Back to the Lesser Antilles

Puzzle Corner
by
Allan J. Gottlieb

Since I am usually the first (and often the only) person to mention any favorable reviews that "Puzzle Corner" receives, let me mention an interesting complaint. Sharon M. Fester is unhappy with M/A SD 1 for "bringing sexism into a probability and statistics problem" by using terms like "the Old Maid Theory."

I can honestly plead innocent to any charges of chauvinism in my personal life, but — perhaps due to insufficiently raised consciousness — I never gave this much thought with regard to "Puzzle Corner." A perusal of the "offending" issue reveals a man rescuing a drowning girl, a boy asking a girl to marry him, and a keyword "Techalumni," in addition to the example with which Ms. Fester is unhappy. So her complaint is perhaps well grounded.

It is certainly true that the same mathematical questions could have been posed in neutral terms. There is a danger, however, that such a rewording would remove a little of the charm of these questions and move them slightly away from puzzles, toward problems.

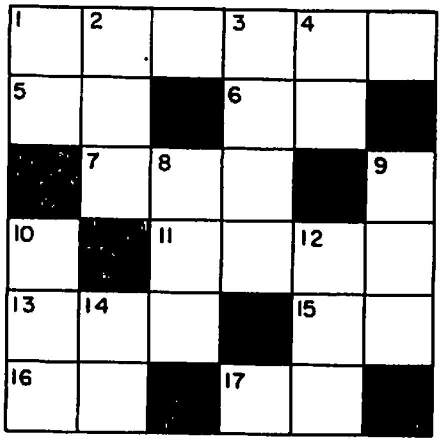
What do you think? I'm especially interested in the opinions of the many women who read and contribute to this column.

Problems

NS6 We begin this month with an old problem (March, 1970) whose solution was never printed. The problem was later revised (June, 1970), and — due to an error on my part — no solution was printed although solutions were listed as Better Late Than Never. So this is likely to be comparatively easy for a "never-solved" puzzle. The revised problem, from Lawrence S. Kalman, follows:

So many of our friends have asked about the boat in which we cruised the Lesser Antilles, and about the crew, that we have prepared a diagram which answers most of their questions.

The crew of five were the skipper, first mate Joseph, navigator Peter, deck hand Moses, and cook Able. They all voted for Eisenhower. The total miles shown on the taffrail log was twice the number for the first nine days plus exactly 200 miles. However, we had the log carefully checked and found that for each mile registered we had sailed 6,120 feet, so the distance sailed was slightly greater than that shown on the log. As to the crew, it so happened that if Peter had been 14 years older the skipper would have been twice the average age of his crew. Also if the skipper had been 13 years older his age would have equaled the sum of the ages of the three youngest members of the crew. The dimensions of the boat, sail area, and ages of crew can now be easily ascertained by completing the above diagram and using the following clues.



Across
1 Yards sailed in nine days
5 Age of first mate
6 Twice the age of Joseph
7 Miles logged in nine days minus 1 down
11 Square of 4 down minus 2 down
13 Total miles logged
15 Age of Moses
16 Length overall
17 1 down reversed

Down
1 Cube of beam in yards or square of draft in feet
2 Miles logged in nine days
3 Area of mizzen times beam
4 Two times 5 across
8 Length overall times draft
9 Area of mainsail or twice area of mizzen plus sum of digits of 11 across
10 Area of mainsail plus length overall
12 Low water length plus length overall plus draft plus beam
14 Age of Able

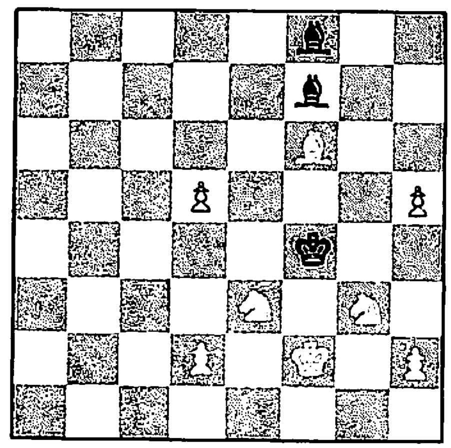
Another clue: the problem was concocted some years ago.

