



SOCIETY OF ACTUARIES

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THE SOCIETY'S TREASURER

By Michael B. McGuinness,
Treasurer

To most members of the Society of Actuaries, the Treasurer is the individual who stands up each year at the annual meeting and announces that the dues for next year have to be increased. He, or she, is usually able to wear a black tie while doing so, to signify that income exceeded expenses during the previous 12 months; but then may add that fees for meetings and examinations will have to rise.

The financial statement presented by the Treasurer at the annual meeting reports on the operations for the fiscal year ending on the previous July 31, a date chosen to allow sufficient time to complete the necessary work and for the external auditors to complete their review. The statement shows highlights of the balance sheet and income and expenses by major category, with the current year compared both to the budget and the previous year's results. It is a summary of the detailed 16-page statement presented to the Board of Governors at its meeting the previous day. The Board is justified in expecting few surprises during its examination, because either it or the Executive Committee has had a chance to comment on interim statements on five different occasions earlier in the year.

Closely linked with the measurement of the financial results for the current year is the preparation of the budget for the following year. The budget presented to the members (about \$4.6 million for the current fiscal year) has been refined twice by the Board and once by the Executive Committee and, like the financial statement, shows each item of income and expense by major

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PHILADELPHIA: CRADLE OF OUR PROFESSION IN NORTH AMERICA

By E.J. Moorhead

Ed. Note: This is extracted from the author's address to the Actuaries Club of Philadelphia in April 1985.

In 1913, Emory McClintock, who at age 73 was certainly one of the three most eminent actuaries on this continent, contributed a paper in several installments to the *Transactions* of the Actuarial Society of America with the uncompromising title, "Charles Gill: The First Actuary in America". McClintock was the recently retired actuary of the Mutual Life of New York; Gill had had a brilliant six-year career as actuary of that same company, cut short by his death in 1855.

Perhaps it was in deference to Mr. McClintock's seniority that no Philadelphia actuary contributed a discussion contesting that author's assertion that Gill was chronologically first on this continent. It's at least equally peculiar that a leading Fellow of that day, Miles Menander Dawson, said nothing on the subject; 13 years earlier Dawson had published an article, first refuting a claim to that designation made for himself by Nicholas De Groot and then conferring it, at least implicitly, upon Elizur Wright.

It seems clear to me that the person who deserves the title that McClintock conferred upon Charles Gill is one of two Philadelphians — either Rober Patterson or Jacob Shoemaker. Here are thumbnail biographies of these two, from which claims on behalf of each of them may be judged.

ROBERT PATTERSON (1743-1824) was born in Ireland, crossed to America in 1768, and immediately began

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A STATIONARY POPULATION PROBLEM IN THE BIBLE

By Solomon Goldfinger

In light of your recent editorial on Moslem insurance, the following "Stationary Population Problem" in the Bible may be of interest.

The problem involves two censuses of male Israelites between the ages of 20 and 59, taken over a period of six months. One is described in Exodus 30:12 and 38:26, and the other in Numbers 1:2. The first census occurred eight months after the Exodus and the second 14 months after the Exodus. Since the two censuses occurred six months apart, one would expect the ages of the population to be different, so that there would be new entrants and "retirees," not to mention deaths, in the period. Nevertheless, the total count (reported in Exodus 38:26 and Numbers 1:46, respectively) for each census was exactly 603,550. What accounted for this Stationary Population?

Several approaches to this problem are offered in the Commentaries. One offered by the mathematician and philosopher Rabbi Levi ben Gershon (Ralbag - 1288-1344) is that the male Israelites between the ages of 20 and 59 did in truth happen to form a stationary population over this period. If so, the famous stationary population exercises in Chapter 8 of Jordan could be applied to the Israelites of this period.

However, the great commentator Rabbi Shlomo Yarchi (Rashi - 1040-1105) offers a different approach. According to Rashi, the solution lies in the method of determining age for the purpose of these censuses. In general, dates of events in the Bible are based on time elapsed since the Exodus. Thus, the first census occurred in the "eighth month of

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Stationary Population

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the first year" and the second in the "second month of the second year" (Numbers 1:1). Nevertheless, the age of an individual is based on the "Calendar Year" (the same definition of Calendar Year used in the current Hebrew calendar). Now the Exodus occurred in the seventh month of the Calendar Year. As a result, both censuses occurred in the same Calendar Year — the first census in the second month of the Calendar Year following the Calendar Year of the Exodus, and the second census in the eighth month of that Calendar Year (since the censuses occurred eight and fourteen months after the Exodus).

