



# The Actuary

The Newsletter of the Society of Actuaries

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## FERTILITY FADE FUELS FICA FLAP

by David M. Lipkin

The actuarial profession became unusually visible in a discussion of appropriate assumptions for OASDI cost estimates during the December 10th, 1982 meeting of the National Commission on Social Security Reform.

"Current Population Reports" issued by the Bureau of the Census two months previously (Series P-25, No. 922) had revealed that its demographers were revising their long-term fertility estimates downward. And the Commission's Executive Director, Robert J. Myers, had directed attention to a *Washington Post* article reporting that the Social Security actuaries were thinking of decreasing their fertility assumptions for the 1983 Trustees Report. The long-term 1.8% deficit, on which the Commission was building its recommendations, would hold water only if the higher fertility assumptions of the 1982 Trustees Report were employed. Myers explained that a change in this assumption from 2.1 (children per woman who lives through the child-bearing ages) to 1.9, along with other changes in assumptions being considered, would lift the deficit forecast all the way from 1.8% to 2.5% of covered payroll.

This revelation shocked some Commission members; several expressed frustration at not knowing which figures to believe. And the political sensitivity of the matter increased their irritation, their acceptance of the 1.8% imbalance having already been widely publicized.

Robert M. Ball, a former Commissioner of Social Security, pointing to the upward trend in fertility, doubted that the assumptions ought to be lowered. Robert A. Beck, Prudential's Chairman, remarked that "in private business we pay for using wrong assumptions", and said that the worst that might happen

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## CENSUS OF PRE-1889 ACTUARIES IN NORTH AMERICA

In April 1839—50 years before the Actuarial Society was organized—there were on this continent just three actuaries, viz. John F. James and Sears C. Walker in Philadelphia, and William Bard in New York. These three were the survivors of a group of seven actuaries who had pre-1839 experience; the other four were Robert Patterson, Jacob Shoemaker, Jr., and Joseph Roberts, Jr., of Philadelphia, and Nathaniel I. Bowditch of Boston.

At this stage in the "19th Century Actuaries Project" (see our April issue, pp. 4-5) we are reasonably well able to justify the following record of actuaries by number, as well as by name, through the half-century from 1839 to 1889:

Number of Actuaries, 1839	3
1840 - 1849: Entered	10
Died	0
—	—
Number of Actuaries, 1849	13
1850 - 1859: Entered	9
Died	-5
—	—
Number of Actuaries, 1859	17
1860 - 1869: Entered	22
Died	-2
—	—
Number of Actuaries, 1869	37
Net Additions, 1870—	
April 1889	42
—	—
Number of Actuaries,	
April 1889	<u>79</u>

At this point we are unable to arrive at a satisfactory estimate of the numbers who entered and departed from our profession in the decades of the 1870's and 1880's. We think we are close to knowing all the names, but haven't yet managed

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## THERE'S A NEW STUDY ON REPLACEMENTS

by Deborah Adler Poppel,  
Associate Editor

Can you answer these questions about replacements of individual life policies?

1. What percent of households that drop a policy replace it?  
a) 22% b) 36% c) 50% d) 74%
2. Of all whole life policies that are replaced, what percent are replaced by term?  
a) 20% b) 33% c) 50% d) 70%
3. What percent of replacements are reported to have been initiated by agents?  
a) 20% b) 33% c) 50% d) 75%

If you answered "b" to all three questions, either you're an expert on replacement or you've read LIMRA's report titled "Replacement — The Consumer's Point Of View". This report, sponsored by LIMRA, MDRT, and ACLI, is part of LIMRA's series on "Consumer Experiences in the Marketplace"; it gives the responses of about 3,000 households (out of 100,000 initially surveyed) that had dropped a life insurance policy during 1979. Of these respondents, 36% replaced the dropped policy; this study defines a replacement as a policy that the household bought with the intention of replacing a dropped policy.

The study shows whether the replacement was internal (same company) or external, and the extent of an agent's involvement. Policy size, policy age, policy type, and other variables are also analyzed, as are the reasons stated for dropping a policy.

If you'd like a copy of the report, ask LIMRA for it. It may make you question some of your prior notions about replacements.



