The Actuary

The Newsletter of the Society of Actuaries

VOL. 17, NO. 7 SEPTEMBER, 1983

NEW DIRECTOR OF RESEARCH

Mark G. Doherty is now the Society's Director of Research, succeeding James L. Cowen who vacated that post in May.

Mark, in his thirties, is an M.S. in mathematics, statistics and operations research from Xavier University, and an M.B.A. from Virginia Polytechnic Institute. His background includes teaching, management consulting, and most recently research for the natural gas industry that required studies interestingly comparable to studies done in actuarial work.

Members who attend our Florida meeting will have an opportunity to meet and welcome Mr. Doherty there.

E.J.M.

HALE-&-HEARTY HEFT

by Frederic Seltzer

Metropolitan Life, into public service health education for over a century, has been producing since 1942 tables that show the weights at which mortality is lowest. Their purpose is to promote sound concepts of weight control.

Originally, adjectives such as "desirable" or "ideal" were applied to these tables, but no longer so. Weights associated with lowest mortality mustn't be confused with weights at which morbidity is lowest, weights at which job performance may be optimal, or weights for which appearance is judged best. Furthermore, these weights weren't calculated from samples of the entire population but from insured lives, excluding people known to be suffering from major diseases such as cancer, diabetes or heart impairments.

(*Continued on page* 8)

REFLECTIONS ON PHILADELPHIA— APRIL 1983

by George D. Gwilt, F.F.A.

Ed. Note: Mr. Gwilt is President of the Faculty of Actuaries. This welcome contribution was solicited.

Outsiders can sometimes see what is hidden by familiarity from those inside a group. That I was an outsider at the Society's Philadelphia meeting doesn't imply that I can unerringly point to every unclothed emperor—to do that I would have to know precisely which emperors appeared (erroneously) to Society members as clothed. But you might, just conceivably, be interested in what an "innocent eye" saw during those two April days when I was made so welcome by your President and others.

Premiums by Sex

That legislation prohibiting different sets of premiums for males and females was on the point of being passed struck me as extraordinary. There is indeed a world-wide movement aimed at reducing many forms of sex discrimination. In the U.K., employers are required to give people equal opportunities regardless of sex. Membership conditions of pension schemes must not depend on sex. For a time there was argument whether contributions or benefits should be equal but the authorities, so far, have stepped back from the brink and haven't required simultaneous equality of benefits and contributions.

There is nevertheless a disturbing draft directive of the European Economic Community now being considered, that would impose more rigid requirements of equality: it would require money-purchase schemes to provide the same benefits to men and women for the same contribution. Clearly, this must be firmly resisted.

(*Continued on page* 8)

VOGEL JOINS EDITORIAL BOARD

We announce with pleasure the appointment of Julius Vogel as an Associate Editor. Mr. Vogel enjoys the distinction of having written an article for our very first issue (March 1967); he went on to become Society President in 1979-80. He is Chief Consulting Actuary in Alan M. Thaler & Associates, stationed in Summit, New Jersey.

NON-ROUTINE ACTIONS BY BOARD OF GOVERNORS, MAY 1983

by Kenneth T. Clark, Secretary

1. The Board took under study a report from the Committee on Specifications for Monetary Values for the 1980 CSO Tables. Copies of the report are available from the Society office.

2. The Board approved formation of a Pension Section, and its By-Laws.

3. The Board reversed its prior decision on status of Associates in our Sections. Associates will now be entitled to vote and to hold office therein.

4. The Board revised the second paragraph of Article IX of the By-Laws to provide a more flexible waiver of dues system, and then adopted a policy for implementation. The policy covers waivers for those disabled or retired, full time students, in military service, and for certain other members.

5. The Board adopted a policy authorizing sale of the Society's mailing list to persons or organizations offering goods and services of particular interest to actuaries. Members will be given the opportunity to have their names omitted from such lists.

(*Continued on page* 8)

The Actuary

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The Society is not responsible for statements made or opinions expressed herein. All contributions are subject to editing. Submissions must be signed.

EDITORIAL

GENEALOGICAL QUEST

Whoever wrote the obituary, printed in R.A.I.A. II (1913), of the co-founder and first president of the American Institute of Actuaries, was in no mood to enlighten succeeding generations. That piece was (justifiably) strong on homage, but barren of facts about the gentleman's career. It failed to mention when and where he was born, and was even silent on the date of his death.

After we had nearly abandoned hope of ever discovering much about that eminent professional forebear, the National Underwriter Company's Mr. Price Gaines got us his exact date of death and a short obituary from the files of NU's predecessor, the Western Underwriter; it revealed the key fact that our subject had graduated at some unstated time from the College of the City of New York. An enquiry letter to that institution brought from its Archivist Barbara Dunlap exactly what we needed: no less than a biography in that actuary's own handwriting composed less than two years before he died.

