



SOCIETY OF ACTUARIES

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PROPOSALS FOR REFORM OF ACTUARIAL NOTATION

by Frank G. Reynolds, Chairman,
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Nomenclature

Ed. Note: This is the first article in a series.

Little noticed by most North American actuaries, our colleagues elsewhere have worked hard in the last 15 years trying to revise our traditional system of notation. While the initial efforts came from a group of German-speaking actuaries, notable work has been done by the British, Australians, and New Zealanders.

Why Change?

Present notation poses three basic problems, two of which are:

- (a) It doesn't serve the needs of pensions and health insurance.
- (b) Minor inconsistencies and difficulties have arisen in practical use, e.g., the Mereu Ambiguity (*The Actuary*, April 1973).

Although there is widespread agreement on the need to replace our notation, and even some consensus on how to do it, the obstacle to progress has been in the third basic problem now to be discussed.

Strengths and Weaknesses Of Our Present System

Reluctance to abandon present notation, a central symbol surrounded by a "halo" of parameters that define it further, comes from its major strengths, which are these:

- (1) A symbol is quickly comprehensible to those familiar with the principles.
- (2) The notation is precise, and forces its users to be specific.
- (3) The system's clarity has led to helpful developments by people pondering the true meaning of certain combinations.
- (4) The system is used worldwide, and has been carried over into related fields.

Yet, proponents of change have two basic arguments and several subsidiary ones. Academics trained in other fields find our notation difficult to accept; first, it's not in the functional form $f(x,y,z,u,v,w)$ to which they are used, and seemingly small changes may result in vastly different meanings; second, the

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Deaths

Allan F. Lebourveau, F.S.A. 1937
Sir George Henry Maddex, F.S.A. 1950*

*Sir George Maddex, K.B.E. was President of the Institute of Actuaries in 1948-50, a period that included the 100th anniversary of the Institute. At our March 1950 meeting the Society unanimously voted to enroll him as a Fellow without examination (*TSA II*, 166). In recent years Sir George has been our only member holding that distinction.

MARCUS GUNN, 1892-1982

Ed. Note: This appreciation has been compiled from recollections by several who knew Mr. Gunn well.

As a very young boy in Oregon, Marcus Gunn was orphaned by the deaths of his parents in a flash flood from which the Gunn children barely escaped. Brought up by an aunt in Detroit, Marcus became a 1914 graduate of the University of Michigan Actuarial Program; in 1920, after his studies had been interrupted by service in World War I, he earned his Fellowship in the American Institute of Actuaries.

Until 1962 when he retired as Vice President and Chief Actuary of California—Western States Life Insurance Company, he established and held his reputation as an actuary who was courageous, innovative and flexible. With other actuaries he pioneered in mass selling, first of life insurance in the 1930's, then of hospital and medical coverage after World War II. Two large life insurance plans, still in existence nearly half-a-century later, stand as evidence of his imaginative combining of group and individual policy concepts in a way not previously undertaken. The health insurance coverage for the California Farm Bureau, in days when such coverage was new to most rural people, was a case of joint underwriting by three companies of a plan that no single company was prepared to undertake.

"Mark," said an eminent actuary 30 years ago, "was the moving spirit in getting the (Pacific States Actuarial Club) started." His friends remember the twinkle in his eye, his enjoyment of physical vigor which prompted him to challenge younger associates to foot or bicycle races, but mostly the aid and encouragement he gave so freely. He generously shared his store of knowledge and experience with those whom it would help. □

HESTER PLAN FOR INVESTING DURING INFLATION

by Robert J. Johansen

At our Houston meeting (PD 1), Donald D. Hester, Professor of Economics at University of Wisconsin, outlined a novel investment system aimed at protecting purchasing power of the lender's funds from inflation's ravages.

Noting that over the next few years corporations will need to borrow large amounts, Prof. Hester suggested that to fill their long-term needs two varieties of paper be created: (1) a series of futures contracts on the Consumer Price Index in the same amount as the repayment due in a year, and (2) a series of conventional coupon bonds which pay, say, 2% per annum. The former would require the borrower to pay at maturity the product of the contract's face value and the percentage change in the CPI since the security was issued. The lender would receive both the conventional bond and the long side of the series of futures contracts. Either party could trade these futures contracts in the usual way in a secondary market such as the Chicago Board of Trade.

This device seems preferable to constant purchasing power bonds because of the secondary market feature, and yet seems capable of fully protecting the interests of beneficiaries. No reinvestment to preserve the inflation premium is involved. With an assured volume of contracts and with settlement allowed in current dollars, this market might well become the dominant futures market in the U.S.A.