**WRIGHTINGS**

G. Graeme Cameron found the following description of the building of the trans-Canada railway in "Towards the Last Spike", by E. J. Pratt:

"Till now the axles justified their grease,  
 Taught coal a lesson in economy  
 All doubts here could be blanketed with facts,  
 With phrases smooth as actuarial velvet."

Gregory R. Childs found two mentions of actuaries in short stories by Robert Heinlein. The first, from "Podkayne of Mars":

"(The) employee's earning power for . . . his working life . . . and his putative value to the Corporation, (were) all calculated by the company's actuaries who are widely known to have no hearts at all, just liquid helium pumps."

The second story, "Lifeline", involves a scientist who invents a machine that predicts the exact moment of any person's death. His clients refrain from buying life insurance until the last moment. His defense, when sued by a large insurance company:

"If to make predictions by methods of scientific accuracy is illegal, then . . . actuaries . . . have been guilty for years."

Dan A. Harbertson spotted an article in "The Idaho Statesman" about the new height-weight tables, that dubbed Fred-eric Seltzer:

"Metropolitan Life's actuarial guru who sculpted the new tables from tons of statistics."

Stuart A. Yarus's wife Joan found a question and answer column about actuarial careers in "The Dallas Morning News." Much of the column was a well presented description of the career by our Linda M. Delgadillo. My favorite actuarial reference was in the question itself:

"My mother, who is in the insurance business, says actuaries work hard but make a nice income."

J. Kenneth Wood sent us a novel, "The Ludi Victor", in which the hero is said to have a "lethal actuarial brain."

Donna R. and Martin R. Claire, while reading the Star Trek novel "Black Fire"

**SGLI (SERVICEMEN'S GROUP LIFE INSURANCE) MORTALITY**

Annual Death Rates per 1,000  
 Calendar Years 1977-81

I. Active Duty Non-Vietnam Experience

Year	Years of Exposure	No. of Deaths	Death Rate
1977	2,140,912	2,600	1.21
1978	2,111,237	2,533	1.20
1979	2,081,250	2,404	1.16
1980	2,103,657	2,411	1.15
1981	2,124,610	2,394	1.13

II. 120 Days Post-Separation Experience

1977	185,087	505	2.73
1978	162,333	367	2.26
1979	175,018	365	2.09
1980	171,196	342	2.00
1981	157,935	317	2.01

(Corresponding figures for 1974-1976 were reported in this newsletter's December 1978 issue.)

Considerable detail by branch of service and age-groups is given in "Service-men's and Veterans Group Life Insurance Programs: Seventeenth Annual Report, Year Ending June 30, 1982", available from the VA Regional Office and Insurance Center, Philadelphia, PA 19101. □

**A EUROPEAN ATTEMPT TO SYNTHESIZE NOTATION PROPOSALS**

by Frank C. Reynolds

(This is Article No. 9 in a series).

At the end of 1974, seven European actuaries from four countries—including such leaders as Boehm, Engelfriet and Kool—set out to distill the numerous extant proposals. Their first step was to summarize the observed strengths and weaknesses of each, making incidentally an excellent reference for readers wishing to explore the notation controversy beyond the depth that this series can probe.

The unwieldiness of long parameter lists had become apparent, as had need for precision in defining movement from one status to another. These actuaries designed a parameter list structured into four portions, two before the main symbol and two after it. Thus,

$$T, i\% \text{ } n|m A_x^{(k)} \text{ becomes } (k) (n;m)a(x) (i;T)$$

(e.g. 58CSO, 10%)

$$18|5 A_0^{(12)} \text{ becomes } (12) (18:5)a(0) (10\%;58CSO)$$

Problems with this format are how to dig out the principal symbol, and how to associate the parameters with the related symbols when several are juxtaposed. Also, no direct attention was given to achieving compatibility with the computer.

The European group deserves appreciation of its foresight and its helpfulness in keeping the debate going, but its proposals don't appear to offer a practical solution. □

by Sonni Cooper, noted a passage where Dr. McCoy is outlining for Captain Kirk what may have happened to Mr. Spock, who has disappeared with a sliver lodged near his spine:

"There are three possibilities: one, he's fine; odds . . . eighty or ninety to one—against. Two: . . . he's paralyzed. Odds: . . . eighty percent. Three: he's dead; probability . . .

twenty percent. All this is conjecture, Jim . . . I'm a doctor, not an actuary!"

