

CORRESPONDENCE.

A FRAGMENT OF HISTORY.

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

MY DEAR SIR,—When recently destroying a mass of papers, I saved from the flames copies (made by me thirty-five years ago) of two private formal “Opinions”, by Joshua Milne and Griffith Davies, upon (what they conceived to be) the proper method of distributing profits. You may probably consider that they possess an antiquarian interest sufficient to justify their insertion in the *Journal*, more especially as the products of two of the most original minds in our profession.

I furnish the Opinions in the authors’ own words :

I.—*Opinion of JOSHUA MILNE expressed in 1821.*

1. From the total value of the property at present held by the company deduct the sum which would be required to discharge its present engagements, including the purchase of all its policies now in force, and call the remainder the *surplus fund*.

2. Call the part of this fund, which is to be divided among the assured, the *gross dividend*.

3. From the amount of the premiums received for each assurance now in force, with its improvement at interest up to this time, deduct the present value of the policies ; the remainder will be the contribution from such policies towards the surplus fund as well as to all the outgoings of the company.

A being insured by any one policy, call this remainder in his case *the contribution of A*.

4. Then, as the sum of such contributions derived from all the policies in force is to the gross dividend, so is the contribution of A to his share of that dividend, or the value in present money of the augmentation of his claim which should now be made.

5. From such present value the equivalent augmentation of the claim may be arrived at.

II.—*Opinion of GRIFFITH DAVIES expressed in 1821.*

The *only* correct method of dividing profits is to apportion them in such a way to the different policyholders as to make the *present values* of their respective bonuses in the ratio of the profits which have accrued to the office from those persons during the time they have been respectively assured.

Suppose A, aged 20 at the time of effecting his policy, has been assured six years for £1,000 at a premium of £21. 15s. 10d., the amount of the six premiums which he will have paid during those six years, improved at 3 per-cent compound interest during that time, will equal £145. 3s. 8d., and the value of his policy at the

end of that time will be only £50. 14s. 5d.: hence, the profit accruing to the office from him if he be then alive must be £94. 9s. 3d.

Suppose D, aged 35, assured for the same sum and for the same number of years at a premium of £29. 18s. 3d., the amount of his contributions will be £199. 5s. 6d. and the value of his policy £77. 16s. 5d.: hence, in case he survive, the office must realize by him £121. 9s. 1d.

I therefore infer that the present values of the bonuses of these two persons must, in equity, be to each other as 94'462 is to 121'454. But in order to have the present values of these bonuses to each other in the above ratio, we must divide the former number by '457, the present value of £1 at the death of A, who must then be 26 years old, and the latter by '5451, the present value of £1 at D's death, who will then be 41 years old; the quotients will be $\frac{94'462}{'457} = 206'7$, and $\frac{121'454}{'5451} = 222'8$.

Let £66. 9s. 5d. be divided—

$$\begin{array}{r} 206'7 \\ \underline{222'8} \end{array}$$

429'5 : 66'471 :: 206'7 : 31'989 = £31. 19s. 9d. for A's bonus; and taking this from £66. 9s. 5d. we get for D's, £34. 9s. 8d.

We notice, by the way, a characteristic of these two actuaries: the methodical manner of Milne, and the partiality of Davies for expressing his views in figures.

Yours very truly,

T. E. YOUNG.

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THE VALUATION OF LIMITED-PAYMENT POLICIES.

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

SIR,—In July 1898, Herr Altenburger, in a letter to the *Journal*, described a method of valuing special class policies by which all those on lives of the same age might be grouped together and valued as whole-life policies, a correction being afterwards made, depending on the nature of each particular contract. The method is especially applicable to Limited Payment Policies, as it avoids the separation of the sums assured and premiums into different sections, if the policies are to be valued in groups. The general formula for age attained x is $V = A_x - Pa_x + \frac{PN_{x+n}}{D_x}$ where

P represents the limited payment premium, and PN_{x+n} is inserted as a constant at the outset in the valuation registers; so that the total of the column divided by D_x gives the value of