

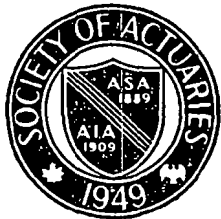


SOCIETY OF ACTUARIES

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# The Actuary

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## MONEY MYOPIA—INSURANCE INDUSTRY AND THE SAVINGS DOLLAR

by D. S. Magnusson and D. E. Steven

*Ed. Note: This is the gist of the authors' presentation to the Actuaries' Club of Winnipeg. The discussion was described as "contentious." Some argued that we are in the protection business and should not enter the shorter-term fund accumulation process, particularly on the ordinary side. Others approved of providing alternatives to other savings institutions and discussed the consequent investment problems.*

Myopia means "deficiency of foresight or discernment." One can review the last 50 years and conclude that our industry has exhibited a degree of myopic behaviour concerning the savings dollar in Canada.

### Individual Products

From the early 1920's to the mid-1950's, individual products demonstrated a relative lack of change or improvement. There was, however, good reason for the success of Retirement Annuities and Retirement Income Endowments over most of this period. Following the Depression, the customer's greatest concern was security, and our industry had an impeccable reputation for meeting financial promises. During the decade following the war, signs of change were emerging, but the cloud of myopia prevented our discerning the future.

The post-war economy provided increased interest rates, and banks, trusts and credit unions started attracting more savings. Reduced term rates led to "buy term and invest the difference" alternatives. And just when we might have reacted positively, the Department of National Revenue introduced the Registered Retirement Savings Plan—a monopoly for our industry. Instead of focusing on the total issue, we continued to sell, with

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## JOHN E. O'CONNOR IS SOCIETY'S NEW EXECUTIVE DIRECTOR

The Board of Governors on May 23rd unanimously approved the appointment of John E. O'Connor, Jr. to fill the vacancy created when Peter Plumley resigned as Executive Director.

For the past twelve years Mr. O'Connor has been on the staff of the American College of Hospital Administrators in Chicago. He holds a B.B.A. degree from Loyola, and is a C.P.A. He will start his duties with us in July.

We welcome Mr. O'Connor to the Society staff. More information about him will appear in *The Actuary* next month. □

## IN THE FOOTPRINTS OF GEORGE KING AND SPURGEON

Alistair Neill, F.I.A., F.F.A., *Life Contingencies*, pp. 452, William Heinemann, London, 1977, £10.50.

by William H. Wetterstrand

This book replaces the Hooker and Longley-Cook texts for the Institute and the Faculty of Actuaries examinations. The author was educated both in Britain and in the United States (under a Fulbright grant). His U.S. experience is strongly evident in the book, since it bears a closer resemblance to our Jordan than to the British texts both in topic selection and arrangement. The most striking difference from Jordan is in the new book's practicality, it having been designed particularly for self-study. Many worked examples are given. The exercises are mostly numerical, treating actuarial functions in applications typical of an actuary's daily work, i.e., theory admirably tied to practice.

Naturally, the treatment relates to British practices. Differences in terminology give the book a certain charm for the American reader: office premiums, assurances, bonuses, retirals, and so on. A gross premium model, showing

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## THE ART OF IMMUNIZING

by C. L. Trowbridge

The Committee on Valuation and Related Problems, formed two years ago to develop a theoretical framework for the balance sheet of an insurance enterprise, has issued a preliminary report. This report was discussed in a Concurrent Session at the New Orleans Society meeting in early April. Number 1 of Volume 5 of the "RECORD," to appear in the late summer, will contain this report and its several attachments.

The body of the report is seven pages long. Assets are viewed as the present value of the income stream arising from investments held; liabilities as the present value of the disbursement stream arising from insurance and annuity contracts already in force. The most troublesome theoretical problem is to determine an appropriate valuation interest rate.

The difference between assets and liabilities ( $D=A-L$ ) is thought of as an aggregate contingency reserve, having three components:

- $C_1$  is a contingency reserve for the possibility of asset loss.
- $C_2$  is a contingency reserve for the pricing of an insurance product proving to be inadequate.
- $C_3$  is a contingency reserve against the possibility of a change in interest rates, which can be expected to affect A and L differently unless income and outgo flows are closely matched.

The Committee has not attempted to quantify  $C_1$  or  $C_2$ , but has referred each to the Actuarial Education and Research Fund. Research specifications appear as attachments 1 and 2 to the preliminary report. The AERF is asking for proposals on these two matters. (See AERF p. 7).