Michael W. Frank found the following in the 1983 Super Bowl program:

"(Twelve days before the game) football actuaries in Reno announced what would be the final line: Green Bay by 13."

D.A.P.

## SOCIAL SECURITY DISABILITY EXPERIENCE

by Bruce D. Schobel

Disability Insurance (DI) program data through calendar year 1982 show continuation of trends that began about three years ago. (See our Dec. 1980 issue, p. 3—Ed.)

The number (2,604,000) of disabled-worker beneficiaries in payment status at year-end 1982 was 12,000 below that of a month earlier, 173,000 below December 1981, and 277,000 below the peak reached in July 1979. The last time the disabled workers numbered fewer than in December 1982 was in June 1976.

Benefits awards in 1982 (299,000) declined 13.5 percent from the previous year, reaching the lowest level since 1966. The gross disability incidence rate for 1982 was 2.9 awards per 1,000 insured workers, 15% below 1981 which had been the lowest in the program's history. This rate has been below 4 percent only four times—1964, 1980, 1981 and 1982.

The total number of terminations in 1982 from all causes—death, conversion to the old-age rolls at age 65, and recovery — was 471,000, exceeding by 40,000 the 1981 figure which had been the program's historical peak. This clearly is the result of the periodic review process called for by the Disability Amendments of 1980 (Public Law 96-265) to begin in 1982. The Reagan Administration decided, however, to begin these reviews early, in March 1981, and has

taken considerable political flak as a result.

Steps were taken in 1982 to make the reviews better understood and fairer to beneficiaries. In March, retroactive cessation was stopped in most cases so that terminated beneficiaries no longer have to make significant repayments. A requirement for face-to-face interviews was later added, so that obvious cases of continued disability wouldn't be missed.

In January 1983, the President signed H.R. 7093, giving further relief to terminated beneficiaries by providing for face-to-face reconsideration and continued benefit payments through the second appeal stage, but not beyond June 1984. This enables the Secretary of Health and Human Services to assure the quality of decisions by waiving the periodic-review requirement, state-by-state. It also permits benefits to be reinstated to persons who haven't reached the second appeal stage, adding perhaps 35,000 beneficiaries to the rolls.

The effect of the increase in investigations appears to have stabilized. The 12-month moving total of terminations was about 470,000 for the last six months of 1982, and even declined slightly in three of those months; it had been at the 400,000 level before the periodic reviews began exerting their influence. Evidently, the increased reviews are responsible for about 6,000 additional terminations per month.

An accompanying table gives data for the past four calendar years.

**Social Security Disabled-Worker Experience**  
(in thousands of cases)

Calendar Year	Awards	Terminations	In Payment Status at Year-End
1979	409M	418M	2,870M
1980	389	398	2,861
1981	345	430	2,777
1982	299	471	2,604

### ARE YOU BUGGED BY A GERM OF AN IDEA?

Let's say you want your notion or query discussed, but you know it won't make the *Transactions* (or *The Actuary*—Ed.). Try ARCH—Actuarial Research Clearing House. Send 3 photo-ready copies to one of its Co-Editors (Courtland C. Smith, Arnold F. Shapiro, Charles S. Fuhrer) at his Year-book address.

### Census of Pre-1889 Actuaries

(Continued from page 1)

to distinguish between those who really were doing responsible actuarial work and those who just signed annual statements for submission to the many insurance departments that had come into operation during that formative period in insurance regulation.

