methods. Although it may not be possible to find the values used in the construction of an annuity table, developing columns consistent with the annuity values is a relatively straightforward process. Having the annuity values $\ddot{a}_x$, one need merely set D_0 equal to some convenient constant. Then $N_0 = \ddot{a}_0 \cdot D_0$ and the columns may be completed by backing off using

$$N_x = N_{x-1} - D_{x-1}$$

$$D_x = \frac{N_x}{\ddot{a}_x}$$

If it is desired, one may conveniently alter the interest assumption of the table by computing

$$D'_x = D_x \cdot \left(\frac{1+i}{1+i'}\right)^x \quad D_x \cdot \left(\frac{1+i}{1+i'}\right)^x$$

As with any such procedure, one must be careful not to carry the results beyond the significance of the input data.

My conclusion, then, is that the problem Mr. Ferguson has examined is one which occurs so rarely (at least in its simple form) that the benefits of the theoretically correct procedure are outweighed by the efforts of implementing it. Areas such as this do provide an opportunity for fruitful cooperation between insurer and reinsurer. Since reinsurers may suffer more from reserve inaccuracies, they have a legitimate interest in the techniques utilized. Perhaps it is time for reinsurers to help develop and implement reserving methods which serve their needs as well as those of primary insurers. In this respect, Mr. Ferguson's article forms an excellent first step.

AUTHOR'S REVIEW OF DISCUSSIONS

I am grateful to Mr. Golz for an interesting review of my paper. Mr. Golz accomplished at least three things in his review: he presented his opinion that the reserving technique is probably not worthwhile since the basic problem does not occur frequently; he pointed to a significant gap in my paper, as respects catastrophes; and he provided us with a technique for determining working values of N_x and D_x given only $\ddot{a}_x$.

I believe our differences of opinion on the value of implementing the reserving techniques described in my paper result from our different perspectives. Mr. Golz, for example, states that with retentions in the neighborhood of \$250,000 one would only infrequently encounter cases where the recommended reserving technique would matter. While the retention of \$250,000 may be used by a large compensation writer, such as the one for which Mr. Golz works, there remain hundreds of companies with much lower retentions, sometimes as low as \$10,000. Clearly, for these companies, the difference between the correct and incorrect reserving technique can be significant.

The reviewer suggests that the "non-pension portions of the reserve outweigh the difference between correct and incorrect methods of splitting the direct reserve." While it is true that the non-pension portions of a loss do complicate the issue, they do not present an insurmountable problem. Very often their present values can be calculated as is done for pension benefits. Frequently, for example, medical care costs can be expressed as \$x per year and then handled as an annuity.

The ink was scarcely dry on my paper when I realized that I had failed to cover the problem of catastrophes (multiple person accidents). Generally speaking, the ceding company's retention applies on a per accident basis rather than on a per claim basis, and Mr. Golz is quite correct in pointing out that this condition will complicate the task of computing the correct reserve. Fortunately, multiple person accidents do not seem to be as common as one might guess and, as Mr. Golz points out, the theory for calculating the correct reserve does exist. With modern day computing machinery such complicated reserving practices may not be as formidable as they seem. In any event, I resist the notion that because it is difficult to calculate correct reserves in a multiple person accident, we should fail to make an attempt to calculate the correct reserve when it is feasible.

Finally, Mr. Golz is to be congratulated for developing an algorithm for determining the N_x and D_x values consistent with $\ddot{a}_x$ values. The reader will recall that the N_x and D_x values were not published in the New York Tables (Bulletin 222).

While not agreeing with all of Mr. Golz's observations and conclusions, I am, nevertheless, indebted to him for a good review of my paper.