NS5 When this problem first appeared in the December issue a noncritical paragraph was omitted. Here is the entire problem:

Since most people find the geometry problems the easiest, I have decided to print one which appears to me to be rather formidable. Should the wording sound a little strange, bear in mind that it comes from Mr. Fine of Gloucester, England; he admits that it may be "too advanced" for the *Review*! And he also says that "though it is fairly easy to find special cases (e.g., a recurrent sequence), I have not really 'got my teeth' into this problem — which is well over 20 years old."

If a pair of triangles is not copolar, the joins of corresponding vertices form a triangle and so do the intersections of corresponding sides. The original pair of triangles has been transformed into a second pair which can be transformed into a third and so on. How does the sequence of pairs of triangles behave?

FEB 1 Our first regular problem this month, from Michael Laufter, is another White to mate in two. Unlike 1975 June 1 (see solutions, below), Mr. Laufter's problem is quite "normal":



FEB 2 Judith Q. Longyear, perhaps noting the rise in women's athletics, asks the following:

The 11 footballers of Croam play five-on-a-side matches against each other, the 11th footballer being referee. One match is played with each possible choice of teams and referee. Can you schedule the 1,386 matches so that each individual team plays its six matches on six different days of the week? Note that in Croam one does as the Croamans do, so the schedule must be set up in such a way that matches are played never on Sunday. (Dr. Longyear should not be held responsible for the wording of the last sentence. — Ed.)

FEB 3 Patricia Lougheed wants you to solve

$$\begin{aligned} x_1 + x_2 + x_3 &= a^2 \\ x_1 + x_2 + x_4 &= b^2 \\ x_1 + x_3 + x_4 &= c^2 \\ x_2 + x_3 + x_4 &= d^2 \end{aligned}$$

where each symbol is an *integer* and the four x's are unique.

FEB 4 Mickey Haney needs, for all N > 0, N positive integers (not necessarily distinct) whose sum and product are equal.

FEB. 5 Can Robert Mills construct a 4x4x4 magic cube (equal sums along horizontals, verticals, in-outs, and diagonals) consisting of 64 distinct numbers?

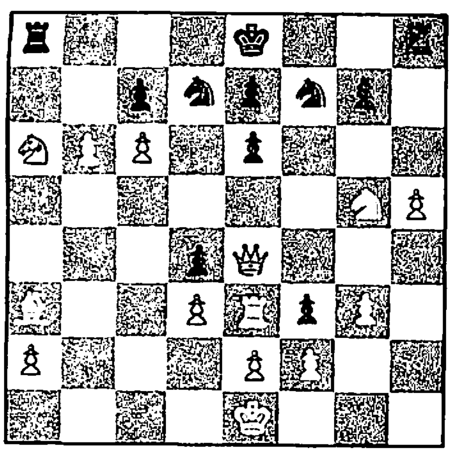
Speed Department

SD 1 Emmet J. Duffy asks what (non-archaic) English verb has no infinitive.

SD 2 The following is from James Shearer: A daily calendar B to be made by putting numbers on the faces of 2 cubes, so that all the dates of the month can be indicated by appropriate rotations of the cubes [01, 02, . . . 29, 30, 31]. (Note that zero is included). How should the integers be arranged on the two cubes?

Solutions

1975 JUN 1 White to move and mate in two:



This problem is not trivial! As we pointed out when the problem first appeared, if White plays QxP(K6), Black replies 0-0-0. So one must show that Black cannot castle queenside. I suspected that a key was the fact that Black's king bishop could not have moved. J. F. Chandler used this fact to prove the whole position impossible and concluded that the problem was in error. But just five minutes ago the solution hit me! Chandler proved that the position is impossible if Black moves *down* the page. Thus Black moves up the page, the position is legal, Black has moved his king and can't castle, and the mate is given by QxP (Q3!!!), any; Q mates on *second* rank. Gotcha, Mr. Nelson (I think). Mr. Chandler's comments follow:

The situation is still impossible as follows: White has now lost three pieces, but Black's pawns need to have captured three to reach this position (e.g. P at Q4 taking two and P at K6 taking one). So White's only missing pawn must have been captured by a pawn and (to allow Black to stack pawns thus with only three captures) at least as far left as the king. That means White's pawn or pawns must have captured at least three Black pieces from the right-hand 5/8 of the board. However, Black's missing pawn must have come from the QR column and couldn't have captured any pieces since all are accounted for. Further, Black's king bishop was clearly captured by a nonpawn since it could never have been advanced. That leaves only two pieces to be captured by White's pawn.