Of the 79 men—we have no knowledge of any women, although Lucy Jane Wright had practiced in the mid-1860's—who were practicing in April 1889, 45 were charter members of the Actuarial Society, 17 joined soon afterwards, 16

### Deaths

Charles A. Chuculate, A.S.A. 1978  
Thomas A. DeSelm, A.S.A. 1967  
Robert T. Jackson, F.S.A. 1948  
Stuart J. Kingston, A.S.A. 1949  
Jacob A. Lazerson, A.S.A. 1962  
Eric Keith Pollard, A.S.A. 1980  
W. Murdoch Stewart, F.S.A. 1937

*Contributions to the Actuarial Education & Research Fund, 500 Park Boulevard, Itasca IL 60143, in memory of any deceased member, are acknowledged to the donor and to the member's family.*

### ROBERT T. JACKSON, 1917-1983

Robert T. Jackson, Society President in 1976-77, undoubtedly inherited his respect and his aspirations, for our profession and for the life insurance business, from his high-principled and eloquent father, Henry H. Jackson, who was an influential actuary four decades and more ago. Those acquainted with both father and son are likely to agree that each possessed a well developed sense of humor, though their ways of displaying it were markedly dissimilar.

Robert Jackson's major contributions to the Society's literature were his 1959 paper on policy dividends and his presidential address dealing with professional reorganization. He has also left us a thoughtful essay—*TSA 23* (1971), D453—on the limits of what a "reasonable policyholder" should expect of his company.

An executive of Mr. Jackson's company is quoted thus in the *Hartford Courant* of April 8th, 1983:

"The rarest thing you can find is an actuary with a good marketing sense and Bob had that."

We may be permitted the rejoinder that warmheartedness, effective leadership, and sound judgment form an equally rare combination, and Bob had those.

E.J.M.

hadn't joined by 1890, usually because they had retired or moved into other activities, and one (Lucius McAdam) seems to have shunned the Actuarial Society but became the first president of the American Institute in 1909.

### Canadians

Twelve Canadian actuaries are in this census. How close can any Canadian member come to naming them? Anyone interested, please send a list to the Editor.

E.J.M.

**BATTLEFIELD MORTALITY:  
AN ANTE-CIVIL-WAR ASSESSMENT**

In May 1859—two years before the U.S. Civil War erupted—a group of life insurance officers, well sprinkled with actuaries, met in New York City for what was labelled “The First American Life Underwriters’ Convention”. A report of what transpired was picked up, from *The Spectator*, by the Institute of Actuaries, J.I.A. 8 (1859), 268-284.

On the subject of war mortality, one finds the following:

“Lieut. (Lewis) Merrill spoke of the mortality from wounds received in action. It was much less than was generally supposed. An increase of one or two years, in the rate charged for insurance at a given age, as, for example, a person twenty-five years of age being charged the rates of one aged twenty-seven, would meet the increased risk of death from wounds in battle. He referred to statistics compiled by Dr. Coolidge, of Washington, and suggested that application to the War Department, for mortuary experience, would be cordially responded to. He also gave the results of calculations, showing that the actual mortality in nearly all wars, within ninety years, had been about one death to every ten thousand balls fired. In the late Crimean war, the rate of mortality from all sources corresponded almost exactly with that of our war with Mexico. . . .

“The President. (Frederick S. Winston, Mutual Life of N.Y.) inquired whether modern improvements in gunnery would render war more destructive to life. Lieut. Merrill thought not. The results would be about the same. What could be done with the old arms at a distance of four hundred yards could be done with the new ones at a distance of a thousand yards or a mile; and although much had been said on this subject, he had come to the conclusion that the deadly effect would be about the same as it had been. In relation to those chemical compounds, noxious gases, or poisons, with which the name of the late Dr. Lardner and others had been connected, they would be considered dishonourable by civilised nations, and to resort to these modes of warfare would be as infamous as to

**MEMBERS BY ATTAINED AGE**

*by James L. Cowen, Director of Research*

The age distribution of our members in 1982—including new members from the May 1982, but not the November 1982 exams—was thus:

Age	Fellows		Associates		Total	
	No.	%	No.	%	No.	%
Under 20	0	—	1	—	1	—
20-24	7	.2	172	4.6	179	2.1
25-29	468	9.8	1,000	26.4	1,468	17.2
30-34	1,094	22.9	885	23.4	1,979	23.1
35-39	949	19.8	608	16.1	1,557	18.2
40-44	714	14.9	401	10.6	1,115	13.0
45-49	350	7.3	205	5.4	555	6.5
50-54	363	7.6	155	4.1	518	6.0
55-59	270	5.6	119	3.1	389	4.5
60-64	141	3.0	62	1.6	203	2.4
65-69	143	3.0	66	1.7	209	2.4
70-74	129	2.7	45	1.2	174	2.0
75-79	88	1.8	37	1.0	125	1.5
80 & over	66	1.4	31	.8	97	1.1
Total	4,782	100.0	3,787*	100.0	8,569*	100.0

\*Excludes 4 overseas Associates whose ages are unreported.

