

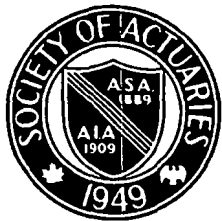


SOCIETY OF ACTUARIES

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The Newsletter of the Society of Actuaries

VOLUME 12, No. 8

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NEW TEXT BOOK

A group of five authors has now been selected to write the new text book on actuarial mathematics. The book will probably be in two volumes, and will expand upon the material covered in Jordan's *Life Contingencies*. It will include applications of contingency theory to individual and group life and health insurance, annuities, pension funding, and computer algorithms used in calculating actuarial values. It will also cover some elementary applications to casualty coverage and to risk theory.

The authors selected to write the new text book are:

Newton L. Bowers, Jr., F.S.A., M.A.-A.A., Professor of Actuarial Science, College of Business Administration, Drake University;

Hans U. Gerber, A.S.A., Associate Professor of Mathematics, University of Michigan;

James C. Hickman, F.S.A., A.C.A.S., M.A.A.A., E.A., Professor of Business and Statistics, University of Wisconsin, Madison;

Donald A. Jones, A.S.A., M.A.A.A., E.A., Associate Professor of Mathematics, University of Michigan;

Cecil J. Nesbitt, F.S.A., M.A.A.A., A.I.A., Professor of Mathematics, University of Michigan.

The text book development will be reviewed by a committee consisting of representatives from the Casualty Actuarial Society and the Society of Actuaries who specialize in the fields of life, health and group insurance, pensions, casualty insurance, and actuarial education. This book is being designed for the course of reading in the Associateship examinations, and it is expected will be published by 1981.



21st INTERNATIONAL CONGRESS OF ACTUARIES

Announcement No. 2 of the Congress Committee has been distributed to members of the International Actuarial Association for 1977 and/or 1978. Note that the Provisional Registration form enclosed therein must be forwarded to the Congress Correspondent by October 31, 1978.

Members of the Canadian Section should send the original and first carbon copy to:

MR. LAURENCE E. COWARD
William M. Mercer Limited
7 King Street East
Toronto, Ontario M5C 1A2, Canada

Members of the U.S. section should send them to:

MR. JOHN C. WOODY
Senior Vice President
North American Reassurance
Company
245 Park Avenue
New York, New York 10017

Actuarial Meetings

Nov. 6-8, Conference of Actuaries in Public Practice

Nov. 9, Baltimore Actuaries Club

Nov. 13-14, Canadian Institute of Actuaries

Nov. 15, Seattle Actuarial Club

Nov. 16, Southeastern Actuaries Club

Nov. 21, Chicago Actuarial Club

MORTALITY MENSURATION

Robert W. Batten, *Mortality Table Construction*, pp. 246. Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632, \$15.95.

by Richard L. London

Measurement of Mortality by the late Harry Gershenson has been for the past seventeen years perhaps the only text published in North America on the subject of the construction of mortality and other tables. It certainly has been the best known and most widely read. It has now been joined by a new publication, *Mortality Table Construction* by Robert W. Batten, Professor of Actuarial Science at Georgia State University.

The scope of the topic contained in the new text is virtually the same as that of the older text, although presented in a slightly different order. In seven successive chapters, Professor Batten discusses the several common mortality assumptions [uniform distribution of deaths (UDD), Balducci, constant force]; the concept of exposure and how it can be directly determined under the Balducci hypothesis; methods of tabulating the basic categories involved in mortality studies; individual record exposure studies (using actual ages, insuring ages, policy durations, and fiscal ages); valuation schedule exposure studies, categorized as being Balducci based or UDD based; the demonstration (both intuitively and mathematically) of the equivalence of an individual record formula and a valuation schedule formula based on identical assumptions (counterpart formulas); and, finally, practical aspects of mortality studies.

Overall, this reviewer considers the new text to be a fairly good one.

Specifically, the treatment of tabulating rules, independent of an application to actual, insuring or fiscal ages, is well

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To Be Continued*(Continued from page 5)*

Interdisciplinary work with economists, demographers, financial analysts, and lawyers should be encouraged (UL).

Some suggested that the Society should commission re-write work on the more mathematical and theoretical study notes (DU) and on some of the textbooks now on the syllabus, and should encourage the creation of new texts to reflect changes in the educational requirements of actuaries (DU, UM).

