



The Actuary

The Newsletter of the Society of Actuaries

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JUNE, 1984

AN EXERCISE IN OAS FUNDING THEORY

by David S. Williams

Actuarial tradition has it that the preferred way to finance private pension plans is by full funding. This principle can be extended to national pensions (OAS), in that full funding ought ultimately to lower the contribution rate. Wouldn't this apply even if the population remains stationary? Well, not necessarily!

Consider the classic pay-as-you-go national pension plan, under which total contributions equal total benefit payments in year n , i.e., $c_n \cdot e_n \cdot W_n = p_n \cdot R_n$, where

c_n = contribution rate (for worker and employer combined),

e_n = average applicable earnings of the W_n participating workers,

p_n = average yearly pension paid to the R_n eligible pensioners.

The population is deemed stationary if $c_n \cdot W_n = k \cdot R_n$, i.e. if $p_n = k \cdot e_n$.

Now the stage is set for comparing unfunded OAS with fully funded OAS.

Under the fully funded plan, the contribution for the average worker in year 1 would be $k \cdot e_1$. This in a year's time would have accumulated to $k \cdot e_1 (1+i_2)$, where i_2 is the rate of return on invested capital during year 2.

But under pay-as-you-go, these funds would have been paid out in benefits in the same year, and would be replaced by $k \cdot e_2$, the contribution in year 2 for a worker in the succeeding cohort. Pay-as-you-go financing would thus produce a larger attributed entitlement per worker in year 2 provided $e_2 > e_1 (1+i_2)$, i.e., if the growth rate of average contributory earnings has exceeded the rate of return on capital.

(Continued on page 3)

MESSAGE FROM OUR PRESIDENT EDITOR'S CHAIR VACANT— ARE YOU INTERESTED?

E. J. Moorhead has decided to step aside from the editorship of this newsletter, vacating a post he has occupied since 1979. He assures me that he has thoroughly enjoyed the duties; he gives his year of birth as his sole reason.

I will be pleased to hear from any member who would like to be considered for this key position.

Serving our members since 1967, *The Actuary* is a publication through whose columns actuaries can express their views, announcements can be made, and short articles on relevant topics can be printed. Its editor enjoys a high degree of independence in both establishment of its style and determination of its content.

Our newsletter is well staffed with an editorial board and a production system which Mr. Moorhead believes will in large measure be available to his successor.

Dwight K. Bartlett, III

SETTING THE EA-1 PASS MARK, NOVEMBER 1983

by James J. Murphy
and Curtis E. Huntington
E&E Committee

This is the story behind an event new to the history of exam co-sponsorship—the setting of different pass marks by two sponsors of a joint examination.

The exam for which this happened was the portion of our current Part 7-P (U.S.) that is also Part EA-1 of ERISA; the exam paper was that of November

(Continued on page 3)

USING BLENDED 1980 CSO

by Robert J. Johansen

In authorizing blended 1980 CSO tables to compute minimum nonforfeiture values under Norris-affected policies at its September and December 1983 meetings, the National Association of Insurance Commissioners noted that no change was being made with respect to using separate male and female tables for minimum valuation reserves. The import of this isn't obvious, although some commentary on this point was in the Exposure Draft Committee Report. The purpose of this note is to call attention to how blended cash values relate to reserves.

If the same mortality table is used to compute cash values and reserves, the reserves will cover the cash values. The Exposure Draft, referring to the reserves and cash values illustrated in Appendix F, noted that cash values on a blended table could exceed CRVM reserves on the female table. It is likely though that if the particular blended table closely approximated the percentages of male and female lives, the total reserves would in the aggregate cover the total cash values.

New York's proposed Regulation 112 (11 NYC RR 47) permits using blended tables for both nonforfeiture values and reserves. On the other hand, the Texas State Board of Insurance seems to be proposing that the sex-distinct tables must be used for valuation and that, if a blended cash value exceeds the sex-distinct reserve, then the cash value must be used as the reserve. This requirement would affect policies issued on female lives. Several other states may also adopt this rule.

If the percentages of male and female lives assumed in the blended tables fairly

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 All contributions are subject to editing. Submissions must be signed.*

EDITORIAL

STYLE

We heartily welcome a loose-leaf book, *Style and Procedures Manual*, just launched by our Casualty Actuarial Society colleagues. Conceived and designed by Matthew Rodermund, it easily warrants the prediction by CAS President-Elect C. K. Khury, that it will serve the profession in countless ways for many years to come.