Age is calculated as 1982 minus calendar year of birth.

The median age of our Fellows is 39; of our Associates, 33. Seven percent of our members are age 65 or over. The earliest year of birth is 1886. □

poison the springs in an enemy's country or to resort to assassination. No enlightened nation would adopt them. . . .”

Who was this Lieut. Merrill who perhaps was to have second thoughts within just a few months? In the meeting's roster he was described as Actuary, Penn Mutual Life Insurance Company of Philadelphia, but it has been established that his connection with that company was extremely brief, perhaps just in a consulting role. At the time he spoke he was less than 25 years old, having graduated from West Point in 1855. His subsequent career was entirely in the military; ironically he personally, as leader of a unit that came to be known as Merrill's Raiders, contributed to raising Civil War mortality beyond the level that he himself had predicted. Eventually he became General Merrill, and apparently never returned to the actuarial profession. He died in Philadelphia on Feb. 27, 1896.

E.J.M.

**MAIL ALERT**

The *Record* Vol. 8, No. 4, covering our 1982 Annual Meeting, should have reached you. If it hasn't, tell the Society office, at its new address shown in this issue's masthead.

**CONSOLE-ABLE ACTUARIES**

Would you like to have a fine set of papers on the theme, “Computers: The State of the Art and Its Implications for the Actuarial Profession”, printed in the 1982.1 special back issue of ARCH? There are two ways you can get this, viz.

1. Send your request, with \$20. to the Society office.
2. Subscribe to ARCH, Actuarial Research Clearing House's informal journal of current thinking and research. For \$40. you can have a \$25. subscription covering two semi-annual issues and the above described back issue.

*Courtland C. Smith,  
Co-Editor*

**PUZZLE SOLUTIONS TO  
MILWAUKEE, PLEASE**

Our Competition Editor isn't in Bermuda Run, nor is he at Society headquarters in Illinois. By checking his name on our masthead, and his address in the Yearbook, the puzzle of where to mail solutions can be solved.

LETTERS

Society Syllabus

Sir:

I'm delighted to read Prof. Batten's opinions (March issue). At last someone has the courage to say that the emperor has no clothes. I had been wondering about this, but thought that my education might be lacking or my field of specialization (pensions) too remote.

On two occasions when I needed academic help, I couldn't find it—not in the resources of my own actuarial education, nor in publications.

In one case, the best paper on the subject (Newton L. Bowers et al, TSA 28, 177) just dismissed my problem as an irrelevance. Admittedly, it's unlikely in the U.S.A. that investment returns would be continually less than salary increase rates, but that state of affairs is normal in a semi-socialist economy with currency exchange controls and limited investment choices.

The other case involved statistics of a peculiarly actuarial kind. Although in most statistical problems the probabilities of several events can be treated as independent of one another, actuaries in both insurance and pensions must deal with cases in which the probability of mortality or other decrement at one age or duration has a strong relationship with those at neighboring ages or durations.

Can any reader refer me to a method (not requiring more than two hours to learn) that recognizes the above relationship and enables one to reject, with a specific high degree of assurance, the hypothesis that two sets of age-specific exposure and death data could have arisen from the same underlying mortality?

Let me clarify with an illustration. I seek the sharpest possible, simple, tools that will enable me to say with what degree of certainty a specified hazard does affect post-retirement mortality, given data such as the following:

Lives Subject to Hazard			Lives Not Subject to Hazard		
Years Exposed	Deaths	Age	Years Exposed	Deaths	
10	1	60	100	1	
20	0	61	200	1	
50	2	62	400	6	
60	0	63	500	8	
70	2	64	600	11	
80	1	65	800	17	
80	3	66	900	20	
80	2	67	900	24	
60	3	68	800	21	
50	1	69	700	25	
40	2	70	600	20	
600	17		6,500	154	

Returns from a questionnaire of the type Prof. Batten devised would be interesting.

