



The Actuary

The Newsletter of the Society of Actuaries

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THE PURCHASE ACCOUNTING QUANDARY

by Joe B. Pharr

It is disconcerting news that an AICPA committee has been disbanded without agreeing on a question of importance to many actuaries—how to account for purchase of a life insurance company. It may be helpful to consider here, first, what the extreme possibilities are, and, second, what range of practical approaches might prove acceptable to both the accounting and actuarial professions.

The Extremes

The extreme value of actuarial liabilities on the high side is, of course, the undiscounted sum of future death benefits and cash maturity values; this would produce large future earnings. The extreme on the low side would be arrived at by a gross premium valuation on realistic assumptions; this would yield no gain or loss at all except to the extent that experience turns out differently from the assumptions selected. The earnings by whatever valuation of liabilities is used in practice must fall between these two extremes.

Three Approaches

Valuation methods observed by this author, diverse though they are, fall into three distinct categories. First is the defined valuation premium method in which the valuation premium is customarily defined as the gross premium reduced by a reasonable profit margin expressed as a percentage of premiums. Second is a variant of this employing deliberately conservative assumptions; for this, see Douglas A. Eckley's paper now in page proof form for Vol. XXXIV of the *Transactions*. The third category establishes benefit reserves on current as-

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COMPUTERS IN THE SOCIETY OFFICE

Ed. Note: This article, aimed at acquainting our members with the steps, to the end of 1978, by which computers came into service at our headquarters, is a composite of recollections by two who were Executive Directors at the time. Descriptions of the machines have been furnished by Bernard A. Bartels, then Administrative Officer. The story of 1979 to 1983 will be told in a later article.

Gary N. See (Executive Director 1973-74):

Early consideration of having the Society's membership records computerized was stimulated by favorable—life saving, one might say—experience we had had in using an outside computer to keep track of students' examination records.

Membership growth was creating difficulties in many office activities. Publishing the *Year Book* using the old typesetting process was expensive and slow. The office found itself making more and more mailings, and particularly needed to be able to make selective mailings, e.g. to chief actuaries. Accuracy of our membership records was clearly declining. And assembling topic material for the Program Committee's work was posing problems that a computer could comfortably solve.

Peter W. Plumley (Executive Director 1975-78):

When I arrived on the scene in April 1975, an addressograph system was in use for Society, Academy and Conference mailings, the plates being filed in six or eight categories according to mailing needs. This system entailed modest expense but suffered from several large drawbacks, the most serious being our inability to make address and other changes promptly. Some thought had been given to choice of a specific com-

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SOME THOUGHTS ON DISCOUNTING

by Richard M. Wenner

If you hypothesize a future that has a given set of non-level interest rates and are presented with a stream of cash flow emerging in that context, how would you calculate its present value? This is the nub of a problem that surfaces in determining the adequacy of a reserve in a manner which fully takes into account both the assets and liabilities involved. This can arise in valuing GICs and annuities under New York's version of the dynamic valuation law; that law requires a demonstration of reserve adequacy when the more favorable (higher) valuation interest rate is used.

One approach would be to project along several possible future interest rate paths the cash flow of both the contract liabilities of the book of business in question and the assets that support them. The resultant net cash flows for a given interest rate path can then be converted to a single value through discounting or accumulating.

But how does one discount or accumulate in the case of a non-level interest rate path? Using a single interest rate would produce results of questionable meaning. That technique would implicitly assume that all future reinvestment would occur at that interest rate.

I believe what is needed in this situation is a form of the investment year method, which incorporates an assumed reinvestment strategy for handling cash flow (both positive and negative) emerging in any given year. How would it work?

Accumulation . . . Or Discounting

Consider first what might be called the "progressive accumulation approach". Under this approach the first year's cash

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Computers

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puter system, but I concluded that we should not proceed immediately. We lacked people with experience in Association record-keeping, which differs materially from that in an insurance company, and I thought it prudent to wait while the cost of mini-computers was coming down, their capacity was expanding, and technology was making strides.