1976 JUN 5 A man walking near a lake with a precipitous shoreline sees a girl struggling in the water. He can run twice as fast as she can swim. At what point should he leave the shore to reach her in the shortest possible time? The spatial relationships are: the man is 100 feet from the water; the distance between the man and the girl, parallel to the shore line, is 100 feet; and the girl is 100 feet from the shore. Ground rule: no calculus.

The following solution is courtesy of Gene Bedal, who admits that "the girl surely drowns if her rescue depends upon my coming up with an answer": The answer is 70.0535 ± 0.00005 feet as measured from a perpendicular from my position. Failing to find a neat equation with the distance wanted, x, on one side, I used a surveying method called "wiggling-in," essentially trial and error, to find an x yielding the shortest value in the equation

$$k \cdot \text{time} = \sqrt{100^2 + x^2} - 2\sqrt{100^2 + (100 - x)^2}.$$

Although use of calculus was disallowed, I tried it for check (while they were dragging for the girl's body). But an even more cumbersome equation results, as you know from taking the first derivative (best solution?). However, for anyone's interest, by similarly finding an x suitable in an equation identical to

$$x\sqrt{(a - x)^2 + a^2} = 2(a - x)\sqrt{a^2 + x^2},$$

result: 70.053453405 ± 5.0^{-10} feet, by use of my TI SR-50A, which I always carry with me on my jaunts. It is assumed that the "precipitous slope" merely provides for an immediate transition from running to swimming and does not indicate a falling/leaping parameter.

Also solved by Carey Rappaport, John E. Prussing, James W. Shearer, R. Robinson Rowe, William J. Butler, Jr., Harry Zaremba, Richard Hess, R. Bart, Jeffrey Miller, Robert Pogoff, Charles Rozier, Glenn Loary, and the proposer, Jack Parsons.

O/N 1 Given the two hands and the bidding shown (both sides vulnerable), and the following first three plays, plan the balance of play. The opening lead was ♥3, won by East with ♥A; East returns ♥7 to West's ♥9; then West shifts to ♦3.

North
♠ J 7 3 2
♥ 6 2
♦ A K 8 7 6
♣ J 3

South
♠ A K 6 5 4
♥ 8 5
♦ 2
♣ A 10 6 5 4

South	*West*	*North*	*East*
1 club	—	1 diamond	1 heart
1 heart	3 hearts	3 spades	—
4 hearts	—	—	—

This must have been hard, as only three solutions were received. The following is from Winslow H. Hartford:

The hand loses the first two heart tricks and must lose a club. For the contract, therefore, declarer must take five trump tricks, two club ruffs, the ♣A, and the ♦A and ♦K. This is easily managed if the trumps break two-to-two; and there are other, remoter, possibilities. In any event, take ♦A and lead to ♠A. The ♠Q is singleton. Now North's ♠J will be needed to prevent the loss of a spade trick. Only one club ruff can be secured, so clubs must break three-to-three. This first strategy has approximately a .375 chance of success. The second strategy has a chance of .125 that the ♠Q is singleton. If the ♠Q drops, then clubs must be tested. The best strategy is to give up a club, and the best defense is a trump return. (You get a little extra if a trump is not returned.) Win the trump with the ♥J. Return to hand by ruffing a diamond (almost reckless), then a club to dummy (ruffing). Play succeeds (a) if clubs are three-to-three (.375) or (b) if the player with the last trump has four clubs (.125). In case (a), cash ♦K, return to hand with ♠K, and cash established clubs. In case (b) there are entry problems and the almost sure incidence of a diamond ruff, so the successful ruffing of the third club is fruitless. The total chance of success in the hand approximates .375 − .125 · .375, or 4219 (I have used binomial probability for simplicity).

Also solved by R. Robinson Rowe and Richard I. Hess.

O/N 2 The proposer, Magne Wathne, noticed that 9/1 = 9, 98/12 = 8.166 . . ., and 987/123 = 8.024. . . . He then found patterns for the numerator and denominator which begin with the three given and result in fractions which approach 8. What are those patterns?

