PUZZLES

THE HARE _WOULD_ CATCH THE TORTOISE

THE history of a problem which has exercised _Listener_ readers during the past year is recounted in a recently published book, news of which comes in the latest American magazines. Professor Edward Kanser has written "Mathematics and the Imagination," which includes among its simpler sections a statement on the problem of the hare and the tortoise.

Zeno of Elea, it seems, decided in the Fifth Century B.C. that it would be impossible for Achilles to catch a tortoise, if the animal had a start. Achilles, he said, would first have to reach the spot where the tortoise started, and by then the tortoise would be some distance ahead. By the time Achilles reached _that_ point, the tortoise would once again have a lead.

Zeno was a nuisance, it seems. Professor Kanser says that wise men wrestled with this paradox for centuries until, in the nineteenth century, Weierstrass, Bolzano, and Cantor (not Eddie) developed the realistic conception of infinity, in opposition to the old mystical conception of this imaginary value. They showed that an infinite class is no greater than some of its parts. The number of geometric points on a line a foot long is infinite, and the number of geometric points on a line an inch long is also infinite, therefore no less. Thus, although the tortoise was ahead at the start, he had to traverse the same number of points on a line as Achilles, and Achilles with his superior speed would speedily overtake him. Reviewing the book, _Time_ notes that the mathematician Leibniz was explaining the mathematics of the infinitely small to Queen Sophie Charlotte of Prussia, but was interrupted by the Queen's statement that she already understood the theory from watching the behaviour of her courtiers.

But there are more serious matters to be discussed, and the first of these are:

ANSWERS

Who Wins?: Sprinter won by four yards.

Cablegrams: Despicable
Irrevocable
Amicable
Impeccable
Implacable
Applicable

(Several correspondents sent correct answers to these, which appeared in the issue of July 12, and to the condensed crossword, answered last week. L.G.L. (Motueka) suggests these additional cablegrams: The removable cable; the understandable cable; the cable susceptible to liquidation; the unrivalled cable; and the French Revolution (1870) cable. But L.G.L. should not be blamed for those clues.)

PROBLEMS

Condensed Crossword

(Each word is of four letters only)
Clues Across:
A knotty problem.
Not used on the average but part of it.
What happened to the logs?
It can be done by someone.

Clues Down:
Rub out the first letter and leave four.
Applies as often to sports grounds as ladies' hand-mirrors.
Church furniture often used in the vernacular as an invitation to rest.
Take the saint out of Ernest.

The Five Travellers

Five people, with the unusual names of A, B, C, D, and E, enter a train at Christchurch. The train stops in turn at Riccarton, Papanui, Belfast, Stewart's Gully, and Kaiapoi, and at each station one of the passengers alights. A borrows D's paper and returns it to him at Belfast, B looks out of the window at Papanui, C does not go as far as E, E does not go as far as A, but goes farther than B. E does not alight at Belfast. Where does each alight? (Problem from R.G.)

Cipher

Another Motueka puzzler, our old friend P.J.Q., writes to point out that our printing of his cipher problem (June 28) omitted the letter O after the initial U, making the first letters UAO instead of UOAO. There has been sabotage somewhere, and the dastard responsible shall pay with his life after morning tea to-morrow. P.J.Q. also correctly answers problems which appeared from other sources on June 28.

Clocks

Here are two problems about clocks. The first comes from B.M.A. (Waitahuna). A clock takes eight seconds to strike 8 o'clock, he says, so how long will it take to strike midnight?
R.G. sets this one:
A clock was 15 seconds slow at noon on Monday and at noon on the following Monday was 27 seconds fast. Supposing that it gained uniformly, when did it show the correct time?

Father and Son

Our reply to the request from the hospital for an answer to the relations problem (July 5) prompted E. M. Ryan (Ohura) to send an alternative.
"Sisters and brothers have I none, yet that man's father is my father's son." Whose photograph was the speaker looking at? We said it was a photograph of his son.
E.M.R. suggests that the man is looking at his own photograph. He claims that the sisters and brothers in the problem have nothing to do with our answer whereas in his solution the answer depends on them. But E.M. is wrong, and we hope the hospital patients don't suffer a relapse finding out why.

