A NEW RULE FOR DIVISION IN ARITHMETIC.

Ten ordinary processes of long division is rather difficult, owing to the necessity of guessing at the successive figures which form the divisor. In case the repeating decimal expressing the exact quotient is required, the following method will be found convenient.

Rule for division.

First. Treat the divisor as follows:—
If its last figure is a 0, strike this off, and treat what is left as the divisor.
If its last figure is a 5, multiply the whole by 2, and treat the product as the divisor.
If its last figure be an even number, multiply the whole by 5, and treat the product as a divisor.
Repeat this treatment until these precepts cease to be applicable. Call the result the prepared divisor.

Second. From the prepared divisor cut off the last figure; and, if this be a 9, change it to a 0, or, if it be a 1, change it to a 9; otherwise keep it unchanged. Call this figure the extraneous multiplier.

Multiply the extraneous multiplier into the divisor; the quotient, and increase the product by 1, unless the extraneous multiplier be 7, in which case increase the product by 5. Call the result the current multiplier.

Third. Multiply together the extraneous multiplier and all the multipliers used in the process of obtaining the prepared divisor. Use the product to multiply the dividend, calling the result the prepared dividend.

Fourth. From the prepared dividend cut off the last figure, multiply this by the current multiplier, and add the product to the truncated dividend. Call the sum the modified dividend, and treat this in the same way. Continue this process until a modified dividend is reached which equals the original prepared dividend or some previous modified dividend; so that, when the process continued, the same figures would recur.

Fifth. Consider the series of last figures which have been successively cut off from the prepared dividend and from the modified dividends as constituting a number, the figure first cut off being in the units' place, the next in the tens' place, and so on. Call this the first infinite number, because its left-hand portion consists of a series of figures repeating themselves indefinitely toward the left. Imagine another infinite number, identical with the first in the repeating part of the latter, but differing from this in that the same series is repeated min-
terruptedly and indefinitely toward the right, into the decimal places.

Subtract the first infinite number from the second, and shift the decimal point as many places to the left as there were zeros dropped in the process of obtaining the prepared divisor.

The result is the quotient sought.

Examples.

1. The following is taken at random. Divide 1883 by 295.

First. The divisor, since it ends in 2, must be multiplied by 2, giving 590. Dropping the 0, we have 59 for the prepared divisor.

Second. The last figure of the prepared divisor being 5, this is the extraneous multiplier.

Multiplying the truncated divisor, 7, by the extraneous multiplier, 5, and adding 1, we have 22 for the current multiplier.

Third. The dividend, 1883, has now to be multiplied by the product of 3, the extraneous multiplier, and 2, the multiplier used in preparing the divisor. The product, 11298, is the prepared dividend.

Fourth. From the prepared dividend, 11298, we cut off the last figure, 8, and multiply this by the current multiplier, 22. The product, 176, is added to the truncated dividend, 1129, and gives 1305 for the first modified divisor.

The whole operation is thus:

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<td>1883</td>
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<td>1129</td>
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<td>176</td>
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<td>90</td>
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<td>129</td>
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<td>195</td>
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Hence the quotient sought is 6.125604100, or, in common practice, 6.12560, etc. but the exact quotient is 6.125604100, which is shown by the method as a simple division.

Example 2. Find the reciprocal of 35067.
The whole work is here given:

| 35067 | 1 |
| 23544 | 5 |
| 16430 | 7 |
| 20726 | 19 |
| 20726 | 22 |
| 20726 | 10 |
| 10000 |

Hence, 0.00002857.

Example 3. Find the reciprocal of 41.

Solution. —

| 41 | 1 |
| 379 | 9 |
| 332 | 7 |
| 148 | 6 |
| 148 | 14 |
| 148 |
| 98 |

Hence, 0.024878049.

URNSSELLA GHACILIS, A FRESH-WATER POLYZOA.

A paper on this polypus, by Professor Joseph Leidy, has been recently published, with illustrations, in the Journal of the Academy of Natural Science of Philadelphia. Urnsella was originally discovered in 1831, and briefly noticed in the Proceedings of the Academy the same year, and also subsequently in 1834, 1855, and 1870. It was found in the Schuylkill River at Philadelphia, but has not been seen elsewhere, except a dried but characteristic specimen on the shell of a Unio from Scioto River, Ohio.

Urnsella is an interesting and beautiful form, living in association with the fresh-water polypus, and having similar habits, but is very different from them or any other known fresh-water polypus, and is most nearly related with the marine genus Pediella. It is found attached to the underside of stones beneath which the water can flow. As commonly observed, it consists of a pair of stems divergent in straight lines, or rather gently curves, from a common point of attachment. The stems slightly taper, and are headed in appearance, due to division into segments alternately expanded and contracted. The segments commonly range from two to a dozen, proportioned to the length of the stem, which, when longest, is about the eighth of an inch or a little more. The stems terminate in bell-shaped polypus, with an expanded oval or nearly circular mouth slanting to one side, and furnished with about sixteen ciliated tentacles. The stems also usually give off a pair of lateral branches from the second segment extending the polypus, and frequently likewise from the first. The branches consist of a single segment or pedicle supporting a polypus, and usually also give off similar secondary branches. The first and second segments are cylindrical, highly flexible, and mostly striated and scaleless, and appear mainly muscular in structure. The succeeding segments are urn-shaped; the body of the urn being commonly pale brown, ringed with lines, and marked with dots of darker brown. The neck and pedicle of the arms are black. The different colors give the stem a headed and alternately brown and black appearance. Through the lighter colored body of the arms a central cord can be seen, extending through the length of the stem. The urn-shaped segments exhibit lateral pairs of cup-like processes, which correspond in position with the branches from the terminal pair of segments of the stem, and apparently indicate branches which have separated from the parent stem to establish themselves elsewhere as new polypus-stocks.

A series of specimens of Urnsella—such as consist only of a simple cylindrical, flexible pedicle, supporting a polypus, to those with long stems, consisting of a dozen segments—indicates the urn-shaped segments to be formed successively through segmentation of the originally single simple pedicle. The segments, therefore, do not correspond with what were polypus; but the terminal polypus is permanent, and the segments originate by division from the neck, very much as the segments of the tape-worm arise from its head. After the destruction of the head, the seg-

![Fig. 1 — Urnsella ghacilis. The one on the left with the polypus expanded; the other on the right in the condition assumed when the animal is disturbed.](image-url)