So, we are in a position to place in our records the memorial as we think it might, i.e., should, have been written.

September 14, 1845 LUCIUS McADAM March 31, 1913

Lucius McAdam, the first president (1909-10) of the American Institute of Actuaries, was born in New York City, his father being from Scotland and his mother from Oneida County, N.Y. After attending New York public schools, he graduated from The College of the City of New York, B.S. 1864, M.S. 1867. It is remarkable that both he and David Parks Fackler, who in 1889 became the moving spirit behind organization of the Actuarial Society of America, were educated in one and the same institution.

Mr. McAdam immediately became actuary of the Guardian Life of New York, not the present company that now bears that name but a small company that had been formed in 1859 and lasted only till 1873.

With his personal reputation as an actuary established despite his company's failure, he then left our profession, earned admission to the New York Bar and practiced law from 1877 to 1896. This hiatus doubtless explains why he was not a charter member of, nor ever joined, the Actuarial Society. During the early 1880s he served a term as mayor of East Orange, New Jersey.

Returning to actuarial pursuits in 1896, he became for ten years actuary of the then Hartford Life, and then moved to Chicago as actuary of the United States Annuity and Life Company which he served till his death. It must have been soon after his arrival in Chicago that he and others began to discuss launching the American Institute of Actuaries.

His pastimes, at which he was accomplished, were literary and musical. He took a keen interest in questions of suffrage, publishing in 1898 a pamphlet designed to reveal gross inequalities in representation in Connecticut.

(This from R.A.I.A.): "As a thinker and writer he was distinguished by contributions to the press and especially to the proceedings of this and other kindred organizations, which have been in the highest degree instructive to those engaged in actuarial pursuits and in general life insurance work."

E.J.M.

LETTERS

Cauchy

Sir:

I would like to reply to the letter of Dan Quick Jr. (June issue). He was wondering about some of my earlier comments (March issue) on Cauchy's functional equation and its application to the theory of interest.

Suppose that f is a function satisfying $f(x+y) = f(x+f(y)$, for all x,y, and we know in addition that f is continuous at the point x_0. For any other point x, let $s = x - x_0$. Then for all t,

$$\begin{aligned} f(x+t) - f(x) &= f(x_0+s+t) - f(x_0+s) \\ &= f(x_0+t) + f(s) - [f(x_0) + f(s)] \\ &= f(x_0+t) - f(x_0). \end{aligned}$$

Since $|f(x_0+t) - f(x_0)|$ can be made arbitrarily small by choosing $|t|$ sufficiently small, the same is true for $|f(x+t) - f(x)|$. We have shown therefore that f is in fact continuous at *all* points.

It is true, as Mr. Quick remarks, that there can be infinitely many linearly independent solutions to the Cauchy equation, but this is in the absence of any further requirements. Almost any type of regularity condition is sufficient to imply the unique (up to a constant multiple) continuous solution. For another example, weaker than the requirement of continuity at a single point, we need only stipulate that f is bounded on an arbitrarily small open interval (a,b).

A good reference for the interested reader is "Lectures on functional equations and their applications", by J. Aczel, Academic Press, N.Y., 1966. (In particular see section 2.1).

S. David Promislow

Ed. Note: Discussions of this topic came in also from Messrs. Charles E. Chittenden, Samuel H. Cox, Jr., and Henry S. Lieberman.

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Speed and Mortality

Sir:

David M. Lipkin's piece (February issue) on the quantitative effect of driving speed on "living" explores a concept of great value which, along with other aspects of modern life, merits close attention from us actuaries as experts.

But, without challenging the author's figures, I feel that, just as he allowed for

(Continued on page 3

Letters

(Continued from page 2)

a proportion only of the extra mortality caused by fast driving, equally he should have recognized that taking credit for the full time "saved for living" is unsound.

Driving nowadays is part of life, just as are eating, sleeping, and making love. How then can we quantify the gain from time saved by fast driving? For me, a drive at reasonable speed has its own value—time to relax (up to a point) and to think about business or life in general. It is not valueless as implied. And the author makes no allowance for the element of strain on drivers, passengers, other drivers or pedestrians—another significant mortality factor that is intensified at high speeds.

Surely the time "saved" would be decimated at least, if these additional factors were taken into account. Could we perhaps arrive at an optimum speed both mortality-wise and socially?

Kenneth F. W. Clayton, FIA, ASA.
Mbabane, Swaziland

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A. & H. Pricing Structure

Sir:

In the light of continually rising medical care costs, isn't the level premium system for guaranteed renewable accident and health policies an anachronism whose time for extinction has arrived?

