CORRESPONDENCE.

MORTALITY ON THE CONGO.

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

15 *March* 1907.

DEAR SIR,—In the foregoing valuable investigation by Paul Bergholm into this subject, the date of death has been taken as the date of exit of those who have died. That is to say, in finding the "exposed to risk", the year of death has not been treated as a complete year, but the life has been held as exposed to risk only up to the date of death. This procedure is different from that usually followed by British Actuaries, and its effect is to diminish the "exposed to risk", and consequently to increase the resulting rates of mortality. In fact the rates deduced by this method are not the true "rates of mortality" as defined in the *Text-Book*, but are approximations to the "force of mortality." This difference should accordingly be borne in mind when making any comparison between M. Bergholm's results and those which have been published in this country. Assuming the deaths to be evenly distributed throughout the year, the effect of M. Bergholm's method will be to diminish the "exposed to risk" by six months in the case of each death. On this assumption, therefore, the true rates of mortality can be deduced from his figures by adding to the number of years of life exposed to risk, as found by him, one-half of the number of deaths. Making this adjustment, we find that the average rate of mortality over the whole experience as shown in Table 3 is reduced from 9·1 per-cent to 8·7 per-cent. The average rate deduced by me ten years ago (*J.I.A.*, xxxiii, 288) was 9·4 per-cent, which is considerably higher ; but this difference may be due to a difference in the average ages in the two experiences. In order to test this I have divided the figures in M. Bergholm's Table 4 into five groups, representing the same ages as the groups in the table given by me on p. 290 of vol. xxxiii. Applying the above-mentioned adjustment in respect of the year of death, the following figures are obtained :

Ages	SPRAGUE				BERGHOLM			
	Years of Life	Actual Deaths	Rate of Mortality per-cent	Expected Deaths	Years of Life	Actual Deaths	Rate of Mortality per-cent	Expected Deaths
17–25	408	29	7·1	34	480	41	8·5	34
26–28	288	23	8·0	24	618	52	8·4	49
29–33	362	29	8·0	28	802	64	7·9	64
34–37	151	16	10·6	12	407	33	8·1	43
38 & up.	138	16	11·6	15	341	39	11·4	39
...	...	113	...	113	...	229	...	229

Having regard to the limited extent of the data, the two sets of rates correspond as closely as could have reasonably been

anticipated. The columns headed "expected deaths" are obtained by multiplying the exposed to risk in each set of data by the rates of mortality deduced from the other ; and it will be seen that (omitting fractions) they coincide in each case with the actual deaths. This shows that, on the whole, the two experiences were subject to the same rates of mortality, and I therefore do not think that the figures indicate any superiority in the mortality of Scandinavians in the Congo over other Europeans.

M. Bergholm writes as if it were an established fact that the rate of mortality in the Congo has appreciably diminished in recent years, and it would be interesting to know his authority for this. His own investigation is, as he points out, not a sufficient proof, and the above comparison seems to throw doubt upon it.

The following figures, deduced from Tables 3 and 7, bring out the relative importance of various causes of death, and show clearly that sailors suffer less from fever than any other class, this being the principal reason why they experience a much lighter death-rate than soldiers. As Table 7 relates to 236 deaths, while Table 3 (from which the "exposed to risk" are taken) relates to 230 deaths only, these figures are rather too large in some cases. The extent of the errors therein can be measured by a comparison of the average rate of mortality in each class with the corresponding rate shown in Table 3 :

Approximate Rates of Mortality per-cent per annum from various causes.

Cause of Death	Soldiers	Missionaries	Sailors	Other Occupations	Total
Fever . . .	10·1	6·0	4·3	5·1	5·7
Other Diseases . .	1·9	·7	1·3	1·7	1·3
Accident and violence	1·6	0·	·8	·6	·7
Unknown . . .	1·6	1·1	1·5	2·8	1·5
	15·2	7·8	7·9	10·2	9·2

It may be that the lighter mortality from fever among sailors is due to their occupation keeping them more or less out of the reach of mosquitos, and so rendering them less liable to be infected with malaria.

In this connection I may mention having once seen it stated that the crews of the vessels on one of the great African lakes had suffered much less from malaria ever since they had adopted the plan of mooring at some distance from the shore instead of close in ; but, unfortunately, I cannot now trace the source of that statement.

Yours faithfully,

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