The "Style" portion, brief and a candidate for growth, offers guides prompted by Mr. Rodermund's rich experience as a newsletter editor. He has given, probably as stimulants for further contributions, warnings against (i) using "less" when "fewer" is meant, and (ii) confusing the usages of "which" and "that". We rise to the bait, and contribute candidates for this section.

Misusing certain words is a familiar phenomenon; overusing others is at least as large a problem in scripts we see. What might a reader suppose to be the word, beyond all others, that actuaries overuse? Our nominee is BASIS. Having learned from early student days to talk about "reserve basis", many of us do so regardless of need, and also extend the habit, e.g., writing "on an annual basis" when "annually" or "yearly" would do nicely.

The runner-up is COULD. This modern monstrosity, by no means confined to actuaries, threatens to make MIGHT, and even MAY, obsolete. The worst case is when COULD is not just inelegant but wrong, as in "To leave your seat-belt unfastened could be dangerous".

Now let us mention two of the stylistic solecisms of which we ourselves have been justly accused.

The first, which we are trying hard to cure, is DUE TO (discussed fully in *Fowler*). The second is a punctuation matter that Mr. Rodermund deals with, but on which we are unrepentant, i.e., the acceptable placing of a closing quotation mark at a sentence's end. Supported by at least one authority, we hold that such punctuation is a matter not only of rules but of personal taste; we hope to be forgiven the exercise of personal taste at the end of the fourth paragraph of this message.

E. J. M.

REFLECTIONS ON AN ACTUARY

by Michael G. Morse

Ed. Note: The composer confesses that this was inspired some years ago while coding a death into the computer. Perhaps many of us on occasion have felt this way.

Vanity, vanity, senseless insanity!
 The endless stream of mortal
 humanity,
 Swiftly swept along time flying,
 Born and dying, born and dying.

Every age remains the same;
 Keepers of records keep the names.
 To chronicle that which they cannot
 change,
 Census takers take the names.

On their own swift rush to death,
 Before they breathe their last
 gasped breath,
 With deliberate care, inane curiosity,
 They pass their days in pursuit of
 demography.

Of late find I men most queer,
 Who profit from death,
 No reverence, no fear.
 They're businessmen
 Who wager men's end.
 They call the odds,
 "A chance in ten".

Devoid of passion in their intent,
 Degrading, debasing without relent,
 They produce the tables and
 measurements;
 The meaning of life in decrements.

Our innermost worth ever they're
 striving,
 In formulas of living and dying,
 To present to us an asset share
 That rationalizes our being here.

So now each day to computers are fed
 Names and dates of the recent
 fresh dead;
 Collated cadavers to categorize,
 Vital statistics to stochasticize.

Profits are up, the theories just fine.
 Jones and Smith have died on time.
 So don't ask why this is his trade,
 Rather, give him your height,
 weight, and age. □

Setting the EA-1 Pass Mark

(Continued from page 1)

1983. This is jointly sponsored and jointly administered by the Society of Actuaries (SoA), the American Society of Pension Actuaries (ASPA), and the Joint Board for the Enrollment of Actuaries (JBEA) under a *Memorandum of Understanding*. This Memorandum contemplates that each sponsor will independently establish a tentative pass mark, that the sponsors will maintain close communication, and that arriving at a common pass mark is the desirable but not the necessary outcome.

How The System Operates

The Joint Board consists of 5 members—3 from the Department of the Treasury, 2 from the Department of Labor—and an Executive Director; recently those 5 have been 3 actuaries and 2 lawyers. And the Joint Board impels an Advisory Committee of 9 pension actuaries; 2 of these are from ASPA, 2 are from SoA, and 5, chosen by the Joint Board, represent the general public.

To enable this hierarchy to work with the E & E representatives, the *Memorandum* must and does establish specific steps, thus:

First, there's a meeting of the Joint Board and its Advisory Committee at which ASPA and SoA representatives present their evaluations of the exam results but do not recommend a pass mark.

Next, the Advisory Committee meets and recommends a pass mark to JBEA, ASPA, and SoA.

If either ASPA or SoA doesn't accept that recommendation, it makes its own recommendation to JBEA (with reasons).

JBEA then independently considers all these recommendations, decides upon its pass mark, and notifies ASPA and SoA.

ASPA and SoA then set their own pass marks and communicate them to JBEA.

(If by now even a tranquil reader wonders why SoA is a co-sponsor, it's because we wish our students to be tested on both the philosophy of pensions and their laws and regulations.)