It is absurd to assume no inflation in our reserve calculations, and to offer people level premiums when we know premiums will have to be raised. Maybe it's time to recognize reality by abandoning the requirement for establishing reserves on a product whose renewability is guaranteed but whose premiums aren't.

Insecurity to the policyholder? Group policies are guaranteed renewable, but don't carry tabular reserves. Why should a practice easily circumvented by going the group route be required for individual policies?

When inflation occurs, reserves do not serve to protect the policyholder; they just delay the day of reckoning. Premiums must be raised, regardless of the reserves. Removal of the reserve requirement would clarify the sufficiency or insufficiency of the premium to cover claims for the couple of years into the future that can be forecast with reasonable confidence. Companies and regulators will be able to judge what changes are appropriate.

Massive paper work and brain fatigue would be avoided, and expenses decreased without loss of safety to the policyholder.

John T. Gilchrist

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(Continued on page 4)

"IT'S THE LAW"

A column by William D. Hager

Ed. Note: Mr. Hager, widely known as the Academy's 1979-83 general counsel, is now a Des Moines attorney in private practice.

The United States Supreme Court's July 1983 decision in the *Norris* case has the virtue, even to the actuary whose work product is dramatically affected, of removing the confusion and ambiguity that followed its 1978 *Manhart* decision.

The Issue

The question presented in the *Norris* case was whether Title VII of the Civil Rights Act of 1964 prohibited an employer from offering its employees even the option of receiving a sex-distinct retirement benefit under a deferred compensation plan.

Under the state of Arizona's plan, the employee could choose any one of three options, the third being a life annuity in any of several private insurance companies authorized by the state. All of these insurers were using sex-based mortality tables to calculate those annuities. A federal district court had held that the plan violated Title VII, and the U.S. Court of Appeals for the Ninth Circuit had affirmed that decision.

Decision

The Supreme Court ruled, five to four, that the plan did indeed violate Title VII. In doing so, the court relied heavily on the *Manhart* precedent, holding that "classification of employees on the basis of sex is no more permissible at the pay-out stage of the retirement plan than at the pay-in stage". On the way to this finding, the Court rejected several Arizona arguments, as follows:

- it was no defense that the plan provided annuities with "roughly equal present actuarial value";
- an employer who offers one fringe benefit that is discriminatory cannot escape Title VII by offering other benefits that are not discriminatory;
- an individual woman may not be paid lower monthly benefits simply because women as a class live longer than men;
- though insurance is unique in its requirement that contingencies be measured in terms of groups, this does not justify resort to classifications prohibited by Title VII;
- the McCarran-Ferguson Act does not bar applicability of Title VII;
- the *Manhart* finding that an employer could establish equal contributions by men and women and permit its employees to purchase whatever benefits they could on the open market is not applicable here;
- an employer who finds that the only benefits available on the open market are discriminatory "must either supply the fringe benefit himself, without the existence of any third party or not provide at all".

The Relief

On the vital retroactivity question the Court decided that to approve retroactive relief to annuitants would be "unprecedented and manifestly unjust", noting that it would have "a potentially disruptive impact on the operation of the employer's pension plan". Hence unisex computation should apply only to benefits derived from contributions collected after August 1, 1983. Justice O'Connor, concurring, noted that "topping-up" was not contemplated by the decision.

Hager Commentary

It seems unequivocally clear that all plans containing provisions inconsistent with *Norris* have to be amended. The choices are three: (1) benefits may be, but clearly are not required to be, raised to the currently highest level; (2) a unisex benefit structure may be introduced; or (3) the prohibited option may be eliminated.

□

Letters

(Continued from page 3)

All's Well

Sir:

The recent ballot for Society officers worried me. I discovered that I do not know anyone on the list. It would trouble me even more had I not observed that the Society is safe, or at least has a 75% chance.

Three of the four candidates for treasurer appear to be good Scotsmen. The fourth, one "Whaley", may also be safe since I note a Canadian address although I do recall that his company's actuary in the good old days was an Australian who spoke with a Down-Under accent rather than the proper brogue.

Oswald Jacoby (F.S.A. 1927)

* * * *

More on Lipkin

Sir:

David M. Lipkin's header in F's (May issue) was circulated to my staff. My note read "Aetna Actuary Alliterates Awesomely".

Doubtless my colleagues are now spending time alliterating rather than valuating. A crisis approaching that of Rubik's Cube may be upon our profession.

Since it can't be licked, perhaps our organizations might get behind this fad. An All-American Actuarial Alliteration Assembly might be held, the winners to be honored at a banquet.

The headline in your columns would be "Fete Flowery Fellows Facile in Fad".

Frank D. Repp, Jr.

