CORRESPONDENCE.

MORTALITY OF ABSTAINERS AND NON-ABSTAINERS.

[We have much pleasure in finding space for the following letters which have been addressed to us.—ED. *J.I.A.*]

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

SIR,—In the discussion which followed the reading of Mr. Moore's Paper on this subject it was pointed out by several speakers that, in order to obtain a true comparison between the rate of mortality amongst abstainers and non-abstainers respectively, it was essential that the lives brought under observation in the two classes should be similar in all other respects; and it was generally considered that Mr. Moore had been fortunate in obtaining data which possessed this necessary qualification. Had time permitted it was my intention to point out one respect in which the abstainers' experience differed from the non-abstainers' in a sense favourable to the former.

Mr. Moore's tables appear to me to contain ample internal evidence that the new business in the abstainers' section has been increasing very considerably in proportion to the new business in the non-abstainers' section.

I. On reference to the footnote to Table XV, it will be seen that during the period of 19 years from 31 December 1882 to 31 December 1901, the number of policies in force in the abstainers' section *increased* by about 29 per-cent, while the number of policies in the non-abstainers' section *decreased* by about 23 per-cent. In fact, while the total number in the two sections remained nearly the same, the numbers in the separate sections practically changed places.

II. On reference to Tables III and IV it will be seen that the policies "existing" at the close of the observations represent 43·5 per-cent of the entrants in the abstainers' section, but only 29·5 per-cent of the entrants in the non-abstainers' section.

III. On reference to the same tables it will be seen that the average number of years of exposure per new policy entering was 13·7 in the abstainers' section and 14·7 in the non-abstainers' section; while from Table V it appears that, if the first five years of assurance be excluded, the figures are 10·0 and 10·7 respectively. *Cæteris paribus*, the difference might have been expected to be in the reverse direction in view of the lower average entry-age and the lower rate of discontinuance in the abstainers' section.

If the explanation of these figures be, as I have suggested, that the proportionate amount of new business in the abstainers' section has increased, the result must be that in two senses of the word the abstainers' experience is somewhat "newer" than the non-abstainers. That is to say—

I. On the average the exposures must refer to a *later period* of time in the abstainers' section than in the non-abstainers', and there is clear evidence (both in Mr. Moore's paper and in the recent O^{M} experience) that the rate of mortality is improving as time goes on.

II. On the average the exposures in the abstainers' section must relate to *more recently selected lives* than those in the non-abstainers' section. This point is not entirely met by Mr. Moore's Table V in which the experience of the first five years from entry is excluded,

because it is now generally recognised that the effect of selection is felt for a very much longer period.

It will be observed that whatever effect these differences might have, would be in the direction of exaggerating the divergence between the two sections.

I do not, however, suggest that these considerations would have sufficient effect in this case to seriously alter Mr. Moore's percentages, or the deductions which he draws from them. I refer to them rather as showing (on the point of statistical method) that it is not necessarily sufficient "that the same method and period be used for both sections" since this does not exclude differences, which, in certain circumstances, might be important.

I am, Sir, your obedient Servant,

G. J. LIDSTONE.

1, *Bartholomew Lane*, 30 *November* 1903.

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

SIR,—Replying to Mr. Lidstone's letter of 30 November, the principle involved in his criticism of my paper must be admitted; but I submit that its bearing on the relative mortality of the abstainers and non-abstainers amounts to very little. Indeed, Mr. Lidstone is good enough to admit this in the last paragraph of his letter. If we compare the rates of mortality of the whole-life policies, healthy males, to the end of 1882, when the relative positions of the abstainers' and non-abstainers' sections were practically the reverse of those at the end of 1901, we have the following results :—

Percentage the Abstainers' Rate of Mortality is of the Non-Abstainers' Rate.

Ages	To end of 1882	To end of 1901
(1)	(2)	(3)
20–24	89·5	69·9
25–29	75·5	70·1
30–34	59·6	56·5
35–39	58·1	54·8
40–44	58·8	57·2
45–49	64·1	58·5
50–54	61·6	62·4
55–59	65·2	70·6
60–64	81·7	78·5
65–69	82·1	84·0
70–74	85·7	86·5
75–79	88·6	110·0
80–84	74·9	93·7

I contend that the figures in column (2) support my general conclusions equally with those in column (3).