I present below an amalgamation of several responses:

The numerator of the nth term is

$$\sum_{i=1}^{n} (10 - i)/10^i = .9 + .08 + \ldots + .000000001$$
$$+ 0 - .0000000001 + \ldots$$

and the denominator is

$$\sum_{i=1}^{n} (i/10^i = .1 + .02 + \ldots + .000000009$$

$$+ .0000000010 + .00000000011 + \ldots)$$

It turns out that the numerator is a nine-digit repeating decimal .987654320987654320 . . . and the denominator is a similar repeating decimal .123456790123456790 . . . The important points are that by summing geometric series

$$\sum_{i}^{\infty} 1/10^i = 1/9$$

and

$$\sum_{i}^{\infty} (i/10^i = (1/10 + 1/10^2 + 1/10^3 + \ldots)$$

$$+ (1/10^2 + 1/10^3 + \ldots) + (1/10^3 + \ldots)$$

$$= 1/9 + 1/10 \cdot 1/9 + 1/10^2 \cdot 1/9 + \ldots$$

$$= 1/9\,(1 + 1/10 + 1/10^2 + \ldots)$$

$$= 1/9\,(10/9) = 10/81.$$

Hence

$$\frac{\Sigma \frac{10-i}{10^i}}{\Sigma \frac{1}{10^i}} = \frac{10\ \Sigma \frac{1}{10^i} - \Sigma \frac{i}{10^i}}{\Sigma \frac{1}{10^i}}$$

$$= \frac{10\left(1/9\right) - 10/81}{10/81} = 8$$

Responses received from John F. Chandler, Judith Q. Longyear, R. Robinson Rowe, Harry Zantopulos, Winslow H. Hartford, R.I. Hess, and the proposer.

O/N 3 A cross-metric:

```
HHE  ×  TEN    = AUITM
 +       ×        −
EALI −  HIE    = ETAM
 =       =        =
CIIE +  ATMAM  = AHMLI
```

Even a typo doesn't slow our readers down. The following solution is from Linda Eckstein:

Setting this up in an easier to read format gives:

```
1)   HHE    2)   TEN    3)  AUITM
    +EALI        ×HIE       −ETAM
    -----       -----       -----
     CIIE       ATMAM       AHMLI

4)   HHE    5)   EALI   6)   CIIE
    ×TEN        −HIE       +ATMAM
    -----       -----       -----
    AUITM        ETAM       AHMLI
```

On initial examination of letter relationships I is obviously equal to 0 [M − M in (3) or E + I = E, I = 0 in (1)]. By examining further, the following relationships can be set up:

a) E + M = 10 (5, 6)
b) E × N = 10^x + M (2, 4)
c) 1 + A = L (5, 6)
d) C + T = H (6)
e) U − 1 − E = H (3)
f) 9 − T = M (3)
g) T + 10 − A = L (3)
h) A − H = T (5)
i) H + L = 10 (1)

By further examination and substitution, two important equations are determined:
Equation one:
L = A + 1 = T + 10 − A (c, g)
therefore: 2A = T + 9 or T = 2A − 9 and T is determined to be odd.
Equation two:
H = C + T = A − T (d, h)
therefore: A − C = 2T. We know that A-C is even, and must be ≤8, and because T is odd, T is either 1 or 3. Then from equation one we know that if T is 1 then A is 5, and that if T is 3 then A is 6. By plugging these values in the above equations (a thru i), we find in equation h that if T is 3 and A is 6, A − H = T or 6 − H = 3, or that H = 3. But H cannot equal T. Therefore T must be 1, and A must be 5. Further plugging in of values gives:

T = 1
A = 5
H = 4 (h)
L = 6 (c, i)
C = 3 (d)
M = 8 (f)
E = 2 (a, b)
U = 7 (e)

And we know that I = 0; therefore, N must be 9. Plugging these values into the original problems gives:

```
1)   442    2)    129   3)  57018
   +2560         ×402       −2158
   -----        -----       -----
    3002        51858       54860

4)   442    5)   2560   6)   3002
    ×129         −402      +51858
   -----        -----       -----
   57018         2158       54860
```

The code, in digital order, spells TECHALUMNI.

Also solved by Harry Hazard, Winslow H. Hartford, Bill Swedish, Ted Mita, R. Bart, Scott Davidson, Richard Early, Larry Wischoefer, Avi Ornstein, Harry Zaremba, Judith Q. Longyear, R.I. Hess, and the proposer, R. Robinson Rowe.

