

what is the quotient of the product divided by the same number?"

He then gives six modes of solving this difficult problem:—

- (1.) Multiply each digit by 12 and gather results.
- (2.) Multiply by 8 and also by 4 and add, as $8+4=12$.
- (3.) Multiply by 4 and then by 3, as $4 \times 3=12$.
- (4.) Multiply by 1 and by 2, as 1 ten + 2=12.
- (5.) Multiply by 10 and by 2, as $10+2=12$.
- (6.) Multiply by 20 and by 8, subtracting the latter, as $20-8=12$.

His commentator gives two other methods:—

(7.) Make as many squares as there are digits in the multiplicand, repeated as many times as there are digits in the multiplier. Draw diagonals through these squares, using the lower half for units and the upper for tens, and getting the complete product by adding along the diagonal spaces. This is really the principle of multiplication by *Napier's bones*.

(8.) The other is what we now call *cross-multiplication*, but, while we write the answer at once, in a single line, doing the rest of the work mentally, they wrote down each part. In this example, instead of four figures they used ten; and yet, he says, it is a method not for dull scholars. They seem to have had a strange dread of mental arithmetic, partly, no doubt, from the fear of making mistakes, and partly because, with their notation, it was so easy to write down and present to the eye all the different successive steps of the operation.

The Arabs had many ingenious ways of multiplying numbers between 5 and 10. 7×8 would be $(5+2) \times (5+3)$, where the highest effort required is 5×5 ; or it might be $(10-3) \times (10-2)$, where 2×3 is the highest multiplication. Some of their methods were spoken of as difficult with ink, but easy on a sandboard, as this afforded a ready means of erasure.

The Italians were, early, skilful arithmeticians, perhaps because they were the great merchants and bankers for the rest of the world. They were, however, evidently arithmeticians *con amore*. Among their methods of multiplication were the following, which they called:—

(1.) *The apricot or chess*.—It was like ours with all the horizontal and vertical lines drawn.

(2.) *The little castle*—the set of figures being turret-shaped.