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**Footprints**

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three types of expense, serves to relieve the student of some of the mystery that surrounds the topic of gross premiums at the Associateship level

There is a welcome array of graphs and pictures; particularly appreciated are those illustrating fractional reserves on premiums payable m-thly. Pictorial aids are marvelous pedagogic devices; future authors might carry their development yet further by offering, say, three-dimensional representations of stationary populations.

Familiar topics omitted from the Neill text include these:

- a) family income benefits at two interest rates;
- b) m-thly increasing annuities and insurances;
- c) Lidstone's Theorem (except for its two common corollaries);
- d) average age at death problems for closed groups in a stationary population.

These omissions remove some complex, confusing mathematics and will be welcomed by students and teachers alike. Their practical import remains to be determined, however.

One addition of note is a compact proof of Woolhouse's formula depending upon operators. The Society has removed responsibility for this from the Part 3 examination. The most serious omission is that of the traditional "mutual fund" justification of insurances or annuities, using mortality table values as expected numbers of lives. Without this interpretation students may have difficulty understanding risk-sharing within an insurance company. Also missing is the explicit formula:

$$\ddot{a}_x = \sum_{t=0}^{\infty} v^t \cdot {}_t p_x$$

Annuities are defined as summed pure endowments, but the formula is immediately translated into commutation functions, thus hiding the analogy with annuities certain and the interpretation

of  ${}_t p_x$  as a discount factor.

The formula

$$\ddot{a}_x = \sum_{t=0}^{\infty} \ddot{a}_{\overline{t+1}|} \cdot {}_t | q_x$$

is given as an exercise without comment, thereby failing to teach that insurance functions are expected values of compound interest functions with respect to the discrete or continuous period till death. For the random variable  $t$ , the time until death of  $(x)$  has probability

density function  ${}_t | q_x$  when  $t$  is measured discretely, and

$${}_t p_x \cdot \mu_{x+t}$$

when  $t$  is measured continuously. There is a brief section on standard deviations,

but referring only to  $\bar{a}_x$ . No-

where is it mentioned that insurance functions have probability distributions, although usual practice is to limit attention to the expected values of these distributions.

In summary, this is a refreshing book that diminishes the Atlantic barrier for English-speaking actuaries. Its numerical problems alone make it an attractive alternate study source, especially for the Part 4 student who is not working directly in ordinary insurance. □

**Competition**

(Continued from page 5)

On that note Chandler McKelvey observes:

It's time perhaps  
To finally lapse

More simply put by Jeffrey J. Nohl:  
His grace period expired

We were a little short on epitaphs for other professionals so will squeeze in one for a hypochondriac:

I told you so  
Robert L. Brown

and one for a lawyer:

Seized from the whereinbefore  
Possessed by the hereinafter  
Gil Fitzhugh

which leads us to our favorite(s) and the winner(s), Howard Kavton's mated pair:

Actuary

Mortality Tabled

Accountant

Posted Mortem

As a runner up we return to Professor Vogt's:

He was an actuary  
capable and true  
and sometimes wise

But now  
midst liars and statisticians  
he lies and lies

This one we find especially appropriate since, it develops, the new Editor has recruited a new Competitions Editor, giving the lie to the assertion in our last column that this was the last competition. We assume that the short established tradition of anonymity will be honored by the new Editor-in-Chief. We wish them both Godspeed and for a send-off here is Competition number  $\Omega + 1$ :

Readers are invited to send in ideas for Competitions. There is no limit on the number of entries; there are no rules and probably no prizes.

C. E.

**Immunizing**

(Continued from page 1)

Determination of interest rates for valuing assets and liabilities is closely associated with  $C_3$ , the contingency reserve for interest rate change. Attachment 3 is a 15-page paper presenting the Committee's thinking on interest assumptions. Immunization theory, first developed in Great Britain and later introduced to North American actuaries by Vanderhoof, contributes much to the theory presented here. (See *T.S.A.*, XXIV, 157, and its bibliography).

Attachments 4 and 5 relate the theory developed within the Committee to practical valuation matters as they are currently seen by the industry and the regulators in the U.S. and Canada.

The Committee on Valuation and Related Problems is made up of D. D. Cody, J. C. Hickman, J. C. Maynard, R. S. Robertson, S. H. Turner, C. L. Trowbridge, Chairman, and D. J. Grady, CAS liaison. The Committee invites comments from any interested actuary. □

**Deaths**

- George W. Chalmers—ASA 1957
- Manuel R. Cueto—FSA 1944
- Arthur J. C. Huenergard—FSA 1919
- Charles F. Wood—ASA 1950