O/N 4 A offers to run three times around a course while B runs twice around, but A gets only 150 yards of his third round finished when B wins. He then offers to run four times around for B's thrice and now quickens his pace in the ratio of 4:3. B also quickens his in the ratio of 9:8 but in the second round falls back to his original pace of the first race and in the third round goes only nine yards for the ten he went in the first race, and accordingly this time A wins by 180 yards. Determine the length of the course.

I have previously published responses from readers in several continents. But I just received a letter from Brooklyn! Ah youth! Ah Ebbetts Field! Ah Reese, Campanella, Newcombe, Robinson . . . Ah shucks, Mr. O'Malley, why did you leave us?

The following solution is from Howard Ostar, a senior at Abraham Lincoln High School in Brooklyn:

Let x be the speed of A, y the speed of B, z the length in yards of one lap, and t the time required for B to travel z yards at y speed. The first race can then be written:

y (2t) = 2z

x (2t) = 2z + 150

Divide the first equation into the second:

x/y = (z + 75) / z

Now A goes four laps 4/3 as far as he was traveling. Merely to simplify, we can keep A at a speed of x to travel three laps. The answer will be the same for z. B increases his speed to 9/8 of his original, and since velocity is inversely proportional to time for a constant distance, his time to run his first lap will be 8t/9. We check how far A travels in the same time, and do the same for the second lap:

19y/8 • 8t/9 = yt = z

x • 8t/9 = 8xt/9 = 8/9 • (z + 75) = (8z + 600)/9

y • t = yt = z

x • t = xt = z + 75 = (9z + 675)/9

So far, B has traveled 2z yards, with (z − 180) yards to go (since he lost by 180 yards). A has run (17z + 1275)/9 yards, with (10z − 1275)/9 to go. We set c as the time needed for A and B to finish this distance for each man at his own speed (B having slowed down again). Then, as before, we divide the B-equation into the A-equation to get rid of c:

9y/10 • c = z − 180

y • c = (10z − 1800)/9

x • c = (10z − 1275)/9

x/y = (10z − 1275)/(10z − 1800)

For x/y, we substitute (z + 75)/z and cross-multiply:

$10z^2 + 750z - 1800z - 135{,}000 = 10z^2 - 1275$

$225z = 135{,}000$

$z = 600$

The length of the course is 600 yards.

Also solved by John E. Prussing, Winslow H. Hartford, Harry Zantopulos, Ed Chalfie, James Shearer, Carey Rappaport, Thomas Turnbull, M. Guerst, Fred Steigman, Carey Kaptur, George Flynn, Frank Carbin, Raymond Gaillard, Richard I. Hess, R. Robinson Rowe, Larry Wischhoefer, Judith Q. Longyear, Scott Davidson, R. Bart, Ted Mita, Bill Swedish, and Harry Zaremba.

O/N 5 A sentential digital form S is a string of digits ? and ~ where ? represents any digit and ~ any digit string. A real number is S-bounded if S appears only finitely many times in its decimal expansion. Show that the S-bounded numbers have (Haar or Lebesque) measure 0. Example: 1?2~3 appears in .351927536802 . . . 1?2~3.

As expected, there were not many takers — in fact, the only response was not convincing. Try again, everyone.

Better Late Than Never

MAY 2 Leon Bankoff submits the following, "more general" solution:

The problem lends itself to a simple solution by inequalities. Indeed, the proposal contains many redundancies. The segments h_1, h_2, r, s, t, u, v and w could

Continued on p. 71

their Ph.D.s after they had been hired! The percentage of doctorates among faculty members had actually been increasing all along. It was as if all the educators were going south when they thought they were heading north because they focused their attention on a reversed compass instead of watching the sun.