Others felt that the actuarial bodies should consider giving direct financial assistance to support research (WM), either by awarding prizes, e.g. an annual prize for the best paper(s) produced by their members (BC), or by, for instance, supporting the full time research of some professors each summer (BS, DU, UW). Liaison between the Society's Director of Education and academics could result in "mini-sabbaticals" (DU); ". . . the basic problem . . . is identification of research areas and coordination with those who will use the results" (UI).

It was noted that the CIA Mortality and Morbidity studies could, at virtually no additional cost, be carried by the universities, thus increasing the professors' internal prestige as a welcome byproduct (UW).

It was also proposed that the Society should keep a well-publicized and periodically updated list of available theoreticians so that, when a company needed a solution to a particular problem, it could consult this list and finance an academic to do the research rather than, as is so often done, setting up a committee to do this. As for costs, "for the industry this (would be) little more than the cost of a single committee meeting" (UW). Cooperation between university researchers and the industry should be strengthened (UL).

With respect to industry attitudes, most responses could be considered to fall in two categories. First, there was some strong feeling that pressure on young actuaries to pass exams prevented them from undertaking research projects and created a tendency to see instruction aimed at exam passing as the only function of university actuarial programs (NE), WM). Direct recognition of the Master's degree in salary determination would help (UI).

Secondly, strong representations were made urging the insurance industry to "contract out" research to the universities: ". . . the university . . . is an environment for the pursuit of research which the industry needs accomplished but (which) . . . is either not being done or is being done by individual companies instead of on an industry-wide basis. The funding of such research could come from the industry, thus benefitting . . . the universities as well as the industry" (NL).

One response (UW) listed a number of projects for which assistance had been requested from both government and industry, but which had all been refused (one was refused by an industry committee on the grounds that "it was felt that actuaries were not qualified to do research into life insurance of a broad nature!"); in addition, great difficulties were encountered in obtaining information from industry sources.

More understanding from the industry would be a great help—" . . . there appears to be little recognition of the fact that an industry brief carries less weight with legislators and regulators than a brief by independent University professors" (UW).

One respondent mentioned that a project for simulation of a life company operation was "farmed out" to an outside agency before it had been offered to one of the universities' actuarial departments (PS).

The comments regarding suggestions to the academic community and professional organizations could have been more or less expected, although this does not make them any less important; the suggestions to the industry however are most revealing and should be given very serious consideration by companies and consulting firms. With some very minor changes in the way they do things there could be a major impetus to research in the universities that could benefit the whole profession (and the industry!). □

Mortality Mensuration*(Continued from page 1)*

done. Professor Batten utilizes a "generalized calendar age" tabulating rule which prepares the reader for dealing later with fiscal age tabulations, a task which has traditionally been a difficult one.

Another useful feature of the text is a significant emphasis placed on the algebraic proof of the equivalence of counterpart formulas. In the older text, Mr. Gershenson apparently assumes that such equivalence is intuitively seen, and that an algebraic demonstration thereof is not necessary. Although Gershenson's assumption is quite reasonable, an algebraic proof, if not over-emphasized at the expense of general reasoning, can also be instructive.

Candor requires, however, that several criticisms of the text be mentioned.

There is undue emphasis on mathematical foundations and analysis of various mortality assumptions in Chapter 1. This material fundamentally belongs to the subject of life contingencies, and is adequately treated by Jordan. A brief review of this material would have been appropriate by Professor Batten, but the emphasis which he has placed on it may cause readers to overestimate the importance of solving algebraic manipulations at the expense of the basic purpose of the text, an understanding of the theory and practice of experience investigations and table construction.

The set of individual record exposure formulas in upper case notation, referred to by Gershenson as "against the traffic" formulas, is developed totally algebraically by Batten, with no supportive general reasoning or intuitive explanation. The same can be said of his development of continuous formulas from their associated single interval forms. Pedagogic considerations would seem to require that a text point out the logic and rationale of formulas, in addition to their algebraic correctness.

In Chapter 5, Batten develops valuation schedule formulas based upon the uniform distribution of deaths assumption. Such formulas are certainly viable alternatives to the traditional Balducci-based set; in fact, one of the UDD-based is probably the most widely used of all

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Mortality Mensuration

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valuation schedule formulas. However, the attention given to these UDD-based formulas seems to be excessive and ill-advised.