The November 1983 Exam

Previously, the above procedure had always resulted in agreement on a single pass mark. Efforts were made to accomplish this again; discussions continued

CLUB'S STUDENT ENCOURAGEMENT PROJECT

Adirondack Actuaries Club is helping the cause of actuarial recruiting with a \$500 award to the college student in their area who shows the most promise for an actuarial career. The Club has just announced this year's winner—Michael L. Barsky, a senior at State University of New York at Binghamton, selected for an outstanding academic record and for having passed our Parts 1 and 2.

in Washington for several days during which various compromises were offered. But, perhaps because one examining body is concerned with a licensing function and the others with consistency throughout a whole series of exams leading to a professional designation, a common pass mark proved unachievable this time. The outcome was that the Joint Board (and ASPA which accepted its decision) gave passing grades to 162 candidates (26.8% of them) while we passed 210 candidates (34.8%), 48 of whom were failed by the Joint Board.

Our representatives believe that achieving a single pass mark in this instance would not have been fair to our candidates. Furthermore, it would have caused too few of our students to enter the imminent transition period with partial credits which they had earned. In the transition, credit for old EA-1 gives credit for only the new Parts 4A and 4B so there is still Part 4C on advanced contingencies, using the new *Actuarial Mathematics* textbook, by which to test our candidates adequately.

The late publication of exam results last January was an unfortunate but necessary price to pay for accomplishing the best result possible for our students.

The Next Advisory Committee

Nominations for the next Advisory Committee will very soon be solicited. Perhaps this account will stimulate some readers to volunteer for service thereon. Any member interested in being nominated as a SoA representative, please tell E & E General Chairman James J. Murphy at his Yearbook location. Any who would like to become a public member can find the procedure in the Federal Register or in some pension publications.

CALVERT SUMMARY OF WALFORD'S "MAXIMUM LIFE SPAN"

Describing its message (accurately, we agree) as having earth-shaking impact on the outlook for social security systems, pensions, annuities, careers, education, and the way actuaries estimate long-range costs, Geoffrey N. Calvert has issued a 25-page digest of "Maximum Life Span" written by Roy L. Walford, M.D. and published by W. W. Norton & Co. Our Society office is making single copies of the Calvert summary available free upon phone request to the receptionist at (312) 773-3010.

OAS Funding Theory

(Continued from page 1)

If this relationship continues through the years, pay-as-you-go financing would enable benefits to be higher than under full funding, or the contribution rate to be lower, or a bit of both.

If the population were nearly stationary, could the growth of real earnings exceed the real rate of return on capital? And if so, would an unfunded OAS plan generate higher benefits than a fully unfunded plan? What then would be the long-term effect on the nation's economy?

Readers, whether experts or just dabblers in economics, are invited to enlighten the rest of us on these questions.

Using Blended 1980 CSO

(Continued from page 1)

closely approximate actual percentages, the use of blended tables for nonforfeiture values would result in increased reserves under the Texas method but not under the New York method.

Comments are most welcome. Please send copies to Ted Becker (Texas) and John O. Montgomery (California), and to Mark Doherty at the Society Office. A copy of the Exposure Draft may be obtained from the Society.

DEATHS

Albert H. Gray, F.S.A. 1942

John D. Rommel, F.S.A. 1954

GRIFFITH DAVIES AND OTHER EARLY WRITERS ON LIFE CONTINGENCIES

Recent references to life contingencies textbooks of pre-Jordan eras (e.g., by Roy Goldman in our June 1983 issue), and awareness that the earliest American actuaries—notably Jacob Shoemaker in Philadelphia, Nathaniel Bowditch in Boston and William Bard in New York—relied heavily on texts from Great Britain, have caused us to enquire, from the Institute's Librarian, Mrs. Ann Sutcliffe, what books were in circulation before George King produced his major work in 1887.

Meanwhile, one of those books—*Treatise on Annuities* by Griffith Davies—has just been donated to the Society by University of Florida's Prof. William M. Howard, M.A.A.A., who has thus earned our grateful thanks.

Who Was Griffith Davies?

Griffith Davies' obituary in the 1855 J.I.A. tells us that he was a mathematical genius who overcame extraordinary obstacles to become a shining light in our profession.

Born in 1788 in a Welsh village so isolated that there was no school even close to his home, his early problem was to learn English, not spoken by his parents. Not till age seventeen did he receive regular schooling, and only then did he discover that he possessed unusual capacity for arithmetic.

At age 20, determined to seek employment in England, "having collected together the little money he had managed to save, and procured a few letters of recommendation to persons in London, he sailed from Carnarvon". After months of disappointment he was engaged as arithmetical tutor at a small country school; within five years he had established such repute as a mathematician that he found himself coaching gentlemen in a mysterious calling—actuarial.

