

CORRESPONDENCE.

ERRATA IN THE INSTITUTE OF ACTUARIES' TEXT-BOOK—
PART I.

To the Editor of the Journal of the Institute of Actuaries.

SIR,—My attention has been called by Mr. D. J. McKenzie to an error in the Table of Values of $\text{Log}_{10}(1+i)$ to 15 places, given on page 166 of the *Institute of Actuaries' Text-Book*, part I. The error is as follows:—

With argument $100i = \frac{9}{16}$, the tabular result $\log_{10}(1+i)$ is given as .002 336 061 443 105, whereas it should be .002 436 061 443 105, the figure 3 being wrongly given in the fourth decimal place instead of the figure 4.

The table in question was, as will be seen on reference to the *Text-Book*, specially computed by my friend Mr. Peter Gray, whose reputation as a computer may be almost described as world-wide, and the conclusion naturally arrived at would be that the error was that of the printer and proof-reader. Curiously enough, however, on turning to the original manuscript table, I found that it was not so, and that the error lay in the table itself as constructed.

I have communicated with Mr. Peter Gray, and have received from him a letter pointing out how the error must have arisen, and as clearly indicating how, with the greatest care and the use of the best methods, errors will creep into calculations, I propose to give an extract from this letter, having received Mr. Gray's permission to do so. He says, after referring to the extreme improbability of the occurrence of two compensating errors in two consecutive additions, "Was not, in fact, the mode of formation the following? First, the "insertion of the differences; secondly, the addition of the same in "groups of ten, the successive sums being terms of the required "series, which sums, or the last of them, at any rate, were verified "by comparison with the parent series. Supposing all this, there "would remain the final additions for the formation of the individual "terms; and verification of the whole would be secured by the "correspondence of each of the previously inserted terms, as it was "reached, with the sum of all the preceding terms. Now $\log(1+i)$ "for $100i = \frac{10}{16}$, is one of these inserted terms, and was therefore "correct to begin with. An error was committed in the formation "for $100i = \frac{9}{16}$; and this was overlooked in consequence of careless "examination." (See Mr. Gray's note on p. 167 of the *Text-Book*).

While writing of this table, it will be of interest to give your readers the benefit of Major-General Hannyngton's examination of the table in connection with the doubt expressed by Mr. Peter Gray (see p. 168 of the *Text-Book*) as to the accuracy of the last figures in the tabular results. Major-General Hannyngton writes to me as

follows: "I have checked the logarithms of $(1+i)$ by the simple " process of *adding* the log of $\frac{1}{16}$ to those of 1,600, 1,601, &c., in " col. 1 of Gray's *24-Figure Table*, pp. 26 to 32. In this way all " the terminal figures are easily found true in the 15th place, and " the following list shows where the last figure should be increased by " an unit:

$0 \frac{1}{2}$	+	2	+	$4 \frac{8}{16}$	+	7	+	8	+
		$\frac{1}{16}$	+	$\frac{7}{16}$	+	$\frac{1}{16}$	+	$\frac{2}{16}$	+
1	+			$\frac{14}{16}$	+	$\frac{2}{16}$	+	$\frac{6}{16}$	+
$\frac{2}{16}$	+	$3 \frac{2}{16}$	+			$\frac{3}{16}$	+	$\frac{11}{16}$	+
$\frac{10}{16}$	+	$\frac{4}{16}$	+	$5 \frac{2}{16}$	+	$\frac{6}{16}$	+	$\frac{14}{16}$	+
$\frac{12}{16}$	+	$\frac{5}{16}$	+	$\frac{5}{16}$	+	$\frac{7}{16}$	+		
$\frac{13}{16}$	+	$\frac{3}{16}$	+			$\frac{11}{16}$	+	9	+
		$\frac{13}{16}$	+	$6 \frac{1}{2}$	+			$\frac{6}{16}$	+

Mr. J. R. Watson, A.I.A., of Glasgow, has pointed out an error in line 9 on page 94, where the words "actually paid by the lender" should read "actually paid by the borrower."

I am, Sir,

Your obedient servant,

1 *September* 1884.

W. SUTTON.