stitutions, both for the sake of accuracy, and for the sake of a general appeal to his commonsense reasoning in the concrete.

One of the most frequent sources of error is the confusion between $a+bc$ and $(a+b)c$, and this is especially noticeable when numerical values are substituted for letters.

A few weeks' practical experience in dealing with this error in boys who are not particularly brilliant will convince the most sceptical mathematician that, however needless the priority convention may be in ordinary Arithmetic, he must insist on it at all times, whether he wishes to or not. He will find it impossible to get on without it.

It is useless to argue that $a+bc$ ought to convey its real meaning to the average boy, when he substitutes numerical values. The boy will write $8{\cdot}2+1{\cdot}8\times14{\cdot}5$, and unless he has had this apparently unnecessary rule drilled into him, the chances are about even that he will write the result as 145.

It is from the psychological point of view a curious fact that this is especially noticeable, when the numbers are so heavy as to require a conscious effort for the working out of their product.

This type of mistake is continually cropping up in the practical application of mathematics to formulae and to physical problems. Such a mistake as $1{\cdot}7+8{\cdot}3(t-4)=10(t-4)$ is all too common, and we shall not improve matters by deliberately stating that $1{\cdot}7+8{\cdot}3\times9$ may be taken to mean either $(1{\cdot}7+8{\cdot}3)\times9$ or $1{\cdot}7+(8{\cdot}3\times9)$.

Royal Naval College, Osborne. R. NETTELL.

DEAR SIR,

I would have much preferred that others should have replied to Prof. Hill's letter on p. 15 of the present volume of the *Gazette*, for, alas, it cannot now be a joint reply; but as he specially calls on me to controvert, *if I can, his argument on p. 281 of the last volume that the application* of Rule 1 to such an expression as

$$9-6\div3\times2+4$$

is illegitimate because $6\div3\times2$ is of doubtful meaning, I feel bound to say a few words.

Putting aside for a moment the meaning to be attached to $6\div3\times2$, there is no doubt in my mind, and I believe the great majority of your readers will agree with me, that it is a number which has to be subtracted from the sum of 9 and 4. It constitutes a 'term.' If arithmetical and algebraic conventions are to be as nearly as possible identical, there is no alternative.

Rule 1 accepts the existence of terms, and indeed may be said to define them; terms being those quantities which are separated from each other by + or − signs. That completes my answer to Prof. Hill's specific question.

With regard to the term quoted by Prof. Hill, viz. $6\div3\times2$, my own feeling is that it ought not to be written without brackets for the reason I gave before, viz. that, if it means $(6\div3)\times2$, which is in accordance with Rule 2, it ought to have been written in the unambiguous form—$6\times2\div3$; consequently, if it is written with $\div3$ in the middle, the inference is almost irresistible that it must be intended for $6\div(3\times2)$, especially if it is read as "6 *divided by* 3 *times* 2," which is a perfectly fair reading. It is no longer a mere beginner's difficulty; experts also would be in doubt.

But that is no reason for discarding Rule 1: this particular difficulty has nothing whatever to do with that Rule! That is why we called it a red herring. ALFRED LODGE.

Charterhouse, Godalming, 30th January, 1917.

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