Match Game

On June 28 we asked puzzlers to try and see how to play F.D.B.'s Match Game, in which players take turns at removing any number of matches from any one of three groups of three, four and five, the loser to be the man with the last match when his turn comes. None replied, until R.G. (of Waihi) came to light last week with this:
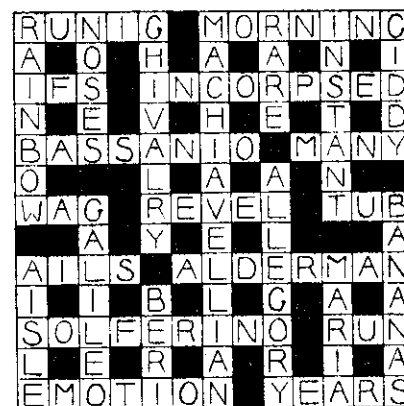"To win, two must first be taken from the heap of three, leaving 1, 4, 5. After that, no matter how B plays, A can leave either two equal heaps (always a winner) or heaps of 1, 2, 3 or 1, 3, 2, also unbeatable. Analysing these groups, you find they consist of equal numbers of the powers 1, 2, 4; e.g.: 1, 4, 5 equals two fours and two ones. So, by leaving equal numbers of these power groups one must always win, no matter how they are distributed in the three heaps at first.
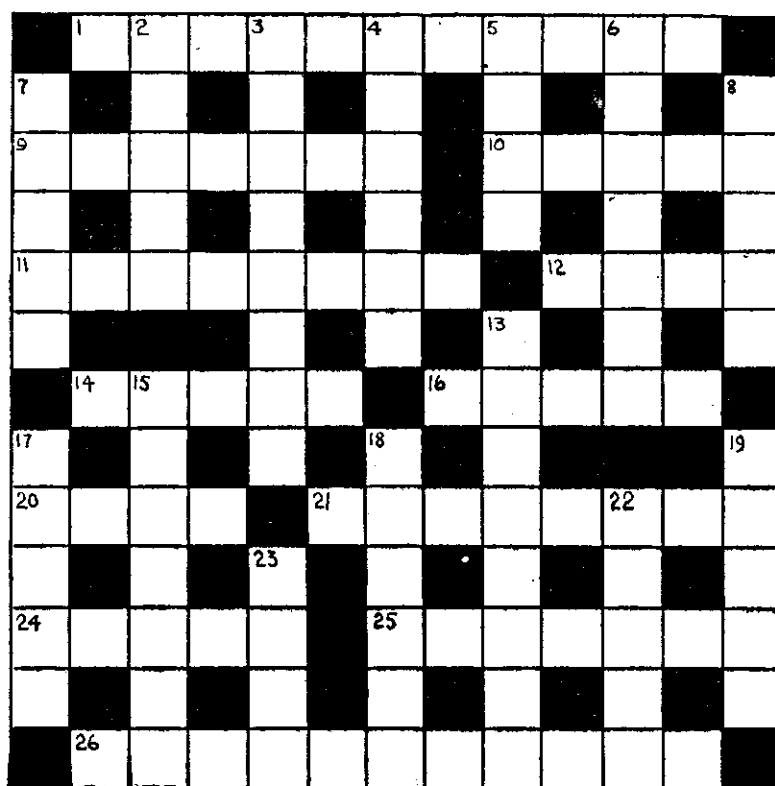Any comments?

CORRESPONDENCE

For later consideration, we are holding letters from H. G. L., S. G. E., Captain Cook, and S. J. S.

The Listener Crossword No. 17
(Constructed by R.W.C.)

Clues Across

1. These people help to keep up the marriage rate, but at present they are keeping smokers worried.
9. Find a senate-house in a coal pit.
10. "Into a —— large and broad, since called The Paradise of Fools, to few unknown" (Milton)
11. A Shakespearean character who provides a nickname for married men.
12. All the best fairy tales begin with this word.
14. Tales may become uninteresting.
16. "The law of the —— and Persians, which altereth not." (Old Testament).
20. Pen-name of a famous essayist? It's a lie!
21. A city is not upset in a confused realm.
24. Trim is disturbed and enlarged into a peak or a symbol of power.
25. Skill in the space of nine inches—this shows great fortitude.
26. To dream 'til ten is injurious.

Clues Down

2. This stock may be found in Nepal.
3. Idle cats in fortresses.
4. A camel and I show ill-will.
5. "I will —— thee, and love thee after." ("Othello").
6. No cream for lovers.
7. A vehicle in a ship; a cause of trouble during strikes.
8. Youngest of the seven; his sleeves were too long for him; all he got to sleep on was one single feather.
13. The calm before the storm? This will check you.
15. The list contains a national emblem.
17. Yes, ma! This is unpleasant.
18. If you play this, you lie low.
19. "——, ——, all, all ——, —— on a wide, wide sea." ("The Ancient Mariner")
22. A special edition.
23. The real father of Limericks.