501.

REVIEW. *Tables de Logarithmes vulgaires à dix decimales construites d'après un nouveau mode* par S. Pineto, approuvées par l'Académie des Sciences de S. Pétersbourg. S. Pétersbourg, 1871.

[From the *Quarterly Journal of Pure and Applied Mathematics*, vol. XI. (1871), pp. 375—376.]

THE tables occupy 56 pages—the principal one being a table in 44 pages, the 22 left-hand pages containing the 10 figure logarithms of the numbers from 1,000,000 to 1,010,999, and the 22 right-hand pages the proportional parts ·01, ·02, ... ·99 of the differences. A like table 100,000 to 999,999 would occupy 3600 pages. By means of an auxiliary table of 3 pages, and of a slight increase of the numerical calculation, *the table of* 44 *pages does the work of the table of* 3600 *pages.* To explain how this is: the auxiliary table gives for any number A the initial four digits of which are equal to or exceed 1011, a multiplier M, such that in the product MA the initial four digits are between 1000 and 1011; this multiplier M contains only 1, 2 or 3 figures, and when there are 3 figures, then in general either the middle figure is 0, or two of the figures are equal; the table gives also $\log \frac{1}{M}$ to 12 decimals; and there is a third column, as will be explained. Hence A being as above, the auxiliary table gives M, we form the product MA, obtain the logarithm thereof from the principal table, and adding thereto $\log \frac{1}{M}$, we have the required $\log A$. Conversely, when there is given a logarithm B the first five digits in the mantissa of which are not included between 00000 and 00474 (being the limits of the first five digits of the logarithms in the principal table), the auxiliary table by means of its third column gives M; adding $\log \frac{1}{M}$ to B, we have a logarithm included in the limits of the principal table, and seeking for the corresponding number, this is $=\frac{1}{M}$ number having B for its logarithm: that is, the required number is $=M$ times the number obtained as above. Of course as regards the principal Table, the proportional parts are employed in the usual manner; the tabulation of them to hundredths (instead of tenths) facilitates the interpolation; for better securing the accuracy of the last figure, directions are given in regard to the 11th and 12th figures. An example of the determination of a logarithm is as follows:

$$\begin{array}{rl} \pi = & 3{\cdot}14159\ 26536 \\ & M = 32 \\ \hline M\pi = & 100{\cdot}53096\ 49152 \end{array}$$

$$\log \frac{1}{M} = 8{\cdot}49485\ 00216.80 - 10$$

$$\left.\begin{array}{ll} \log = 2{\cdot}00229 & 95705.75 \\ 64 & 2764.80 \\ 91 & 39.31 \\ 52 & 22 \end{array}\right\} D = 4320$$

$$\log \pi = 0{\cdot}49714\ 98726.88$$

(correct value of last two figures = 94).

The labour saved by the small bulk of the Tables goes far to balance that occasioned by the additional steps in the calculation.