C instead of 13 and all three have 1-1 records, then the only possible triple (A,B,C) is a solution. For n=5, he did a search of all $\binom{5}{3} = 10$

solutions and found that 5 work. For n=7, he found that 14 of 35 work and, for n=9, 30 of 84 work. He then noticed that, in the 4 cases he tried, which were n=2k+1, for k=1,...,4, the number of successful triples was $\sum_{i=1}^{k} i^2$. Conjecturing that this formula holds for all k, he believes the answer to be $\sum_{i=1}^{6} i^2 = 91$.

Can anyone supply a proof or counterexample?

Jul 3. Rocco Giovanniello sent us the following pictorial solution

Alyssa please insert figure from the ms-word file here

BETTER LATE THAN NEVER

Mar 1. Tom Terwilliger notes that the solution given assumes that the hemisphere itself doesn’t move. Perhaps Sinclair keeps his favorite frictionless hemisphere glued to the table.

OTHER RESPONDERS

Responses have also been received from G. Coram, H. Hodara, L. Nissim, J. Paulsen, A.J. Peralta, G.F. Quinn, and Somen U.

PROPOSER'S SOLUTION TO SPEED PROBLEM

Zero. The last piece will be the last quarter (else it isn't the last piece the patient will take out).