of the mean rate of interest between the limits is a fair one when loans and repayments are dealt with year by year, the table in the Paper continues the series and indicates how such an assumption should be modified to represent the average accumulations of longer transactions. A real and not a fictitious tabular simplicity of results may thus, it is hoped, be gradually brought about in actuarial calculations; and with the greater and greater effect, as the supposed difficulties of variation, instead of being evaded, become more and more thoroughly studied.

To prevent undue inferences, it is right to state that the eminent mathematician alluded to, is not to be considered as in any way answerable for the contents of the paper in question, nor indeed as an implied authority either for or against the principles therein enunciated.

Your obedient Servant,
EDWIN JAS. FARREN.

Hanover Chambers, Buckingham Street, Strand,
London, February 2nd, 1855.

ON THE FACILITIES AFFORDED BY MR. THOMSON'S ACTUARIAL TABLES IN MAKING CERTAIN CALCULATIONS.

To the Editor of the Assurance Magazine.

Sir,—It would, I think, be useful, if you were to invite communications from your readers of such questions as they may meet with in practice, and which are not to be found in the text books. If you approve of this suggestion, and think the accompanying case worthy of a place in your *Magazine*, perhaps you will kindly insert it. The facility with which the formula is worked out affords another instance of the usefulness of Mr. Thomson's Actuarial Tables, and of the consequent benefit they confer on the profession.

I am, Sir, yours truly,
ROBERT TUCKER.

Lombard Street, 8th February, 1855.

What single and annual premium should be charged to secure £100 per annum to A, aged 32, after the death of B, aged 40, provided B die within 5 years (Carlisle 3 per cent.)?

The value of that portion of the annuity which may be enjoyed by A during the first five years is evidently $_{\overline{5}|}A - {}_{\overline{5}|}AB$; and it is equally clear, that the value of the remaining portion is $^{5}A \times {}_{\overline{5}|}\mathfrak{B}$ $\therefore$ the total value of the annuity is $_{\overline{5}|}A - {}_{\overline{5}|}AB + {}^{5}A \times {}_{\overline{5}|}\mathfrak{B}$.

Thomson, Table 1, Single Lives.		Table 2, Single Deaths.
$A = 19{\cdot}13521$	$^{*}AB = 14{\cdot}30229$	$\mathfrak{B} = {\cdot}47158$
$A_{-\lvert 5} = 14{\cdot}69049$	$_{-\lvert 5}AB = 9{\cdot}91515$	$_{-\lvert 5}\mathfrak{B} = {\cdot}40884$
$_{\overline{5}\lvert}A = 4{\cdot}44472$	$_{\overline{5}\lvert}AB = 4{\cdot}38714$	$_{\overline{5}\lvert}\mathfrak{B} = {\cdot}06274$
$4{\cdot}38714$		
$_{\overline{5}\lvert}A - {}_{\overline{5}\lvert}AB = 0{\cdot}05758$		

* AB being taken equal to a single life of 50.

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$$
{}^{5}A \times {}_{\overline{5}|}\mathfrak{B} = 17\cdot9287 \times \cdot06274 = 1\cdot124846
$$
$$
\cdot05758
$$
$$
{}_{\overline{5}|}A - {}_{\overline{5}|}AB + {}^{5}A \times {}_{\overline{5}|}\mathfrak{B} = 1\cdot182426
$$

Annual premium $= \dfrac{1\cdot182426}{1+{}_{\overline{4}|}AB} = \dfrac{1\cdot182426}{4\cdot588} = \cdot25772$ for £100 per annum. Premium in one sum, £118. 4*s*. 10*d*., or £25. 15*s*. 5*d*. annually.

FORMULA FOR AN APPROXIMATE VALUE OF ANNUITIES AT SIMPLE INTEREST.

To the Editor of the Assurance Magazine.

Sir,—In looking over some old letters, I found one, dated some years back, from Professor De Morgan, in which he gives the following elegant approximation to the value of $\dfrac{1}{1+r} + \dfrac{1}{1+2r} + \dfrac{1}{1+3r} +$, &c. $\dfrac{1}{1+nr}$.

He says the best approximation is

$$
\frac{2\cdot3025851}{r}.\log.\frac{1+nr}{1+r} + \frac{1}{2}\left(\frac{1}{1+r} + \frac{1}{1+nr}\right) + \frac{r}{12}\left(\frac{1}{\overline{1+r}|^{2}} - \frac{1}{\overline{1+nr}|^{2}}\right)
$$
$$
- \frac{r^3}{120}\left(\frac{1}{\overline{1+r}|^{4}} - \frac{1}{\overline{1+nr}|^{4}}\right);
$$

error only in the sixth decimal when $r = \cdot1$, or interest at 10 per cent.,

$$
\frac{1}{1\cdot1} + \frac{1}{1\cdot2} + \frac{1}{1\cdot3} + \ldots\ldots \frac{1}{2\cdot0}.
$$

Approximation	6·687715
Truth	6·687714

I am, Sir,

Your obedient Servant,

London Assurance, March 10, 1855. PETER HARDY.

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