* * * *

Tempora Mutantur

Sir:

LIMRA (Study on Replacements, May issue) has performed a great service for insurance archaeologists in documenting the consumer's frame of mind in the epoch P.U. (Pre-Universal). My company took an informal sampling of terminating policyholders in 1982 (Year 3 A.D.—Anno Disintermediencis), and found that a new world has indeed arrived.

We studied samples drawn from those we knew (from disclosure forms and internal records) to be replacers, and from those we thought to be "pure" terminators. Even for the latter group, the answer to Deborah Poppel's first question, "What percent of households that drop a policy replace it?", was 50% (LIMRA showed 36%). As for her second question, "Percent of whole life replaced by term", and her third, "Percent of replacements initiated by agents", for external replacements our findings are 50% and 33% (vs. LIMRA's 33% in each case), while for internal replacements in a universal life company, today's answers are 20% and 70% respectively.

The LIMRA study, while doubtless accurate, may be an antique.

Arnold A. Dicke

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Language Aptitude

Sir:

Chiu C. Chang (June issue) asserted that "studies have shown that those who are analytically-minded are usually not good at language".

What are these studies? My observations don't support this conclusion. Even if it were true, there would be many exceptions to be found in our profession.

Actuaries need to be able to communicate effectively, both with other actuaries and with the rest of the world. To do this, they must be "good at language". Mr. Chang's letter shows that he is.

This is not a vote for reintroduction of a Society language aptitude test.

Frank H. David

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Stati

Sir:

I was a little startled at the plural "stati" in your columns (Frank G. Reynolds, April issue). I suppose my instincts expected the homelier "statuses", but then instincts have to be educated. Also I had supposed that the etymon was fourth declension with a plural in -us (long), like that other troublesome word, "apparatus".

Webster isn't much help; it gives the usual plural but cites the English word "state", for which it gives as etymon the past participle of the Latin "stare".

On with the quest! My Latin dictionary gives two entries for "status". The first is a past participle, not of "stare" but of "sistere", an interesting verb but one whose connection with "status" seems tenuous. The other entry, however, nicely supported by quotations, is a fourth declension noun meaning standing or posture, which sounds a lot more like status.

Next stop was the OED, which in its peremptory fashion gives the plural as "status", but calls it rare. Very unsatisfying. But the OED did have some of its musty supporting gems, from which I quote two given under the entry "finance" in which the OED defines "status" as "a particular grouping of the conditions bearing on the continuance of an annuity", bringing us squarely into our own professional field.

1838—De Morgan: "This annuity will be enjoyed as long as either of the following status exist."

1862—Waterston: "A compound status is one which exists as long as either of two or more status remain."

Of course, you know the English.

Miguel A. Ramirez

* * * *

Actuaries Aren't Being Squeezed Out

Sir:

I have been challenged to document the following statement that appeared in the "Role of the Actuary" exposure draft that I distributed on April 18th:

> "Some (committee) members noted that fewer actuaries are reaching executive and managerial positions because the life companies, traditionally the largest employer of actuaries, are hiring higher caliber and more broadly trained people from other disciplines to meet their anticipated future financial management needs."

Since determining accurately which actuaries are working in "management" as opposed to more traditional actuarial work poses problems, I tabulated, as a proxy, from the 1963 and 1983 Society Yearbooks, the numbers who have the titles Chairman, President or Executive Vice-President of life companies, with the following results:

		Chairmen	Presidents	Exec. V.P.s
In U.S.A. & Canada	— 1963	8	32	17
	— 1983	14	68	63
Elsewhere	— 1963	0	2	0
	— 1983	1	4	0

This suggests that our profession is doing quite well. Although the proportionate increase would lag a bit behind the growth in our whole membership, it looks to compare favorably with the growth in numbers of those who work for life companies, and clearly is well ahead of the growth in numbers of life companies in North America.

Dwight K. Bartlett, III

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(Continued on page 5)

October Exam Seminars

University of Waterloo is offering these:

Parts 5A, 5B, 7, 9 (the last two covering both Canadian and U.S. material). Period is Oct. 16-Nov. 5. Get particulars from Prof. Frank G. Reynolds, Yearbook address.

At *Georgia State,* there were still openings in the following at press time:

Parts 2, 3, 4, 5B and 7I. Ask Prof. Robert W. Batten at his Yearbook address.

Letters

(*Continued from page* 4)

Statistics in our Syllabus

Sir:

I don't feel comfortable with the level of practical or theoretical statistics that I received in attaining my associateship (in 1980). A basic non-mathematical graduate course in statistics for education majors that my wife recently took gave her a better idea than I of how to perform and evaluate simple statistical studies. Also, I don't quite grasp the implications of the actuary's deterministic approach to all modeling, especially the practice of using a single interest rate as the estimate of a highly volatile distribution function.