Dr. Cartter points out other gaps or weaknesses in national data. He suspects the validity of recent National Center for Education Statistics data because continuous retroactive revision of the numbers "not only makes it difficult for one to determine the real historic trend in average and incremental student-staff ratios, but also raises doubts about the reliability of the faculty data in the first place." If we don't have a reasonably accurate idea of where we have been and where we are now, how can we make an intelligent projection of where we are likely to be tomorrow? Dr. Cartter cites the changing Ph.D. projections issued for the 1974-75 period by the National Science Foundation in recent years. Taking the figures for engineering, a field with which this reviewer is most familiar, N.S.F. in 1969 projected 4,800, reduced this to 4,440 in 1971, and dropped the estimate further to 3,450 in 1975. The actual production of engineering doctorates for 1974-75 was 3,138. In another table, Dr. Cartter bases some of his own calculations on National Center for Education Statistics projections indicating that the number of B.S. degrees in engineering will increase by only 3 per cent from 1973-74 to 1983-84. He evidently was not aware of Engineering Manpower Commission data showing an increase of 45 per cent in freshmen enrollments from fall 1973 to fall 1975.

On the positive side, he praises the efforts of the physics profession to keep its members aware of changing supply-demand conditions. The American Institute of Physics, he says, "has placed truth and objectivity for their field above the parochial interests of their local departments," and he credits to this approach the fact that physics has become more market responsive than any other scientific field. He also gives the Engineering Manpower Commission a pat on the back for its "long tradition of manpower assessment."

Who Needs a Ph.D.?

Dr. Cartter comes up with other findings that are either contrary to common beliefs or have not been brought out elsewhere. For instance, his analysis of Ph.D. placement data leads him to conclude that academic job discrimination against women had disappeared by 1973 and that "academic institutions have successfully eliminated sex inequities in the job market for the current generation of young doctorate recipients." A similar conclusion can be reached on the basis of starting salary data for women in engineering, but most observers continue to cite crude, aggregated statistics in which recent trends cannot be described.

Another finding should be of special interest to engineering doctorate students. Data for 1973 (the latest available to Dr. Cartter) show that for all Ph.D. fields combined, 68.6 per cent of the graduates entered academic jobs. However, the percentage varied by field from a high of 91.7 per cent in English to a low of 27.7 per cent in engineering. Further, only 10.3 per cent of the engineering doctorates went into teaching. In other words, the greatest part of the job market for engineers holding Ph.D.s is outside academia, and even within the academic sector there are probably more positions in research than in teaching. This leads to the conclusion that even Dr. Cartter's prediction of future surpluses of Ph.D.s, while of serious concern in most fields, may have less import for engineering.

If there is one area where this reviewer would challenge Dr. Cartter's thesis, it would have to be his implicit assumption, which is also reflected in Clark Kerr's introduction, that a Ph.D. is necessary and sufficient to qualify a person for academic positions, and that the excellence of an educational institution is measured by the percentage of doctorates in the faculty. It is a shame that Dr. Cartter, who was prepared to challenge the conventional wisdom in so many other respects, never undertook to examine the basis for his own faith in the superiority of the Ph.D. degree. He never seems to have doubted that employers, if given the choice, would hire Ph.D. holders in preference to persons with other degrees, and he hoped that the surplus of graduates which he clearly saw coming out of the educational pipeline between 1980 and 1985 might lead to an enrichment of the educational process for students and older Americans alike. "By 1990 average student-faculty ratios could be reduced by at least one-third; postsecondary educational opportunities could be extended to all adults who have missed this experience; lifelong recurrent education could become a reality. Whether or not we shall take this bold step toward a 'learning society' depends upon how society orders its priorities, not upon whether there is manpower available to undertake the task."

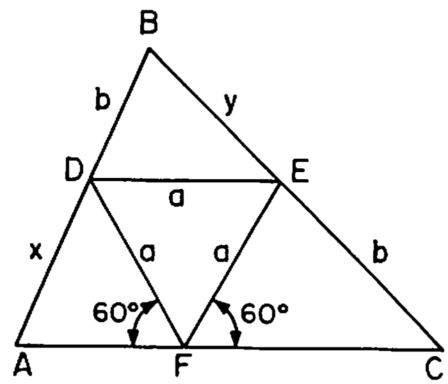
A less optimistic observer might note that the traditional market response to a surplus of manpower is increased competition for any available openings and intensified pressure on the wage and salary structure. If the observer were from industry he might express doubts about the substitutability of doctorate holders for workers with other educational backgrounds, using terms such as "overqualification" and "underutilization" rather than "enrichment" of the work force. In any case, Dr. Cartter has raised serious issues that deserve more attention than they will probably receive. It is up to us, the recipients of his legacy, to decide.