Actuaries should, in the normal course, be taught to apply, accurately and knowledgeably, tools developed by academic actuaries and statisticians, and applied by academic actuaries to genuine actuarial problems encountered by practitioners. Knowledgeable application requires that their proofs be understood. The most useful, though not the only role of the academic actuary, apart from teaching, is to bring within the practitioner's reach those statistical tools the latter needs. Some practitioners need to have mastered risk theory, but many of us would, like those Prof. Batten surveyed, rate statistics and risk theory among the least useful parts of our actuarial education.

Bearing in mind how many potentially useful subjects must be omitted for lack of syllabus space I'm glad someone whose academic credentials outrank mine has dared to question the need for risk theory. Perhaps we should leave it as an optional specialty—or to the casualty actuaries.

Charles V. Schaller-Kelly

Sir:

Having read the pros and cons, may I express my full support for Robert W. Batten's view of what the actuary's role is and how those aspiring to become actuaries should be prepared for it. We should clearly understand that an actuary isn't just a mathematician or statistician, but an expert insurance businessman who uses mathematical and statistical techniques.

And I support Prof. Batten's suggestion that optional specialty exams be created for those wishing to specialize in statistical techniques and research; indeed, this treatment might well be extended to other subjects, e.g. investments, data processing and social insurance. These specialties should be in the Fellowship syllabus.

The present syllabus falls short of producing actuaries for tomorrow; it just increases our vulnerability to raids from other disciplines.

Arshad H. Qureshi

*Ed. Note: Surely more than two readers think these questions important enough to warrant sending along their own views.*

\* \* \* \*

First Lady Chief

Sir:

Does the honor of being the first lady member of the Society (and of our predecessor bodies) to become chief actuarial officer of a U.S. or Canadian life insurance company belong to Henricka Bryant Beach who first held that post at Provident Life Insurance Company of Bismarck, N.D. about 1918?

If so, even she may not be the first intentionally so appointed. I'm told that Ms. Beach was hired sight unseen; only when she reported for work did that company discover that they had hired a woman to be their Chief Actuary.

Dwight K. Bartlett, III

\* \* \* \*

Not Defunct

Sir:

It's a pleasure to tell your readers that, contrary to the belief I had when I wrote about Purchase Accounting (Feb. issue) the AICPA Task Force has *not* been disbanded. It isn't even in the doldrums, but is at work on the problem discussed in my article.

Joe B. Pharr

(Continued on page 7)

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(Continued from page 7)

### Social Security Conference

Sir:

May I encourage actuaries to participate in a conference sponsored by The Cato Institute, entitled *Social Security: Continuing Crisis or Real Reform*, scheduled for Washington, D.C. on June 6-7, 1983.

The general objectives of the Institute may be divined from the name it chose for itself when organized several years ago. Roman statesman Cato, 234-149 B.C., renowned for devotion to simplicity of life, honesty, and unflinching courage, fought against extravagance in public life.

Among the speakers will be Rep. William Archer (R-Texas), Peter J. Ferrara, author of *Social Security: The Inherent Contradiction*, and our own A. Haeworth Robertson.

Request particulars from Kristina Herbert, Cato Institute, 224 Second St. SE, Washington, D.C. 20003, ph. (202) 546-0200.

Michael F. Davlin

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### Actuary Leads North Carolina CPA's

Sir:

Jonathan S. Carr, FSA 1982, who was an actuarial student with our company from 1979 to 1981, has won two N.C. Association of CPA's awards for performance with high distinction at the national level.

One, the Katharine Guthrie Memorial Gold Medal, was for the highest North Carolina grades on the CPA Examination. The other, the Elijah Watt Sells Certificate, is presented to candidates who take all four sections of the Uniform Certified Public Accountant Examination at one time and receive the highest grades.

Willis B. Howard, Jr.

\* \* \* \*

### Discounting

Sir:

Richard M. Wenner (Feb. issue) describes a discounting method that we have found particularly useful in valuation of single premium immediate annuities.

My company maintains a segregated pool of assets for its immediate annuities.

In this context, and for prospective valuation of non-par business (for which no generation has a claim to its share of profits), no separate valuation rate by generation is necessary. The valuation actuary must be concerned with mismatching of cash flows on existing funds as a whole.