By 1977, these three conditions had sufficiently come to pass, and I had established friendships with other Association executives upon whom I could rely for guidance. Through these sources I came into touch with Michael M. Carollo of a firm named Computer Assistants Ltd., a most fortunate discovery of a man and a staff with the needed experience in Association computerization, and upon whose advisory services the Society continues to call more than five years later. With his help I developed a proposal, first for a feasibility study, then for implementation, which was promptly approved by the Executive Committee and the Board of Governors.

The three major candidates for prompt action were mailings, year book, and education and examination. Mailings, the most urgent, was tackled first. Our first computer was acquired in January 1978, and mailing records were on it by early spring of that year. It being well known that many computerization projects end up far behind schedule and incurring serious cost overruns, it is pleasant to remember that, largely through Mr. Carollo's expertise and energy and the hard and effective work of Bernard Bartels in the office, we came remarkably close to our targets in both these respects, and encountered few and easily correctable systems problems. The Society office was thus on the computer by the time I left at the end of 1978.

Bernard A. Bartels (at that time Administrative Officer):

The 1978 computer, to be with us for just one year, was an IBM System 32 with 9.1 million bytes of disk storage, 16K of memory, and 150 lines per minute of printing capacity. It was a self-contained machine. □

THE E. & E. CORNER

Ques.: Will Risk Theory on the next syllabus include Credibility Theory? If not, when?

Ans.: The latest risk theory material doesn't include credibility theory, and there are no plans to add it. (It does get brief coverage in group experience rating.)

We consider the credibility theory on CAS Part 4 too detailed for our students. But we'll review this topic for appropriateness, available material, and possible inclusion.

Ques.: New topics worthy of being examined upon continually arise, but to load students with more and more exams

WATERLOO COURSES

University of Waterloo professors will again offer courses on Parts 4, 5A, 5B, 6, 8, and 10—April 17 to May 6, 1983. Details can be had from Prof. Frank G. Reynolds at Faculty of Math., Waterloo, Ont. N2L 3G1.

clearly isn't the answer. Why doesn't the Society adopt a system with more electives to accommodate these new subjects?

Ans.: We agree; in fact, new Parts 7, 9 and 10 have embraced this concept. Our continuing aim is to avoid more exams and too much course of reading material. □

SPEED AND MORTALITY

by David M. Lipkin

We all hear that crime doesn't pay—but does speeding? The question may allow an actuarial approach.

Let's analyze two 30-year old drivers—"Quicky", who drives an average 50 m.p.h. and "Legal", who averages a safer 40 m.p.h. Being average Americans, each drives 10,418 miles a year. Quicky spends 208.36 hours on the road each year, compared to 260.45 for Legal. Quicky's saving of 52.09 hours can optimistically be viewed as a "bonus" to Quicky's life. This oversimplified view treats Quicky's "speeding hazards" in the following manner:

- 1) The hazard of increased mortality due to higher probability of a fatal motor vehicle accident should be recognized as a "debit" to Quicky's 52.09 hour "credit".
- 2) Financial hazards of speeding are ignored.
- 3) "Secondary mortality debits", such as stress, possible poverty, jail, etc. are ignored.
- 4) Legal's extra time in the car is assumed to be totally unrewarding compared with the time Quicky has saved.

According to the Vital Statistics in *The Actuary* (Oct. 1982 and April 1979), the average decrease in overall motor vehicle mortality is 16.7% from the pre-1974 period to the post-1974 period. (1974 was when the speed limit was cut to 55 m.p.h.)