The Balducci basis, although chosen for practical, not theoretical, reasons, has the useful property of allowing an independent determination of exposure which can then be divided into the deaths to determine rates of mortality. UDD-based formulas have no such property. Thus they do not have a comparable intuitive base, and really just exist as the result of an algebraic manipulation. Since there is no independent determination of exposure, it follows that UDD-based valuation schedule formulas do not have individual record counterparts. It should also be pointed out that under the assumption that migration occurs at the ends of unit intervals, the single-diagonal Balducci-based formulas are in fact exact formulas, whereas the analogous UDD-based formulas are correct only under the UDD assumption.

On the matter of the algebraic demonstration of the equivalence of counterpart formulas, Professor Batten warns the reader that confusion can arise from the fact that valuation schedule formulas have rigidly-defined notation, whereas the individual record counterpart formulas do not. Unfortunately, the text tends to contribute to this confusion by occasionally changing the definition of the previously well-defined valuation schedule symbols to conform to the arbitrarily-defined individual record symbols. Much less confusion would ensue if the text were to consistently allow the former to remain well-defined, while defining the latter to conform in each case.

Since there is practically no difference in the scope of coverage of the Batten and Gershenson books, it would appear that the two should be compared on the basis of pedagogic effectiveness. In the preface for the Society of Actuaries in the new text, attention is drawn to the fact that many students study this subject on their own, unaided by classroom instruction. In light of this, it is important that text material be designed to effectively communicate to readers material and concepts that can be fairly complex. The ability to achieve this effective

communication in textbook form is a rare skill.

With all due respect for Professor Batten's pedagogic abilities as a writer and classroom instructor, it is the opinion of this reviewer that the text by Mr. Gershenson is the better one. The toll road analogy praised by Batten in his preface, but not utilized by him in the text, is an exceedingly useful teaching device. Furthermore, Mr. Gershenson had that rare ability to communicate with his readers almost conversationally. Although not incapable of improvement, Gershenson's work, judged on the basis of pedagogic effectiveness, can only be described as excellent.

The Batten text has been chosen by the Education and Examination Committee as the officially recommended text for the Part 5 examination. Nevertheless, it would be advisable for the Society of Actuaries, as the publisher of the Gershenson text, to continue to make it available as a companion resource to the Batten text. □

Letters

(Continued from page 3)

Actuarial Directions

Sir:

In the September issue, Mr. Leckie asks for ideas for future Actuarial Research and Experience Studies. I would like to propose two such ideas.

First, I think there is a need for an entire review of the subject of risk classification criteria. In the past, the tests of a useful criterion included at least the following:

- (1) It should be easily understood (such as sex, age, etc.)
- (2) It should be easily quantified (such as age, height, etc.)
- (3) It should provide a meaningful differentiation (for example a difference in attained age usually means a difference in remaining lifetime).

However, no one criterion is an absolute predictor of remaining lifetime. Therefore, the anti-discrimination forces have successfully attacked most criteria. It is no longer legal to require mandatory retirement at age 65. It is no longer legal to differentiate pension contributions as between men and women. And so the process continues.

What is needed is some alternative set of criteria which meet the three tests listed above, but which have not yet been encrusted with the emotional discriminatory connotations of sex, age, etc. Such a new set of criteria would permit the life insurance industry to continue to match the premium to the risk.

Second, I think there is a need for authoritative statistics in areas where new corporate and governmental activity is beginning, and where the insurance industry has not been very active. In the past, movement into these areas has led to over-generous benefits and under-funding. The funding weaknesses of Medicare, Social Security Disability, state pension plans, and similar situations are not all traceable entirely to a lack of statistics at the outset, but that lack was certainly a factor.

Now, for example, we see a need to provide group life insurance, disability benefits, health benefits, and pension accruals between 65 and 70. Important regulatory and corporate decisions are being made on inadequate statistical evidence. The Society could do a service to government, the corporate world, and the insurance industry by putting forward in a simple format what information is available, and by organizing to collect further information as the years go by. The format should be simple and not unduly burdened with footnotes and disclaimers.

George L. Hogeman

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MAIL

There's been a change in the mailing address for material to go into *The Actuary*. Please be sure to address it—

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1740 Broadway
New York, New York 10019

Deaths

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James H. Riggs