We therefore decided upon a single valuation rate that recognized any prospective mismatching. For this reason Mr. Wenner's method was put to use, the required reserve being the "present value" as defined by the cash flows on liabilities, given the pool of assets. The valuation rate becomes just a calculating device to reach this required level of reserves.

We have also found this method useful in quantifying exposure to the risk of changing interest rates, and have extended its application to other types of business.

Hemant Tilak

\* \* \* \*

Sir:

Mr. Wenner's article brings to mind a somewhat different approach that we have used in pension plan work.

Ours assumes that the rate of investment and reinvestment return will eventually stabilize at some selected rate  $i$ . This won't happen, but there seems no better assumption to make.

Using this premise, we estimate the cash flow that will emerge for investment before the rate levels off. We then assume it to be invested in fixed income securities yielding the new money rate we have selected for that year.

The securities so acquired are revalued at rate  $i$ , resulting in a "gain" for that year. The accumulation of all such gains, discounted at rate  $i$ , is then subtracted from the actuarial present value of all benefits, discounted also at rate  $i$ . The result thus reflects the higher rates assumed in the years before the rate has levelled off.

This model strikes me as more realistic than using discount factors of the form  $1/(1+i_1)(1+i_2)\dots(1+i_n)$ , which suffer from the severe theoretical limitations that Mr. Wenner describes.

Although this discussion assumes that the interim rates are greater than  $i$ , the technique should work equally well if "gains" are replaced by "losses". I'm not sure how the process works with negative cash flow, but these are rare in pension valuations.

Thomas P. Bleakney

### Complaints and Discipline

Sir:

Essentials for any true profession are (i) a code of conduct, and (ii) a means of enforcing it.

I'm pleased that my article (Dec. 1982 issue) has prompted Gregg Skalinder to express his views (Feb. issue). Although I cannot comment on the reprimand case he mentions, I can discuss several of his other points.

Mr. Skalinder calls the Committee's mandate "vague". It is broad, but I don't consider it vague. Article VII says that the Committee "may also receive and hear any complaint relating to the conduct of a member preferred *in writing* (emphasis added)". A written complaint by anyone, in or out of the profession, should get attention, but I doubt that the Committee would often pursue verbal complaints or vague questions that come up without any complaint having been registered.

I believe in the wisdom of the confidentiality rules; they should be rigidly followed. The several actuarial bodies have separate legal identities. Each must take its own separate disciplinary actions; each must follow its own confidentiality rules, even with respect to the other bodies. How then should "joint investigating committees" work?

A joint investigating committee should never be contemplated by one body unless it has been told, normally by the complainant, that the complaint has gone to another body also. In such circumstances, a joint investigating committee might be formed purely to save inconvenience and expense, even to the actuary complained against, that would result from multiple investigations. Each body should regard some of, but not necessarily all, those on the joint committee as its own representatives; ideally, the chairman should be a member of all the bodies involved. Minority reports from an investigating committee shouldn't be uncommon; nor should separate reports to each body by its own representatives.

An investigating committee, joint or not, is just that. Its duty is to determine the facts—that is all. Once its reports are rendered, the Committee on Discipline itself must render judgment. If more than one actuarial body is involved, each must render its judgment independently of the others.

John M. Bragg

(Continued on page 8)

## Letters

(Continued from page 7)

**The Amicus Brief (March issue)**

Sir:

It is unfortunate that eight highly respected and competent actuaries should decide to do battle in public on the implications of sex-distinct annuity pricing. My major concern, though, is the generalizations and inaccuracies in their brief to the Supreme Court.

In their summary they state that insurers "have in the past protected themselves against adverse experience by including substantial safety margins in annuity premium rates", and that these are required because of "uncertainty as to future investment returns". In the brief it's implied, though not clearly stated, that the reference is to deferred annuities.

My company has been writing immediate annuities for many years. Our approach to pricing is based on immunized investments, usually A or AA bonds or mortgages, and a 1/8th to 1/4th percent profit margin, and our competition appears to be doing likewise. I hardly call this substantial safety margins; certainly this pricing isn't sufficient to provide male benefits to female annuitants.

