

## LITERATE CRYPTARITHMETIC

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The hybridization of words and numbers finds its classic expression in cryptarithmic. In my view, cryptarithmic has two distinct forms, the cryptarithms of the codebreakers, and the witty constructions of the wordsmiths. Codebreakers (most notably the members of the internationally-respected American Cryptogram Association) produce algebraic puzzles with meaningless collections of letters which appeal to the mathematically inclined. The teasers produced by the wordsmiths are far more difficult to devise but usually much easier to solve. This article is concerned with the latter, which for want of a better term I call literary cryptarithms.

In literary cryptarithmic, one sets oneself the task of saying something which is apt or ironic, and which is capable of letter-to-number translation in a unique way. For example, consider the fact that two ODDs always make an EVEN. Written arithmetically,  $ODD + ODD = EVEN$ . Can this be proved mathematically? Is the answer unique?

This puzzle contains five different letters, each to represent a different number. What combination of numbers would make sense?

First of all, the E must represent one; no other digit is mathematically possible. Write a one wherever the letter E occurs, resulting in  $\dots + \dots = 1.1$ . To produce the one in the tens position of the answer, D must be made equal to five, resulting in  $.55 + .55 = 1.10$ . Sadly, there are two possible solutions to this,  $655 + 655 = 1310$  and  $855 + 855 = 1710$ , so that it fails the test of a unique solution.

Creating witty literate cryptarithms is quite a challenge, and perfect ones are worthy of publication as teasers for others to solve. To begin with, here are two which illustrate the twin aspects of aptness and irony which I devised for Pears Advanced Word-Puzler's Dictionary. Can you solve them? They are just as easy as the ODD-EVEN example previously discussed.

1. NINE + NINE + NINE = HELP
2. WRONG + WRONG = RIGHT

The first puzzle needs explanation for the non-British reader. In Great Britain, 999 is the telephone number which brings immediate response from whatever emergency service (police, fire, ambulance, or coast guard). Both puzzles have unique solutions, which are given in Answers and Solutions at the end of this issue.

I consider a teaser which needs explanation in advance (as the

first puzzle, at least for the American reader) to be inferior to one which is obvious. The third teaser, given below, falls into this category, as one must point out that AREG is the very curious plural of ERG in its meaning as "an area of shifting sand dunes in the Sahara" (see the Concise Oxford). In the fourth teaser, NEAT is both singular and plural, and means either OX or OXEN in the sense of one (or more than one) bovines. However, the two versions of the fourth teaser have different solutions. Which of these is perfect?

$$3. \text{ERG} + \text{ERG} + \text{ERG} + \text{ERG} = \text{AREG}$$

$$4. \text{NEAT} + \text{NEAT} + \text{NEAT} = \text{OXEN}$$

$$\text{OXEN} + \text{OXEN} + \text{OXEN} = \text{NEAT}$$

So far, the only teaser which is perfect in all respects is the second one, stating that two wrongs make a right: it is witty, immediately understandable, and possesses a unique answer. Creating perfect literary cryptarithms is bedeviled by all manner of infuriating difficulties, as with these failures employing subtraction instead of addition:  $\text{ADAM} - \text{RIB} = \text{EVE}$  has no mathematical solution, but if you change the lady's name  $\text{ADAM} - \text{RIB} = \text{EVA}$ , there are solutions galore:  $1015 - 324 = 691$ ,  $1016 - 735 = 281$ ,  $1017 - 596 = 421$ ,  $1018 - 427 = 591$ ,  $1019 - 258 = 761$ .

But success is possible. The following teaser is difficult to solve but, in every sense, is worth the effort.

$$5. \text{BRAZIL} - \text{TREES} = \text{DESERT}$$

To complete this review of literate cryptarithmic, one final example

$$6. \text{FACET} + \text{FACET} + \text{FACET} = \text{WHOLE}$$

which utilizes nine of the possible ten digits available (including zero), and one which is a blatant plug for my new book, due for publication in March 1990:

$$7. \text{PEARS} + \text{WORD} = \text{GAMES.}$$

I will gladly submit a copy of this book to the **Word Ways** reader who submits the cleverest perfect literary cryptarithm to **Word Ways** over the next six months. The judgment will be that of the editor, to whom confirmation of the receipt of the prize would be appreciated.