There are credentials that actuaries can obtain from numerous graduate schools to demonstrate proficiency in statistics. Several actuaries of my acquaintance have masters' degrees in statistics (but they don't seem to use any more statistics in their work than I do).

Giving wider choice of specialty in the fellowship exams has great appeal. There's room for improvement too in the primary/secondary structure of Parts 9 and 10.

Some sections of our exams seem repetitious while others require extensive study of areas unlikely to be of much use to actuaries. An expanded specialty list would solve both these problems. I favor dividing the five fellowship parts into about ten shorter exams, allowing students with relatively little study time to pursue them in smaller bites, while the more ambitious could take two or more parts at once. The syllabus also would be easier to revise.

David N. Ingram

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The Fellowship Goal

Sir:

I believe that Dorn Swerdlin's fear (April issue) that students will content themselves with EA status rather than sitting for Fellowship, is unfounded.

Since early 1980, slightly over 500 persons have become enrolled, some proportion of whom either are or will become FSAs. Yet in 1980-81 alone, 678 Associates were admitted to Society Fellowship.

Just as there is a place in business for both the B.A. and M.B.A., coexistence of EAs and FSAs should cause no problem. The Society serves a broader purpose than just serving the needs of pension specialists. We shouldn't change our syllabus and standards just to accommodate one subgroup of our members.

David L. Renz

In Favor Of Better Meetings

Sir:

This is being written during a Panel Discussion at a Society meeting. Yet another panelist is reading us his paper, verbatim. I needn't listen; in just a few months I'll be able to read it all myself. But he could have saved me both today's listening time and the wait by simply distributing copies of his script right now.

Speaking to a group doesn't mean reading to it. I came to hear what you have to say. Talk to me, please!

Denis W. Loring

* * * *

Sir:

An Academy survey printed in the March 1983 *Enrolled Actuaries Report* ought to give us food for thought:

How can the Society loosen its grip on last place in these ratings made by U.S. actuaries with a pension orientation? One possibility is to make our programs more flexible. Putting the latest developments into our programs is necessary even though not easily done. And lead time, normally 6 weeks, for furnishing texts of handouts at our meetings is too long.

True, our new seminars and our sections supplement the technical content of our meetings. But regular Society meetings are part of the glue that holds our diversified membership together. As such, they are worth preserving and strengthening.

Richard G. Schreitmueller

HOW ENROLLED ACTUARIES RATE THE ACTUARIAL MEETINGS

(Percentages other than "Don't Use" add to 100 percent)

Meeting	*Not Useful*	*Useful*	*Very Important*	*(Don't Use)*
EA	2%	54%	44%	(18%)
CAPP	6	64	30	(67)
ASPA	11	56	33	(82)
SOA	35	59	6	(34)

STUDY NOTES OF GENERAL INTEREST

10GB-215-83	Life Company Financial Statements, by R. Arthur Saunders	$11.00
10LB-509-83	1980 Amendments to Standard Valuation Law, by Gary E. Dahlman	$ 4.00
10LB-510-83	Actuarial Review of Reserves & Other Statement Liabilities, by Edward L. Robbins	$ 4.00
10PB-714-83	Guaranteed Investment Contracts, by John D. Stieffel	$ 4.00

Orders must be prepaid, in U.S. funds. Send request, with check or money order payable to Society of Actuaries, to the Society at Box 98474, Chicago, IL 60693.

REPLACEMENTS DISCUSSED AT CANADIAN INSTITUTE

by Michael B. McGuinness

At the Canadian Institute of Actuaries meeting in March 1983, a panel of Charles T. P. Galloway, Prof. Joseph M. Belth and Gerald A. Fryer addressed these questions:

> Can a policyholder reasonably expect to be advised by his company or his agent when to "select" against his company either by surrender and reissue or by replacement with another company? Do the policyholders of a mutual company have more "rights" in this respect? Are nonguaranteed cash value products capable of being sold? Can we explain to our agents or policyholders why asset values fluctuate when we compete against Canada Savings Bonds?

It is, observed Mr. Galloway, the peculiarity of life insurance with its guaranteed coverage for a lengthy period as the risk deteriorates, its heaped commissions to recognize the concentration of the agent's efforts at the initial sale, and its increasing or level premiums generating surrender values, that makes the replacement question so vexing. In an environment in which risk classes that once seemed reasonable and practical no longer appear so (e.g., the advent of non-smoker and investment generation classes), companies face the dilemma whether to tolerate a situation wherein a sophisticated policyholder can exercise advantageous rights that the unsophisticated will fail to recognize, or whether to exacerbate their own problem by encouraging the latter to follow suit.