John D. Alden is Executive Secretary of the Engineering Manpower Commission of Engineers Joint Council, a federation of 36 U.S. engineering societies. He is responsible for the Commission's surveys of the enrollments, degrees, and salaries of engineers.

Puzzle

Continued from p. 69

very well have been omitted without altering the conclusion that triangle ABC is equilateral. For example, assuming that DE and AC are parallel, let us start with the diagram shown here:



(I) Assume $x > b$. Since DE and AC are parallel, $x > b \Rightarrow b > y \Rightarrow x > b > y$.
In triangle ADF, $x > b \Rightarrow \angle DFA > \angle ADF \Rightarrow \angle DAF > 60°$ (*) $\Rightarrow a > x$.
Then $a > x > b > y$.
In triangle DBE, $a > y \Rightarrow \angle DBE > \angle BDE = \angle DAF > 60°$, or $\angle DBE > 60°$ (**).
In triangle FEC, $a > b \Rightarrow \angle ECF > \angle EFC = 60°$, or $\angle ECF > 60°$ (***).
Hence, by the strict inequalities (*), (**), (***), the sum of the interior angles of triangle ABC > 180°, an impossibility.
(II) Assume $b > x$. Since DE and AC are parallel, $b > x \Rightarrow y > b \Rightarrow y > b > x$. In triangle DFA, $b > x \Rightarrow \angle ADF > 60° \Rightarrow \angle DAF < 60°$ (*) $\Rightarrow x > a \Rightarrow y > b > x > a$.
In triangle FCE, $b > a \Rightarrow \angle ECF < 60°$ (**).
In triangle DEB, $y > a \Rightarrow \angle DBE < \angle BDE = \angle DAF < 60° \Rightarrow \angle DBE < 60°$ (***).
Consequently, by the strict inequalities (*), (**), (***), the sum of the interior angles of triangle ABC is less than 180°, an impossibility in Euclidean plane geometry.
(III) By (I) and (II), since $b > x$ and $x > b$ are impossible, it follows that $b = x$, which implies $y = b$ and AB = BC. Furthermore, in triangle DAF, $b = x \Rightarrow b = x = a$. Similarly, triangles FEC, DEB and ABC are found to equilateral.

MAY 5 M. Kaufman has also submitted a detailed analysis.

J/A 5 J. R. Sutton has also responded. And Eric Jamin has responded to all the J/A problems and kindly agreed with Martin Gardner's evaluation of "Puzzle Corner."

1975 JUN 1 Several correspondents point out that, given the position resulting from a real game, there is a forced mate in the second play, since Black cannot castle ringside. Black's pawns have made three captures, and — given the position — these captures had to be pieces. Since White is missing only two pieces, his missing pawn had to reach the eighth rank. If this was via the rook file, Black's rook had to have moved at some time. If this was via Bishop 7, the King had to be moved to get out of check. In either case, Black can no longer castle kingside. Therefore White's move is Q x P (K3).

This is summarized:

If Black:	*Then White mates via:*
Castle queenside	P – N 7
K – Q 1	Q x N (Q7)
K – B 1	Q x N (B7)
Anything else	Q x P

1976 JUN 2 Doug Hoylman offers the following:

When I first read the problem I concluded that something must have been left out; how can one draw conclusions from what people said, without any information as to whether the statements are true or false? Now I've read the published solution, and I'm even more confused. I think the key to my bewilderment is the following sentence in Michael Bissell's explanation: "The combinations of a false part 'A' and a true or false part 'B' can be eliminated since they result in a nonsensical statement." Granted, the combination is nonsensical; but *what basis do we have for concluding that Sally is not speaking nonsense?* As the problem stands, I don't see how any conclusion can be reached. Incidentally, I also disagree with the assertion that Breck, Kevin, and Deb cannot all be telling the truth. Nowhere is it stated that the table is rectangular; if it were circular, an arrangement with Breck at noon, Deb at two o'clock, Kevin at four o'clock, and Sally at six o'clock would meet all the conditions.

Proposers' Solutions to Speed Problems

SD 1 The verb "can," as in "I can," means "I am able to."

SD 2 The integers 0, 1, and 2 must be placed on both cubes. The integers 3, 4, 5, 6, 7, and 8 are then placed in any order on the remaining faces (three on each cube). The integer 9 is obtained by turning the 6 upside down!

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