Some light is thrown on the effect of "selection" in my Tables V to VIII. Moreover, it does not necessarily follow that the selection operates in the same manner in each section. If we omit the first five years of assurance, the superiority of the abstainers' life is rather more evident than in the total experience, as is here shown :—

Percentage the Abstainers' Rate of Mortality is of the Non-Abstainers' Rate, Whole-Life Healthy Males, 1841–1901.

Ages	Total Experience	Excluding first five years of Assurance.
20–24	69·9	45·8
25–29	70·1	58·2
30–34	56·5	51·7
35–39	54·8	52·7
40–44	57·2	55·8
45–49	58·5	55·9
50–54	62·4	60·7
55–59	70·6	69·4
60–64	78·5	76·1
65–69	84·0	83·4
70–74	86·5	86·4
75–79	110·0	109·5
80–84	93·7	93·7

We might be justified in assuming from these figures that if "selection" could be entirely eliminated, the abstainers would come out better still.

I am, Sir, your obedient Servant,

R. M. MOORE.

1, *Adelaide Place, E.C.,* 14 *December,* 1903.

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

SIR,—The object of my letter of 30 November was to call attention to a question of principle, which, as it seemed to me, was in some danger of being overlooked, and I am glad to note that in principle Mr. Moore and I are in agreement. I was, however, careful to disclaim any intention of discussing the quantitative effect of the considerations to which I alluded, and I do not now propose to enter into any such discussion, for which the published data appear to be inadequate.

I should like, however, to suggest to Mr. Moore that, as his paper is likely (for a long time to come) to be the standard source of information on the subject, it would be very desirable to add to his tables a statement giving, for quinquennial periods, the relative numbers of new entrants in the two sections; thus showing clearly the different rates of progression.

Mr. Moore's remarks as to the relative effect of selection in the abstainers' and non-abstainers' experience are very interesting, and encourage the hope that as he is in possession of a unique body of facts he may see his way, at no remote time, to analyze the data according to the duration of assurance. By this means he would not only obtain the most scientific comparison between the rates of mortality in the two sections, but would also secure the means of investigating whether the effect of selection differs in the two sections as he suggests.

In the case of assurance statistics it is hardly possible to *eliminate* the effect of selection, but what I understand Mr. Moore to suggest is that as the duration of the assurance increases the effect of

selection may wear out more rapidly in the case of the non-abstainers than in the case of the abstainers. This hypothesis is certainly consistent with the percentages given in the second table of Mr. Moore's letter, and it offers an interesting subject for further investigation. It may be worth while to point out that if the hypothesis be correct the effect will be to increase and not to diminish the disturbing effect of the differences of duration to which I called attention in my previous letter.

I am, Sir, your obedient Servant,

G. J. LIDSTONE.

1, *Bartholomew Lane, E.C.*, 21 *December*, 1903.

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

SIR,—I regret that owing to pressure of other business I am unable at present to furnish the relative numbers of new entrants quinquennially in the Temperance and General Sections. To do so would involve a very extensive re-sorting and counting of the cards. I hope, however, in a few months to go more closely into the question of " selection " by an analysis of the data, as suggested by Mr. Lidstone.

I did not intend to imply in my letter of 14th inst. that selection may wear out more rapidly in the case of non-abstainers, nor have I any reason to believe that this is so, except that " Abstinence " is an element of selection with the Abstainers, and this always remains with them ; in other words, never " wears out." But the other elements are the same in both sections, so far as we know.

Broadly, the aggregate experience shows a certain superiority of the abstainers over the non-abstainers. If we exclude the experience of the first five years of assurance, this superiority is even more evident. At present we have no material to show that either section would show relatively better or worse results if we excluded the first seven or ten years of assurance, but I hope to make this clear shortly.   I am, Sir, your obedient Servant,

R. M. MOORE.

1, *Adelaide Place, E.C.*, 29 *December*, 1903.

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