Concluding that he himself ought to become an actuary, but being turned down for employment in an established company, he joined a group engaged in

"IT'S THE LAW"

A column by William D. Hager, Esq., Des Moines, Iowa.

Russell v. Massachusetts Mutual Life Insurance Company

In this pension-related decision (722 F. 2d 482) the Ninth Circuit Court of Appeals held that ERISA permits awarding damages for all losses and injuries directly and proximately caused by breach of a fiduciary duty, in this case improper and untimely handling of a benefits claim. The court held that an award for mental and emotional distress, accompanied by some physical manifestations, is permitted under ERISA, and therefore punitive damages may be awarded under appropriate circumstances.

This opinion makes clear that ERISA gives courts broad discretion to award both equitable and remedial relief. The court noted that Congress fully intended this so as to discourage violation of the Act.

Textile Workers Pension Fund v. Standard Dye and Finishing Company

Here, No. 83-7004 (CA-2, 1-9-84), the Second Circuit Court of Appeals has joined the Fourth and Seventh Circuits in upholding the constitutionality of retroactive withdrawal liability under the Multiemployer Pension Plan Amendments Act. The court, applying the four-prong test developed by the Seventh Circuit, upheld retroactive MPPAA liability where withdrawal occurred during the "window" period. Now the only nonconforming appellate court is the Ninth Circuit in the *Shelter Framing Corp.* case—see this column, February issue—which held that to do so was an unconstitutional impairment of employers' ability to contract. The U.S. Supreme Court should soon eliminate this discrepancy.

International UAW v. Yardman, Inc.

In this decision (No. 81-1718), the Sixth Circuit Court of Appeals held that benefits for retirees are a voluntary, not mandatory, subject of collective bargaining under the National Labor Relations Act. Therefore an employer may—but is not required to—bargain an agreement with a union on benefits for retired employees. □

forming a new company, Guardian Assurance, became its actuary, and in due course earned fame for his works on mortality statistics.

By 1825 his tables and pamphlets were widely known, but he never issued them in book form. After he had died in 1855, his executors assembled his writings into the volume that will now repose in the Society library in Illinois.

Other Early Books.

The following is just a sampling of the numerous books on life contingencies of earlier dates than the 1850s that are in the Institute Library in London:

18th Century

1730 Edward Laurence: A Dissertation on Estates upon Lives and Years, whether in Lay or Church-Hands, with Tables.

1753 J. Hardy: A Complete System of Interest and Annuities.

1755 J. Dodson: Analytical Solutions of Problems relating to Annuities, Etc.

1771 Richard Price: Observations on Reversionary Payments.

19th Century

1808 Francis Baily: The doctrine of interest and annuities analytically investigated and explained, together with several useful tables.

1815 J. Milne: A Treatise on the Valuation of Annuities and Assurances on Lives and Survivorships.

1837 P. Watt: Progress and Present State of the Science of Life Insurance, with Thermometrical Tables. Also, Observations on Health Insurance Etc.

1844 E. Baylis: The Arithmetic of Annuities and Life-Assurances, or, Compound Interest Simplified.

William Hendry

A book published in 1820, not in the Institute's list, was "The Method of Calculating The Value of Life Annuities, Assurances Etc.". This may be of special interest to Canadian actuaries because its author possibly is an ancestor of Canada's early actuary of the same name, William Hendry.

E.J.M.

"ACTUARIAL EVIDENCE"

This is an impressive 92-page guide to the actuary in the field of expert testimony. The chapter headings reveal its scope:

- Chapter 1. Actuarial Skills
- Chapter 2. Scope of Actuarial Evidence
- Chapter 3. Fundamentals of Actuarial Calculations
- Chapter 4. Income Stream
- Chapter 5. Interest and Inflation Factors
- Chapter 6. Contingency of Mortality
- Chapter 7. Contingencies of Employment
- Chapter 8. Physical Disability
- Chapter 9. Contingencies of Divorce and Remarriage in a Fatal Accident Action
- Chapter 10. Miscellaneous Contingencies
- Chapter 11. Actuary's Report
- Chapter 12. Testimony of the Actuary
- Chapter 13. Structured Settlements
- Chapter 14. Role of Cases and Precedents

Its author, Donald R. Anderson, F.S.A., a Toronto consulting actuary, describes his book's purpose as:

... to record the present state of this art so that it can be understood and properly appreciated by the wider circle of people who feel its influence. This circle includes the legal profession, the actuarial profession, the courts, the universities, the governing authorities and the public. Also, this book attempts to bridge the gap between those who practise the law and those who practise actuarial science.

