

SOLUTION TO PUZZLER OF THE MONTH (Parabola Vol.27 No.1)

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- Since 15 across is a 2 digit cube, and an integer, it is either 27 or 64. Assume that it is 64.
- Now 8 across and 11 across are years, so they begin with 1 (obviously they do not begin with 0 or 2, as there was no such thing as shillings before 1000 and shillings are not used now.) Hence 9 down ends in 1. Let it be $X1$, where X is a digit.

- Now

$$\begin{aligned} 16 \text{ across} &= 15 \text{ across minus } 9 \text{ down} \\ &= 64 - X1 \\ &= (6 - X)3. \end{aligned}$$

So 16 across ends in a 3, and 7 down ends in 3. But 7 down is a square, and therefore we have a contradiction. So 15 across is 27, so that Dunk's walking speed is 3MPH, or 88 yards per minute.

- Now 10 down ends in 2. But

$$\begin{aligned} 10 \text{ down} &= 10 \text{ across} \times 9 \text{ down} \\ QR2 &= QS \times X1 \text{ (capital letters are digits).} \end{aligned}$$

So $S = 2$, and 10 across ends in 2. Therefore 8 down ends in 2. Thus it takes 12 minutes for Dunk to walk around Dogsmead $1\frac{1}{3}$ times at 88 yards per minute, and the perimeter of Dogsmead $= \frac{3}{4} \times 12 \times 88 = 792$ yards.

1		2	3		4
		5		6	
			7		
	8		9		
	1		(X)		
10	(Q)	2	11	1	12
	(R)			14	13
			7	9	Z
15	2	7	16	6	(B)

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- Let the length of Dogsmead be ℓ yards and its breadth be b yards. Then

$$2\ell + 2b = 792$$

$$\ell + b = 396.$$

But $10 < 6 \text{ across} = \ell - b < 100$. So $148 \leq b \leq 193$. Now b^2 ends in 76, so b ends in 4 or 6. Test $b = 154, 156, 164, 166, 174, 176, 184, 186$. The only ones where b^2 ends in 76 are 174 and 176. So $\ell = 222, b = 174$ or $\ell = 220, b = 176$. Therefore $\ell b = 38628$ or 38720. But the area in roods is an integer (in the puzzle) = $\frac{4\ell b}{4840}$ so $\ell b = 38720$ is the only solution, i.e. $\ell = 220$ and $b = 176$.

- 9 down must be 11 (if it were 21 or higher then 16 across would be less than 10). So 16 across is 16.
- Area in acres is 8; in roods is 32.
- 7 across = $32 \times 11 = 352$.
- 6 across is $220 - 176 = 44$.
- 1 across = 38720.
- 12 down is $(8 + 1 + 2 + 7) + 1 = 19$.
- 6 down is 45 (discovered from grid). So next year Ed will be 46, Mary 23. So this year Mary is 22 (3 down).
- Now one number in the puzzle is 32. This is now either 10 across or 5 across, as there are no other 2 digit numbers left. Now if Dunk (10 across) is 32, and his son is 45, there is something strange going on. Therefore Dunk's daughter is 32 (5 across.)
- 2 down begins with 73. 2 down is a square. The only square between 7299 and 7400 is 7396. (Mrs. Grooby is 86).
- The year the puzzle was invented is 191A, so little Pigley has had a tenure of 191A - 1610 years, i.e. 32B years are (A,B are digits). So 13 down begins with 3. So Mary was born in 1913, and is 22. Therefore the year the puzzle was invented was $1913 + 22 = 1935$ and 13 down is 325 (= 1935 - 1610).
- To finish the puzzle, if 4 down is 242, then the value of Dogsmead is $\frac{242 \times 20}{8} = 605$ - but 1 down begins with 3. So 4 down is 142, and the value of Dogsmead is (1 down) $\frac{142 \times 20}{8} = 355$.

- Now one of the cross numbers is the same as one of the down numbers. Since all clues are filled in except 10 down and 10 across, either

a) 10 across is 22,19,11,45,

or

b) 10 down is 352, so 10 across is 32, (unacceptable: Dunk is older than Ed who is 45.)

Now we know that 10 down = 11×10 across; so $792 = 11 \times 72$.

So 10 down is 792, 10 across is 72.

Now the puzzle is complete, and it was invented in 1935.

1 3	8	2 7	3 2	0		4 1
5 5		5 3	2		6 4	4
5		9		7 3	5	2
	8 1	6	9 1	0		
10 7	2		11 1	9	12 1	13 3
9				14 7	9	2
15 2	7		16 1	6		5