CORRESPONDENCE.

THE TWENTY-THREE GERMAN OFFICES' EXPERIENCE.

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

SIR,—A reference of Mr. Chatham's (*J.I.A.*, xxix, 91) to the method adopted by the compilers of the mortality experience of the twenty-three German offices, immediately following a notice of Mr. Meikle's Paper "On the Official Publications of the Mortality of Assured Lives" (T. A. S. Edin., i, 334), with a mention of his method of computing the exposed to risk by taking the lives from birthday to birthday, has prompted me to offer a description of the exact process employed by the German actuaries, which I trust will be the more interesting, inasmuch as the only previous reference to it occurs in Mr. Meikle's pamphlet.

The difference between the German method and that of other experiences lies fundamentally in the manner of treating the age. In the experiences anterior to this, the observations grouped under age x had been made up really of persons who might have been half a year older or half a year younger than x, and it had been assumed that the average age would not differ materially, in a sufficient number of observations, from age x. In dealing with such an experience the rate of mortality of a group of lives of all ages from $x-\frac{1}{2}$ to $x+\frac{1}{2}$ being determined, the result is presumed to represent with sufficient accuracy the rate among a body of lives who are all of the exact age x. The observations are divided into yearly periods, determined either by the falling due of an annual premium or the end of a calendar year, and the rate of mortality deduced for each year.

The method adopted by the Germans dealt with the age exactly; the entrants were grouped according to age, and the periods of observation were determined to be the time from birthday to birthday —always one year, with the exception of the first and last periods. As the insured do not enter on their respective birthdays, the first period runs from the date of entry to the next birthday—on the average, half a year, but varying from a year to a day; the second period, and every other except the last, runs from birthday to birthday, while the last period runs from the birthday to 31 December 1875, the close of the observations. The last period on the average is, like the first, half a year.

There is no difficulty in dealing with any of the intervening years, but a little further consideration may be given to the first and last periods.

The ages in the first period vary from an exact age to the next exact age, less one day, and the average duration is half a year. Following, in principle, the method adopted by the Institute in dealing with year 0, the rate of mortality has been found by working with half the entrants to get the exposed for a full year, and the age has been taken to be the age at the previous birthday, thus obviously understating the average age at entry by half a year. For the last period the time of observation varies from a year to a day, and the age is the age of the last birthday under observation, while half the number exposed to risk has been adopted as in the first period. This explains the difference noticed by Mr. Meikle between the making up of the experience of the Institute and American tables, and that of the German, which amounted to half the existing at the close of the observations on 31 December 1875.

Considering, further, the differences between this method and that of the Institute, at the commencement of the second period we have a number of lives all of exactly the same age, but the time which has elapsed since entry is different, varying from a year to a day; on the average, half a year has elapsed, and it is assumed that the rate of mortality deduced correctly represents the rate among a body of insured lives who have all entered a society exactly half a year ago. Similarly for other periods of observation—at the commencement of the third period the average time elapsed since the date of entry is $1\frac{1}{2}$ years, at the commencement of the fourth, $2\frac{1}{2}$ years, and so on, the experience being made up in years similar to the calendar years of the Institute and American experiences, and these years may be called years 0, 1, 2, 3 . . . . as if they were truly calendar years of observation.

In conclusion, I may say that the foregoing explanation has been

written after a perusal of a paper in the German Assurance Year Book for 1886,* "On the Methods for ascertaining the Mortality from the Experience of Life Insurance Offices", by the late Mr. W. Lazarus, in which the author not only expounds the method followed by the Germans most carefully and fully, but also examines that which has been adopted by the Institute, by the Gotha, and by the Americans respectively.

I am, Sir,

Your obedient Servant,

York, PHILIP L. NEWMAN.
3 *June* 1891.

"CURRENT AGE."

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

Sir,—In your report of the discussion on Mr. Chatham's prize essay you state that I objected to the phrase *current age*, as incorrect; and I shall be obliged if you will now allow me to state the reasons why I consider it to be incorrect. We can speak of the current week, or the current year, or the current century: because each of these is a definite period of time, which is in progress—in fact, current; but a man's age is a period of time which is not current, but is completed. This is obvious when we have the age stated exactly as so many years, months, and days. In ordinary language, however, if a man is between 29 and 30 years of age, we say that he is 29, taking into account only the completed years; and it may be argued that, as the 30th year of his age is current, it is permissible to speak of his current age being 30 years, as is done in the *Institute of Actuaries' Mortality Experience*. To me this seems as incorrect as it would be to say that the now current century is 1,900 years. The following illustrations, however, may perhaps place the matter in a still clearer light. If the distance between one place and another is between 29 and 30 miles, we may say in general that the distance is 29 miles, neglecting the fraction of a mile; but we could not say the current distance is 30 miles. So, again, if the time is between 11 and 12, we could not say that the current time is 12 hours; but this would be exactly analogous to saying that the current age is 30 years. I trust, therefore, that the objectionable phrase will be dropt, and that the

* *Assecuranz Jahrbuch.* Herausgegeben von A. Ehrenzweig, vii Jahrgang Wien, 1886. Vol. vii, Part ii, pp. 216–239.