Pointing out that the work is written from the perspective of an actuary practising before the courts in Ontario, he reminds us that the actuarial profession adheres to more or less the same principles elsewhere in the western world.

Actuarial Evidence: Valuing Past and Future Income. By Donald R. Anderson. 92 pp. September 1983. Published by Carswell Legal Publications, 2330 Midland Ave., Agincourt, Ont. M1S 1P7. \$US 23.50.

SIGHTINGS

Steven R. Grainger and J. Patrick Kinney both sent in the following, from the science fiction *The Colour of Magic* by Terry Pratchett. A main character is:

"Twoflower, an insurance actuary who'd shucked his painfully boring life . . . for a glimpse of the . . . more adventurous side."

Lawrence N. Bader spotted the following in Studs Terkel's *Working*:

"I usually don't tell people that I model. I say I'm an actuary or something . . . There's the thing about models being free and easy."

Charles A. Peirce found an intriguing spelling of actuary in *The Boston Globe* — "acutuary". I guess that beats ob-tuary.

Denise Fagerberg bought a Volvo, after noting a poster claiming its "life

expectancy" to have "actuarially been determined to be 16.4 years in the United States". (It's slightly longer in Sweden, but the actuaries didn't know why.)

Colin E. Jack tells us that the daughter of George Boole (of Boolean algebra fame) married an actuary and brought up a family on a small salary. A quote to this effect appears in a book on Regular Polytopes by Coxeter.

Paul G. Schott dug out the March, 1917 Provident Mutual employees' magazine, and found an article by Albert Linton. Linton told of a "picturesque attack upon the whole business of life insurance", at that point only in proof sheets. He quoted two paragraphs:

"Every actuary on earth knows that our recent reform insurance laws are burglars'

STUDY AIDS AVAILABLE*From Temple University*

Copies of the Part I Examination Preparation Manual, announced last year and well received, are still available from Ms. Bonnie Averbach, Director, Program in Actuarial Science, Temple University, Philadelphia PA 19122. Prices: Regular mail, \$25; First class, US & Can., \$27; Elsewhere, \$28.

From ACTEX

ACTEX Study Manuals, revised to reflect syllabus changes other than those for 7-P (U.S.), are available for November 1984 exams except Parts 9 and EA-2. Particulars from your company representative, from your Society study note package, or from ACTEX, Box 2392, Framingham MA 01701.

Ralph Garfield Manuals

These, edited by Dr. Garfield, are: Part 2 (Nov. '81 & May '82 exams) \$18; Part 3 (2 practice exams and solutions) available August, \$29; Part 4 (2 practice exams, new syllabus, with solutions) \$30. Order from A. S. M., Box 522, Merrick, NY 11566. □

jimmies, dishonestly fabricated by the companies designed to be used to break into the people's safes, and which the actuaries have extended so as to become burglars' scientific electrical jimmies to get into safe deposit vaults."

"Every actuary knows that he is a hypocrite and not entitled to the fair name that he enjoys among decent neighbors, and that no asbestos coffin can save him from a just punishment for a long life of deception."

Editorial Comment: I must ruefully admit that although I happily prepare this column, I sometimes wonder why. Do you all read it and enjoy it? What type of "sightings" do you like best? (I tend not to print those that, for example, cite actuaries in the proper context, e.g. designing social security. On the other hand, I do print those that I find funny independent of the use of the word "actuary". Perhaps I'm missing the point.)

D. A. P.

READING LIST AVAILABLE

The Society office will be happy to mail to anybody requesting it, an impressive 9-page document entitled

Literature Available for
Continuing Education of a
Valuation Actuary

The text, written by Donald D. Cody for the Joint Committee on the Role of the Valuation Actuary in the United States, lists, with explanations, papers that have been written on each of the following four segments of the topic:

- I. The C-3 Risk
- II. All C-1, C-2, C-3 Risks and Their Combination
- III. NAIC and Academy Activities
- IV. Items Not Yet Researched Their Combination

There is also a covering letter by Committee Chairman Gary Corbett. This material has been distributed to company chief actuaries.

REVISION OF STANDARD INDUSTRIAL CLASSIFICATION (SIC)

The U. S. Office of Management and Budget is revising the SIC for 1987 to reflect structural changes in the country's economy since the last major modifications in 1972. Actuaries are invited to submit proposed changes, which should contain:

- (1) Specific details of activities to be covered in such change;
- (2) Statement of the relationship to existing industries;
- (3) Statistical evidence that the proposal is worthwhile and appropriate.