A Joint Committee of the Canadian Life and Health Insurance Association and the Life Underwriters Association of Canada studying this problem recognized the field position: (1) the agent is a professional advisor who must disclose substantially advantageous replacement opportunities to his client; (2) since agency remuneration aims to reward accomplishment, salesmen should be paid for justifiable replacements, and companies should make some practical offer removing substantial disparities between old and available new business. The companies recognize the validity of these arguments but are concerned over lost investment opportunities caused by increased surrenders and decreased surplus, reducing their capacity to write future new business. Various compromises have been suggested, all based on the principle that the agent should receive something for his service but that inhibitions against devoting too much time and effort to this are warranted.

Prof. Belth, stressing that almost all his research has been on United States practices, views the typical life company as engaged in two primary activities: (i) that of a financial intermediary, and (ii) that of hiring, training, and trying to keep good life insurance agents. It's the agent, not the company, that's in the business of selling life insurance.

And since it takes a high order of salesmanship to persuade people to buy a product associated with death, the companies in their role as major financial intermediaries must necessarily be in the business of hiring, training, and trying to keep good agents; it is level premium life insurance that has placed them in that role. Now that this product has become incompatible with economic conditions, companies are designing contracts that shift some financial risk to the policyholder, a new relationship that has to be accepted if life companies are not to decline in importance as financial intermediaries. The implications, for agent training and for disclosure requirements, of this shift are staggering; problems of comparing sales illustrations by two companies, one that allocates investment income by portfolio average and the other by an investment year method, or one using a fixed policy loan interest rate with direct recognition and the other a variable rate, are examples of this.

Prof. Belth's answer to the first program question, as worded, was "no". While it would be generous for the company to advise policyholders to select against it, he didn't believe the policyholder could reasonably expect to receive such advice. His anwer to the second was also "no"; he saw nothing inherent in the corporate form making either type of company necessarily superior in financial strength, price or quality of service. His answers to the third and fourth questions were "yes", but with those large implications for agent training and for disclosure requirements.

Panelist Fryer began by considering the problem from the viewpoints of the company, the policyowner and the agent, noting the different time horizons of the first two. The decision to replace must be a balanced one and often isn't clear-cut; for one thing, the new Canadian tax laws expose the policyholder to the risk of more onerous taxation both before and after disposition of the policy. The agent must arm himself with product knowledge, must avoid being overly swayed by compensation, and must help his client keep his products appropriate for the long term, which might or might not mean replacement. But actuaries cannot expect the agent to stray far from his prime economic motivation.

The company has to choose between a program of response—creating higher expenses offset by public relations and persistency gains—and creeping losses in earnings and agent morale if nothing is done. The actuary probably should speak for the old policyowners first; they might have no other spokespersons.

The second question he found difficult because the distinction between stock and mutual companies is so blurred. Even though starting from different viewpoints, companies might well reach identical conclusions. They should, at the very least, facilitate periodic reviews of policyowners' insurance programs.

Nonguaranteed cash value products are sold successfully in Great Britain, but there insurance premiums are in large part tax-deductible, the investor's range of tax-favoured choices is not wide, and illustrative materials emphasize maturity values more than surrender equities. Although Canada's tax structure differs and its financial alternatives are more varied, guarantees seem not an essential element in the Canadian life insurance product. Buyers are accepting Universal Life with its minimal interest rate guarantees, and today's savings market has marked short-term orientation. A capital guarantee, though, does seem necessary, and many purchasers still want cash value guarantees. □

Academic Actuary Sought

for probable tenure-track faculty position in actuarial science, beginning 1984-85 academic year. Requires desire and ability for teaching and creative research. While a Ph.D. does improve one's chances of success, applications from Society and Casualty Society Fellows holding M.S. degrees are encouraged. Rank and salary will depend on qualifications. Send resume and three letters of recommendation to James D. Broffitt at his Yearbook address. An Equal Employment Opportunity & Affirmative Action Employer.

Term Cost Vesting and the TEFRA Minimum

by Howard J. Small

The accelerated accrual and vesting requirements under the TEFRA top-heavy rules have added a new consideration to small plan pension funding—the cost of vesting. Traditionally, only the retirement benefit has been valued while the benefit contingent on vesting has been ignored; its justification has been that the present value of the accrued benefit, typically determined under the fractional rule, is less than the reserve or asset accumulation determined when a participant terminates. In a top-heavy plan, a participant's accrued benefit will be front-loaded, and the incurred liability at termination will frequently exceed the released reserve liability. If an employee hired at age 30 terminates employment at age 40, he will have accrued the 20% minimum benefit. Assuming the funding period runs from age 20 to age 65, the incurred liability, usually paid in a lump sum, is about twice the released retirement reserve. One remedy, a departure from current practice, might be to defer payment of all termination benefits to normal retirement.