The brief has other sweeping statements and innuendos which strike me as regrettable. For example, it could be inferred that mortality differentials between smokers and non-smokers should be taken into consideration in pricing annuities. (I wonder how?) And they say that health or any factors predictive of longevity except sex and age don't generally enter into annuity pricing. The fact is that many companies, including my own, do write substandard immediate annuities.

Much of what actuaries do is judgment rather than science. I wish we actuaries would consider how our dialogue in a public forum will be interpreted before we start to debate, in public, the basis of our judgments.

Robin B. Leckie

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**Price and Dodson**

Sir:

Richard Price's Northampton Table (Jan. issue), though apparently the first used to calculate reserves, was not the earliest

table to be constructed for life insurance premiums. I believe that honor goes to the "London Table of Observations" that was mentioned there in the William Morgan quotation. The London Table was developed by James Dodson, one of the founders of the Equitable Society (of London), who, like Price, was a Fellow of the Royal Society. That table, used to compute the Equitable's original premiums, was based on the mean mortality of 1728-1750.

Dodson invented the whole life policy, i.e., a non-cancellable policy with a level death benefit. The London Table produced whole life premiums that were in some cases lower than the term insurance premiums charged by the then two stock companies (the London Assurance and the Royal Exchange), and lower than premiums on policies with non-guaranteed death benefits offered by the old Amicable. The whole life premiums derived from the London Table nevertheless proved to be well on the safe side, and Richard Price developed the Northampton Table to compute even lower premiums.

Among Richard Price's many contributions to actuarial science was an actuarial text book, *Observations on Reversionary Payments*, which remained the standard text for nearly a century, and was, in the opinion of his friend, Benjamin Franklin, "the foremost production of human understanding that this (18th) century has afforded us". Price developed the Equitable's first dividends in 1776, and with William Barren developed the reversionary bonus or paid up addition dividend.

Price also wrote articles in 1776 favorable to the American Revolution; in 1778 Congress invited him to come to America to help regulate the nation's finances, but he declined because at 55 he felt he was too old. Yale University in 1781 conferred honorary doctorates on two men—George Washington and Richard Price.

The above facts come from M. E. Ogborn's 1962 book, *Equitable Assurances*, and a copy of Dodson's handwritten 1756 manuscript, "First Lectures on Life Insurance", both kindly sent me by actuaries of the old Equitable.

Thomas C. Kabele

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**THE E. & E. CORNER**

*Ques.: Instead of either a multiple-choice or an essay examination, might we not have a compromise, i.e., a multiple-choice exam in which a student can write comments on questions that appear unclear or in need of a qualified answer?*

*Ans.:* Students troubled by a particular question do now send such comments to the Part Chairman after the exam; such messages are carefully reviewed, and remedial action is taken when needed. In the future, many multiple-choice exams will contain questions calling for written answers, and it will then be possible for the concerned student to record such messages on the answer sheet.

*Ques.: Why was the Part 7 morning session split into two 2-hour pieces? Why wasn't the student allowed to allocate the four hours as he or she saw fit?*

*Ans.:* The split session was an expedient, not expected to be needed next time. This was the first time that essay questions had been in Part 7, and something had to be done to accommodate different splits by both subject and national content, and to simplify matters for examination committee.

*Ques.: I've noticed that the multiple-choice exams are now copyrighted. Why?*

*Ans.:* We have long declared the multiple-choice exams confidential; copyrighting is a way to emphasize this. A reason for confidentiality is to avoid giving some students the advantage, if any, of looking at past questions that other candidates haven't seen. Another is our belief that a student's study time is better spent on mastering the text than in reviewing past questions extensively. □

**Effects Of TEFRA**

Sir:

I don't believe it's necessary or practical to amend plans annually to comply with changes in the maximum pension under Sec. 415, as Lawrence Mitchell suggests (Feb. issue). Many plans have received favorable determination letters stating that the annual benefit must not exceed the existing Sec. 415 limitations as later amended by IRS rules and regulations.

On another point—it's true that TEFRA doesn't permit a deduction for funding the part of projected benefit in excess of the current plan year maximum. But this isn't new; IRS had adopted this position before TEFRA—see, e.g., Revenue Ruling 81-195. Rick A. Roeder