Get details from Pamela S. Powell-Hill at (202) 395-3093, or from Federal Register Vol. 39, No. 36, Feb. 22, 1984, pp. 6582-84. Send your proposals by Oct. 1, 1984 to: The Chairperson, Technical Committee on Industrial Classification, Statistical Policy Office, Office of Information & Regulatory Affairs, Office of Management & Budget, Washington DC 20503.

Mark G. Doherty

PREPARING FOR RETIREMENT WITH COMMON STOCKS

This is the promised sequel to the April issue display of S & P 500 common stock yields reflecting both capital appreciation and reinvested dividends. In this article are shown the results when dollar values have been adjusted to recognize purchasing power changes in accordance with the U.S. Consumer Price Index. Average values are used throughout.

Our purpose is to present these figures in a manner particularly useful for persons who are saving for retirement. To do this we must keep in mind that it's in the years nearest to retirement that the funds are largest—and usually the contributions likewise. It serves no good purpose to demonstrate, as can easily be done, that stock investments made thirty years ago will have far outpaced the offsetting CPI increases; the results for, say, the last five years simply swamp those of the early years.

The accompanying table contains three separate blocks. The figures in col. (8) of the first block show, crudely but perhaps representatively, some returns on savings funds being accumulated for retirement in 1983. Those in the second and third blocks relate to retirements in 1980 and 1975 respectively.

None of this trio is free of the damaging effects of a negative real yield during one of our three selected accumulation periods. It's hard to say which in practice had the best (or worst) experience. It seems clear that a negative real yield in the final five years (the case of retirement in 1975) must have been devastating, but the other two accumulations lost ground in the central one of our periods.

Conclusion: Describing common stocks as a hedge against inflation is passé.

E.J.M.

REAL COMPOUND ANNUAL GROWTH RATES, COMMON STOCKS

Over Selected Periods Dividends Reinvested

Period Observed	S. & P. 500 Values*			Consumer Price Indexes			Col. (3) Col. (6)	Real Annual Growth
	Start (1)	End (2)	Ratio (3)	Start (4)	End (5)	Ratio (6)		
5 yrs. 1978-83	2,162	4,525	2.09	195	298	1.53	1.37	6.5%
10 yrs. 1968-78	1,569	2,162	1.38	104	195	1.88	0.73	— 3.1
10 yrs. 1958-68	559	1,569	2.81	87	104	1.20	2.34	8.9
5 yrs. 1975-80	1,723	2,926	1.70	161	247	1.53	1.11	2.1
10 yrs. 1965-75	1,289	1,723	1.34	94	161	1.71	0.78	— 2.5
10 yrs. 1955-65	439	1,289	2.94	80	94	1.18	2.49	9.6
5 yrs. 1970-75	1,415	1,723	1.22	116	161	1.39	0.88	— 2.5
10 yrs. 1960-70	716	1,415	1.98	89	116	1.30	1.52	4.3
10 yrs. 1950-60	159	716	4.50	72	89	1.24	3.63	13.8

* Index values (1871 = 1). See TSA XXII (1970), 196-197, and extension in *The Actuary*, April 1984, p. 5.

MORGAN TURNS DOWN SAM

Three kind readers, no less, sent us an ode about underwriting of skinny applicants in 18th or 19th century Britain, that they saw in "Commentary By Charles A. Will", E.F. Hutton Life's bulletin, December 1983. Mr. Will says that Canada's Bill Weighton lug these verses up from *John Bull*, Tory newspaper of long ago.

"Sam" was Samuel Rogers (1763-1855), a poet of notoriously cadaverous appearance. "Morgan" was William

Morgan (1750-1833), actuary of the Equitable of London, whose portrait is reproduced and career described in our booklet, *From Actuarial To Actuary*.

Cries Sam, 'All human life is frail,
E'en mine may not endure.
Then lest it suddenly shall fail,
I'll hasten to ensure.'

At Morgan's office Sam arrives;
Reckoning without his host;
'Avant' the frightened Morgan cried,
'I can't insure a ghost.'

'Zounds! 'Tis my poem, not my face;
Here list while I recite it.'
Said Morgan, 'Seek some other place,
I cannot underwrite it.'

□

LETTERS

Stock Companies

Sir:

Julius Vogel surely won't be led astray by his innuendo ("Mutual Companies", Feb. issue). I fear, though, that others might be.

First, to dispose of a side issue: It's implied that mutual companies pay more than their fair share of tax, which I have yet to see proven. I submit that a large demutualized life company would find itself suffering under the same tax burden as before, assuming an on-going obligation to satisfy ownership expectations.