Another possibility is to fund the TEFRA minimum by the accrued benefit cost method. This has the advantage of forcing an asset accumulation to equal the accrued benefit, but its drawback is that the whole plan must be funded in this manner or else IRS approval would be required to fund some participants' benefits under one cost method and others under another method. Also it's unclear how one would implement a dual funding approach.

Explicitly valuing the vesting benefit is another alternative but this, too, presents problems. The appropriate turnover table for a small group is not easily determinable. Small plan valuation programs frequently do not provide the facility to advance-fund an ancillary benefit. Also, many small plans are split-funded. Even if the valuation program has the provision to advance-fund vesting, the data base would require cash values at all issue ages and durations.

Term Cost Funding

An attractive alternative to advance-funding the vesting benefit is to use the term cost funding method. The idea, here, is that an annual "term insurance premium" is determined such that if the actual experience each year equals the expected experience, there will be no actuarial gain or loss attributable to terminations.

The actuarial gain is derived from two sources. If the actual release (AR) in liability exceeds the expected release (ER) in liability, there will be an actuarial gain. And, if the expected incurred (EI) liability resulting from individuals withdrawing with vested benefits is greater than the actual incurred (AI) liability from such withdrawals, there will be an actuarial gain. Notationally, this will be written

$$G = (AR - ER) + (EI - AI).$$

If we make a withdrawal assumption with respect to the forthcoming plan year and assume that the plan experience is consistent therewith, then (1) G, in the general equation above, equals 0 and (2) ER, AR, and AI, in the general equation are completely determined. This implies

$$EI = AI + ER - AR.$$

There are several advantages to the term cost method. One, the actuary has complete flexibility in determining the withdrawal assumption or load to the basic retirement benefit for the vesting provision. Two, the extra computer programming should be manageable even if added to an existing valuation program. Three, current year cash values are the only additional data needed. And, four, as a by-product of the term cost feature, the vesting cost can be illustrated separately from that of the basic retirement benefit. This last feature is useful because the financial impact of accelerated accrual and vesting requirements can be easily presented to a client.

Ed. Note: Mr. Small here gives an illustration, which shortage of space has prevented us from printing, in which the actuarial assumptions provide for no withdrawals and no pre-retirement mortality, and the data show a 100% vesting percentage and $q_x^w = 0.05$. He continues as follows:

One special case is of particular interest. If we let $q_x^w = 1.0$, the asset accumulation under the individual aggregate funding method is identical to the asset accumulation in a plan funded by the accrued benefit cost method. This result is consistent with the intuitively obvious cost method that has been suggested to fund the front loaded TEFRA minimum benefit accrual. (This the author demonstrates—Ed.)

If the basic funding method is individual aggregate and it has been decided to fund the TEFRA minimum by the accrued benefit cost method, a more succinct procedure is available. Consider the effect of letting $q_x^w = 1.0$ and advance-funding the vesting benefit. For any individual, the present value of liabilities will degenerate to the present value of accrued benefits and the temporary annuity becomes 1.0. The normal cost is the difference between the present value of accrued benefits and the allocated assets. Clearly, the normal cost plus the allocated assets will always equal the present value of accrued benefits. □

CANADIAN ACTUARIES MATCH INVESTING SKILLS

Seventy-five teams have put $15 on the line in "INVESTMENT GAME 83/84" run by the Younger Actuaries Committee of the Canadian Institute of Actuaries. At issue is which team can show the largest market value on April 30, 1984 arising from $250,000 assumed invested in up to eight securities chosen on June 30, 1983, with just two interim opportunities (October 1983 and January 1984) for trading.

Lists of eligible common stocks and bonds are furnished the contestants. Funds may also be placed in specified forms of residential and commercial mortgages, and in gold and silver. Short-term notes are available, and will be used for reinvestments.

Brendan M. McCormick, in charge of arrangements and portfolio records, has kindly promised this newsletter a report on the results. □

DEATHS

Kingsland Camp, F.S.A. 1926
Harold J. B. Cope, A.S.A. 1957
Douglas S. Craig, F.S.A. 1931
J. Ross Gray F.S.A. 1932
Donald C. Pailler, F.S.A. 1949

Hale & Hearty

(Continued from page 1)

Change Over Past Two Decades

The latest of these tables, "1983 Metropolitan Height and Weight Tables based on Lowest Mortality" derived from the *Build Study* 1979 of the Association of Life Insurance Medical Directors of America and the Society of Actuaries, show material differences from their immediate predecessors calculated from the corresponding 1959 study of these same two bodies. Today's adults can weigh more than their 1959 counterparts and still expect favorable longevity. But it's still true as it has been—it is better to be lean than plump.