The presentations by Prof. Hester and his panel colleague Prof. Victor Zarnowitz, and the ensuing discussion, will appear in the *Record*, Vol. 8, No. 1. □

Message To Part 7 Students

For the 1982 exam, the following have been removed from Required Reading: *From Part 7E*, the Winklevoss text and the Street paper; *From Part 7I (Can.)*, study notes 705, 706 and 711. Other minor changes are being made, and a modest amount of material added. Be sure to read the Introductory Study Note carefully for particulars.

L.N.C.

As One Man Sees Us

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posit but if you die a day after buying a life insurance policy someone gets a windfall. This was sloppy reporting in an otherwise well researched book.

What does the author say about actuaries?

"Actuaries forecast claims, crank in assumptions about interest rates and, thus armed, set insurance rates. They excel at statistics, probability theory, compound-interest calculations and the extrapolation of trends. They say things like (and I quote) 'The adjusted rates were graduated by a Jenkins fifth difference modified osculatory interpolation formula with fourth differences at the end points set equal to zero.' They tend to be conservative."

A bright spot is that although he complains of an excess of lawyers, underwriters, agents, and insurance in general, he never says there are too many actuaries.

...I needn't expound on Tobias' book; Valerie Sands did this capably in the *National Underwriter* (April 3, 1982). It is important that actuaries not dismiss this book with, "Who does this guy think he is to tell us how to run the industry?". This guy is basically an educated consumer; his misconceptions and gripes are those of the consumer, albeit expressed with sophistication; his solutions, the ill-advised as well as the feasible, will appeal to consumers. We should prepare ourselves with rebuttals to his misconceptions, and with our solutions to his gripes.

At least buy the book, it's deductible.

Actuarial Software Catalog Available

The first Actuarial Software Catalog, a project of our Committee on Computer Science described in our Sept. 1981 issue, has been published. To obtain a copy, send \$3.00 to Society of Actuaries, Box 98474, Chicago, IL 60693.

Systems for employee benefits are listed separately from those for life and health actuarial operations.

Shrinkage

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Assumption A: Level 1,200 Part 1 Passers

1985	9,678	3.9
1990	11,221	3.0
1995	12,725	2.5

Assumption B: Level 1,600 Part 1 Passers

1985	9,798	4.2
1990	11,932	4.0
1995	14,013	3.3

Assumption C: Level 2,000 Part 1 Passers

1985	9,918	4.5
1990	12,643	5.0
1995	15,300	3.9

Assumption D: 10% Annual Increase (from '81)

1985	9,722	4.0
1990	12,172	4.6
1995	16,203	5.9

Assumption E: 2% Annual Decrease (from '81)

1985	9,678	3.9
1990	11,117	2.8
1995	12,359	2.1

None of these five possibilities will achieve membership growth even approaching in percentage what we have experienced during the 1970's. Even to accomplish growth rates in the 3%-5% range—the second and third projections—would require a recruiting and publicity effort beyond the scope of anything presently contemplated.

Actuarial Notation

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difficulties that printers and even typists have with the notation are barriers to getting books and papers published.

The subsidiary arguments for change get into the practicing actuary's world. The present notation is difficult to convey by the spoken word—a problem in everyday work and even more so for the student attempting to comprehend a professor in the classroom. Computer incompatibility too has been identified as a practical problem, though less and less so as computer flexibility grows.

Our next article will begin to examine various proposals for change that have been offered.

AERF Dollars

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Unallocated funds, largely contributions by individual actuaries, support AERF's administrative activities and new projects still ahead.

Income and Expenditures

Income

Contributions	\$ 14.0 (thousands)
Interest	6.4
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	20.4

Expenditures

Halmstad prize	1.2 (thousands)
Administration	2.9
Fund solicitation	3.3
Research Director	7.1
Project development	1.3
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	\$ 15.8

AERF's Research Director is Cecil J. Nesbitt, University of Michigan. Its Directors are in our 1982 Yearbook, p.19.

SOCIAL SECURITY REPORTS

It is specially important this year that actuaries familiarize ourselves with at least the official summaries of the Social Security Trustees Reports. These help us to evaluate the funding and benefit proposals being made and criticized as the system's decision-making time approaches. There is also supplementary material useful to many of us. The following have been issued recently:

I. Trustees Reports

Single copies of two summaries are yours for the asking, viz.,

Summary of the 1982 Annual Reports of the Social Security Boards of Trustees. 23 pp. Request this from Office of the Actuary, Social Security Administration, Baltimore, MD 21235.

Summary of the 1982 Annual Reports of the Medicare Board of Trustees. 20 pp. This is a new summary that has been prepared, says Roland E. King, F.S.A. "because of public misconceptions regarding the nature of the trust funds and their financial problems." Request this from Bureau of Data Management and Strategy, HCFA, Office of Financial and Actuarial Analysis, Room 1-C-11 Oak Meadows Bldg., 6325 Security Blvd., Baltimore, MD 21207.

And of course actuaries who will read them should include in their letters requests for the full texts of the customary three Trustees Reports.

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