Now, to the real meat. I don't object to Mr. Vogel's assertion that some or many (but certainly not "in general") mutual companies have been among the most responsible elements of our business, but rather to his making it sound as if there were no stock companies in that same responsible group.

Many mutuals have indeed consistently offered worthy products at reasonable prices, and they have sometimes, if not most of the time, lagged in product design and marketing innovation. But it's the very fact that stock company managements "have a stockholder constituency whose interests must be recognized" that causes those companies to lead the way in product design and marketing innovation.

No company, stock or mutual, has some intangible right to exist forever if it doesn't strive to be out front in meeting at least some elements of changing consumer needs. Over the long term, the public will decide who should survive; even over the short term, a company's health is determined in part by the public's daily vote in the marketplace on the job it is doing.

For whom is the absence of the concerns (quarterly per share earnings, stock price fluctuations, etc.) healthy? Surely not for the policyholder, nor for the industry as a whole. Even asset diversion can be viewed as healthy if it involves under-utilized surplus; mutual companies have discovered the value of this.

I do not say all this in opposition to mutual companies; merely to keep the discussion in balance.

David R. Carpenter

Ed. Note: In J.I.A. 6 (1856) a British actuary reviewing another actuary's book, wrote: "... we could not but be struck with the truth of the author's observations in reference to the merits respectively of the mutual and proprietary systems of life assurance. . . . As (that author) quaintly remarks, 'the avaricious dispositions of the majority of those mutually assured' . . . 'threaten to become not only insatiable, but incapable of being controlled by any other means than the overwhelming power of the Court of Chancery'."

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GAAP For Mutual Companies

Sir:

Richard S. Robertson (March issue) is correct in defining the issue as finding a form of financial statement acceptable to the Financial Accounting Standards Board that would be best for mutual company managements, not finding one that's consistent with GAAP as now defined for stock companies. But if FASB has decided that mutuals shouldn't have an unfair advantage by having to calculate only three sets of reserves while stocks have to calculate four, I'd propose requiring mutual companies to issue statements in a form designed to meet needs of policyholders (not of management as Mr. Robertson recommends).

My reasons are these:

1. Management is always free, without FASB approval, to establish statement forms that meet their own needs.
2. Mutual company statements have long been designed to demonstrate solvency, modified only to avoid federal income tax liability.
3. Mutuals have no incentive to overstate their profits. To do so invites policyholders, consumerists and regulators to press for higher dividends.
4. Reserves can be increased: (a) to reduce taxes, (b) to help weather an expected future loss, or (c) to avoid a probably unmaintainable dividend scale increase. But policyholders aren't equipped to distinguish among these three cases.

Therefore I propose that if mutuals have to restate their reserves (and earnings), they adopt a basis more realistic than statutory but more conservative than GAAP. Reserves should make ample but not excessive provision for future benefits; gains and losses should be fully recognized. It would be up to management to explain to its publics any discrepancies between earnings and dividend payouts.

To avoid confusion with stock GAAP, these should be called Generally Accepted Mutual Earnings Statements.

Howard H. Kayton

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Where's The Fairness?

Sir:

I'm incredulous at the E & E Committee's so-called rectification (footnote to Charles E. Moes Letter, March issue), rewarding those who earned a 5* on old Part 5A with credit for new 4C or 5A. This has made a mockery of the exam process.

Sitting for 5A, hence required to divide my study time between Life Contingencies and Risk Theory, I scored a 5, earning higher scores on the former than the latter.

Our examiners, apparently preferring to compound their error than to face criticism, have rewarded those who didn't play by the rules (on dividing study and exam time), punishing those who did. This confirms my belief that the Society is out of touch with its students.

Steven A. Appel

Ed. Note: E & E General Chairman James J. Murphy has replied (in part) that the committee must assume that all the candidates did play by the same rules since nobody had reason to suppose that special dispensation would be made. The committee, he says, dealt as fairly as it could with an unusual circumstance that arose in a transition.

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Power Buttons

I strongly support Robert L. Brown's view (April issue) that calculators with power buttons should be allowed in actuarial exam rooms. The most efficient way to solve a problem in which interest and payment periods differ is to change the interest rate so they do coincide. This requires the power button.

Such problems can be solved by developing new formulas, as on pp. 68-77 of S. G. Kellison's text. But the power button approach frees students from rote memorization, allowing them to concentrate on problem-solving; surely that is in accord with our educational objectives.