The 20-year weight increases (for greatest longevity) are not uniformly distributed throughout the tables. For short men the average such increase was 13 pounds; for men of medium height, 7 pounds; for tall men, only 2 pounds. The corresponding increases for women registered 10, 8, and 3 pounds respectively. Over these years there have been substantial advances in public health and nutrition and changes in life style—immigration too may have affected the mix of body types.

Contrast With Other Studies

Studies with contrary findings have appeared, but most of them come from populations that include impaired lives and hence may measure the combined effect of weight and disease rather than weight alone. Duration of observation is also important because the influence of weight on mortality is substantially deferred. Many of the studies that seem contradictory to ours had follow-up periods of 10 years or less.

Ed. Note: Readers who haven't acquired one of the pocket-size plastic cards that display the two 1983 tables, for men and for women, may find the following formulas, derived by this Ed., handy. They produce results within the weight ranges of the 1983 Metropolitan Tables:

Frame	*Men*	*Women*
Small	126 + 2.5 k	111 + 2.5 k
Medium	128 + 3 k	119 + 3 k
Large	135 + 3.5 k	131 + 3 k

"k" being the number of inches that height exceeds 5 feet.

It's explained that weights are in indoor clothing, and heights include shoes with 1-inch heels. No instructions on selecting the right frame size appear, but having seen Metropolitan's Chief Medical Director on the Today Show measuring Jane Pauley's elbow, we know there is a scientific way to do this. Applicable ages are 25 to 59 only. Heights for men range from 5 feet, 2 inches to 6 feet, 4 inches; for women, from 4 feet, 10 inches to 6 feet, 0 inches.

Ed. P.S.: Mr. Seltzer explains that frame size is ascertained by measuring the space between two prominent bones that make their appearance on either side of your elbow when you have (i) extended your arm with fingers straight, (ii) bent your forearm upward at a 90° angle, and (iii) turned the inside of your wrist toward your body. Frame is classified as Medium if the following relations apply:

Height Range	5′4″-5′7″	5′8″-5′11″	6′0″-6′3″
Elbow Breadth—M	2⅝-2⅞	2¾-3	2¾-3⅛
—F	2⅜-2⅝	2⅜-2⅝	2½-2¾

□

Reflections

(Continued from page 1)

And there have been complaints by women of unfair treatment in comparison with men under permanent health insurance contracts. One or two such cases have been settled out of court, so no legal principle has been established. In another case a female dentist, supported by the Equal Opportunities Commission, is arguing that the higher premiums she must pay are not supported by adequate statistical evidence. Present legislation does allow discrimination if it is actuarially justified. Long may that situation continue.

Peering Ahead

I was intrigued by the existence of a futurism group in the Society. The Faculty has no such group and I doubt that we would contemplate starting one. This doesn't mean that actuaries in Scotland don't worry about the future, but rather that each of us will deal with the problems in his or her own way. The Society's group covers a wide spectrum of approaches, ranging from the scientific to the mystical. To me the most important principle seemed to be that one must not forecast by mere extrapolation of trend lines from the past; one must be prepared to make radical direct assumptions about the future. For example, the population trends of a decade ago extended would—in the comparatively short time-scale measured in mere hundreds of years—produce a world population mass exceeding the total mass of matter in the universe; this tells us that any sensible projection must assume specific change in this trend.

Another mistake is the all too easy practice of assuming that current high interest rates are of the same nature as those in the 4% range of non-inflationary times. Today's rates contain within them not only the real return demanded by borrowers but also recompense for inflationary erosion of capital. So, an explicit assumption of future inflation must be made.

I imagine the futurism group will help to concentrate people's minds on matters such as these. I do hope, though, that not too much time will be spent on such potentially sterile topics as ESP or eastern mysticism. As a discipline for the mind such studies may have merit but as a means of determining action now in anticipation of future events I judge them dangerous.

The Sessions

The meetings themselves seemed to me to provide an 'embarras de richesse'. The sessions necessarily overlapped, making choices necessary. The lack, or sparseness, of advance written contributions made it especially requisite to absorb ideas on the spot, a useful discipline but one to which I'm not wholly attuned. Little time was wasted, however.

The conference struck me as very well organized, I could only hope that if a similar operation were held in the U.K. it would run as smoothly. In Edinburgh or London we rarely if ever have meetings of the same sort as yours. Ours allow for a full and lasting record of the proceedings—useful for posterity but making perhaps for a duller occasion. Yours is livelier but largely ephemeral.

I much enjoyed my official visit to Philadelphia and look forward to seeing many of you again at the Congress in Australia next year. □

Board of Governors

(Continued from page 1)

6. The Board approved a new textbook on actuarial mathematics to replace Jordan's *Life Contingencies*. It will go into use gradually, starting with the May 1984 examinations.

7. The Board approved a restructuring of the examinations, transition to start next year. A descriptive notice has been sent to students. □