Furthermore, under Rashi's approach, age was not defined as either age nearest birthday or age last birthday (in which case the population would have changed), but rather by the formula:

$$\frac{\text{(Current Calendar Year)} - \text{(Calendar Year of Birth)}}{1}$$

This formula may be recognized as the one typically used by actuaries for measuring policy year duration for such purposes as determining valuation rates, if "Issue Year" is substituted for "Calendar Year of Birth" in the formula.

Combining the Calendar Year basis with the "duration" definition of age, the result is that everyone was of exactly the same age at the time of the two censuses.

This explains why there were no new entrants or "retirees," but why were there no decrements due to death? The answer given is that this extraordinary mortality experience was a fulfillment of the Divine promise, "there would be no plague among Israel," stated in Exodus 30:12, if the first census was conducted properly. Not only was there no plague, there were no deaths at all for those six months!

It thus turns out that the population of the two censuses was *literally* a stationary one — exactly the same people were counted in each one, and they were all exactly the same age at each census. The question then arises, why was the second census required at all? Given the formula and definitions used and the known fact that no deaths had occurred, it was obvious beforehand that the second census would result in exactly

WINNERS

Last year the Society announced a contest in which entrants were asked to submit applications of the new text, *Actuarial Mathematics*. The winners are as follows:

The first prize, \$500, is awarded to H. Dennis Tolley and Megan P. Jones for their paper, "Variance in Policy Design". Both authors are at Brigham Young University.

The \$300 second prize goes to Warren R. Luckner of the University of Nebraska for his paper, "Analysis of Premiums".

The third prize, \$200, is awarded to Michael Schachet, The Wyatt Company, Memphis, for his entry, "Evaluating Optional Forms of Payment Available from a Defined Benefit Pension Plan".

In addition to the cash prizes, winners will receive plaques acknowledging their contributions. A workshop has been set aside at the Annual meeting in New Orleans for the presentation of the winning papers. □

the same count of 603,550!

The answer given to this problem involves some further actuarial insight, namely that, depending on the purpose of the census, different questions are asked and different sub-categories of information are obtained. The purpose of the first census was fund-raising for the Sanctuary. Each male between the ages of 20 through 59 contributed exactly one half-shekel of silver. The census was a byproduct of this fund-raising effort — since each male in the age range contributed exactly the same amount, by tallying the total amount of silver collected the population count could be derived. In fact, the population is reported in Exodus 38:26 in terms of the number of half-shekels of silver donated. Because the purpose was fund-raising, no demographic information was obtained from the first census other than the total population count.

The purpose of the second census, on the other hand, was to derive the actual count of the Israelites, not only in total, but by demographic breakdowns, i.e., by tribe and family. These breakdowns are all reported in detail in Numbers 1-4. Thus, it is true that the *total* was known from the first census. However, more detailed demographic data was required, thus necessitating the second census. □

Deaths

Henry G. Devitt	FSA 1948
Harrison Givens, Jr.	FSA 1957
Miguel A. Ramirez	ASA 1967
Thomas B. Sorensen	FSA 1968

InFact

The Actuary is pleased to tell its readers about a relatively new and too-little-known publication, *InFact*, an Abstract of Recently Published Insurance Articles. *InFact* is compiled by Herbert C. Pettersen.

InFact is a large collection of small abstracts of recent articles appearing in insurance publications, organized by date of appearance under subject matter. Among the 25 or so sources from which content is abstracted are most of the publications of the Society, Academy, and Conference. Other sources are ACLI, CLU, HOLU, and LOMA, as well as the insurance magazines. Mr. Pettersen hopes to keep *InFact* up-to-date. The most recent issue was published in February, and carries the abstracting through calendar 1984.

As an indication of the format, we reproduce here the *InFact* abstract of John Boermeester's article which appeared in this newsletter.

Topic: ACTUARY Reflections on "Actuarial
 Author: Boermeester Mathematics, Vol 1";
 Reference: The Actuary comments about new life
 Date: 84/09 Page:2 contingencies text with illustrations of possible applications suggested by formulas developed in the text. □

Actuarial Books Available

I am helping a distinguished actuary, now disabled, to dispose of his many books. These include TASA back to 1929, TSA and Report Numbers to their beginnings, JIA to 1906, TFA to 1924, HOLUA 1930-81, and some ICA volumes, 1957 and later. Readers wishing to acquire any of these for the cost of shipping may notify me at my Yearbook location. Specify the books.

E. J. Moorhead

I have a complete set of cloth bound copies of TSA, Volumes I through XXXV, available to any reader willing to pay shipping.

John S. McCoy