Michael M. Parmenter

(Continued on page 8)

Letters

(Continued from page 7)

How To Discount Statutory Profits

Sir:

Douglas A. Eckley's analysis (April issue) is welcome but his discussion troubling. It seems to me that:

1. Book profits must be the ones discounted. That is, each year's experience must start with assets equal to liabilities. Otherwise, reinvestment of the stream at experience rates would be assumed, and the present value would simply be a discounting of the final result, not of the stream.
2. The discount rate should be that which the company deems appropriate for return on capital, since the stream's components are either uses of or return on capital. Most companies would find an after-tax rate much too low to use as a rate of return on capital. One would expect it to be the rate needed to satisfy stockholder expectations—or, in the case of a mutual, the company's long term growth rate.

There's a landmark paper on this by I. Christopher Smart in JIA 104 (1977), 125: "Pricing and Profitability In A Life Office".

3. Choice of the pre-tax rate has the helpful attribute, noted by Mr. Eckley, that the value of the discounted stream will be unaffected by the reserve level provided the reserves qualify as "tax reserves".

Henry B. Ramsey, Jr.

Sir:

Why discount reserves at all? Wouldn't it be better to discount projected cash flow? If the assets supporting reserves can earn the same rate of return as unassigned surplus, reserves seem to have no bearing on cash flow or ultimate profitability except to the extent they affect tax timing. In this respect, high-reserve products may indeed produce higher profits.

In most circumstances, I find no inconsistencies in using after-tax rates. In examining results that differ according to reserve method, one should be careful to ascertain whether such differences reflect variations in real costs resulting e.g. from timing of taxes, higher invest-expenses associated with borrowing required surplus, not just imaginary costs associated with timing differences in reserve changes. Any results that differ by reserve method should be viewed with caution.

Lee A. Zinzow

Sir:

About ten years ago I discussed Mr. Eckley's question with leading practitioners and sought insight and perspectives in its literature. I reached two conclusions that I believe are still valid.

First is that unless for a general audience you discount after-tax profits at a before-tax rate you will create misunderstanding and misinterpretation because that's the overwhelming general practice.

Secondly, for a specific audience it doesn't really matter provided you make completely clear which alternative you are using. Whether one measures with a ruler calibrated in inches or centimeters doesn't matter, but you must report whether your answer is 12 inches or 12 centimeters. And one must consider one's listeners' familiarity with the standard used; little is conveyed to a U.S. audience by saying that an actuary stands 3 meters tall.

Paul T. Bourdeau

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Putting Statistical Theory to Use

Sir:

David M. Holland (Nov. 1983 issue), in responding to the earlier challenge by Charles Schaller-Kelly, gave us an excellent application of theory that has been developed in the Society's new textbook, *Actuarial Mathematics*. One can also solve such problems using elementary statistical techniques via a computer; total required time would be less than half the two-hour limit that Mr. Schaller-Kelly set for this.

Assuming the lives in each age group to be independent, one can calculate the exact probability that the number of deaths equal d , where $d = 0, 1, 2, \text{etc.}$ Then by combining these probabilities—the textbook term is "convolution"—one can determine the probability that total deaths are greater than or equal to any selected integer, n . The analysis then follows as in Mr. Holland's concluding paragraphs.

To simplify those calculations, let us group the lives into five blocks by age, and determine the q_x 's for each block from the lives described as not subject to hazard. For instance, if $M = 11$, the results are:

Age Group	Lives Subject to Hazard	q
60-61	30	0.00667
62-64	180	0.01733
65-66	160	0.02176
67-68	140	0.02647
69-70	90	0.03462

The expected number of deaths is 13.623, and the variance is 13.286.

The resulting cumulative probabilities are given below. To show the power of Mr. Holland's approach, which doesn't require a computer, I compare these exact probabilities with those obtained from a Poisson approximation with mean (and variance) equal to 13.623. The agreement is close, confirming Mr. Holland's results.

n	Probability of Deaths $\geq n$	
	Exact Calc'n	Poisson Approx'n
10	.875	.872
11	.801	.798
12	.710	.707
13	.606	.603
14	.496	.495
15	.389	.390
16	.292	.294
17	.210	.212
18	.144	.147
19	.095	.098
20	.060	.062
21	.037	.038
22	.021	.022
23	.012	.013
24	.007	.007
25	.004	.004

Roy Goldman

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Elapsed Exam Times

Sir:

Marta L. Holmberg (April issue) tells us that the longest elapsed time, from first exam written to F.S.A., among 1983 new Fellows was 20 years.

I tried my first exam (unsuccessfully) in May 1946, and my last in November 1982: elapsed time, 36.5 years. Is this a (dubious) record?

Robert A. Nix

Ed. Note: This fascinating case illustrates Dr. Holmberg's point about differences in partial segments; Mr. Nix reached Associateship in 1948.