On the assumptions that (1) one-half of the recorded change in motor-vehicle mortality is indicative of a change in driving speed from 50 m.p.h. to 40 m.p.h., (2) the contribution to the overall age 30 mortality rate from motor-vehicle deaths is 34.07% (U.S. Dept. of Transportation Statistics), and (3) q_{30} for Quicky is .00156 (U.S. Life Table 1959-61, males), we find that q_{30} for Legal is as follows:

$$q_{30}(\text{Legal}) = .00156 \div [1 + (.167 \times .5 \times .3407)] = .00152$$

This reduction from .00156 to .00152 translates into an average debit of:

$$\begin{aligned} &.00004 \times (\frac{1}{2} \text{ year} + e_{81}^{\circ}) \text{ (assuming mid-year deaths)} \\ &= .00004 \times 40.54 \text{ years} \\ &= 14.21 \text{ hours} \end{aligned}$$

The trade-off, then, is a mortality credit of 52.09 hours in exchange for a debit of 14.21 hours.

Different mortality decreases would result from different combinations of ages and speed reductions. Lack of information makes estimation difficult, but it's interesting to guess how fast one must go to get an even mortality trade-off. □

Thoughts on Discounting

(Continued from page 1)

flow derived from projecting the net cash flow of existing assets and liabilities is reinvested according to the assumed reinvestment strategy for the first year. Next, the subsequent years' net cash flows are modified to reflect the incremental effect of the future cash flow resulting from reinvestment. This process is then repeated for year 2 and subsequently for each following year. If the reserve is to be adequate for that path, the accumulated value at the end of the projection period must be positive.

The accumulated value could also be derived by applying accumulation factors to the original cash flow stream (i.e., before any reinvestment). The accumulation factor to be applied to the cash flow of any given year can be determined by taking \$1 of cash flow emerging in that year and accumulating it, using the basic progressive accumulation approach outlined above, to the end of the projection period.

Now to discounting. Here a definition of present value broader than the traditional definition and involving future accumulation potential is needed. The definition might be:

The present value of specified cash flow emerging in some future year is the amount of current cash needed to produce, over the assumed path, the same accumulated value to which the specified cash flow will ultimately grow, provided both the current cash and specified cash flow are reinvested in accordance with the assumed reinvestment strategy.

Under this definition present value is a function of both future interest rates and reinvestment strategy. Note that traditional discounting at a single interest rate in a level interest rate environment represents a special case.

Discount factors appropriate for changing future interest rates can be derived by dividing the accumulation factors by the ultimate accumulation value of \$1 of cash emerging at the valuation date.

Comments

(1) One interesting ramification of this approach to discounting occurs

FOR YOUR READING

Robert M. Jennings & Andrew P. Trout, *The Tontine: From the Reign of Louis XIV to the French Revolutionary Era*, pp. 91. Paperback \$14.95, Richard D. Irwin, Homewood, Ill.

An excellent fresh exploration of a fascinating subject in a Huebner Foundation Monograph.

J. David Cummins & three others, *Risk Classification in Life Insurance*, pp. 320. Kluwer Nijhoff, Boston, \$45.

Outcome of a 2-year study at Wharton School in cooperation with ACLI. Its three sections are: I. Fundamentals, II. Current Procedures, III. Multivariate Analysis of Risk Factors and Mortality.

Geoffrey N. Calvert, *Social Security Problems: Radical Approaches to Social Security Design*, pp. 14, mms. Available from author at his Yearbook address.

Text of a 1982 presentation to CAPP. Examines outlook and solutions in context of four "tidal waves"—demographic, economic, technological, global. Characteristically vivid, and in parts controversial.

Actuarial Note No. 114, *Social Security Coverage in 1972 by Marital Status and Reasons for Non-Coverage*. Wilfredo Cruz.

Finding is that at ages below 65, 82% of men, but only 49% of women, are covered.

Actuarial Note No. 115, *Average Wages for 1981 for Indexing under SSA, and Automatic Determinations for 1983*. Eli N. Donkar, A.S.A. & James P. Buchman.

Sequel to SSA Actuarial Note No. 112.

(1) *Guide to Health Insurance for People with Medicare*, pp. 7.

(2) *Where To Get Answers at HCFA*, pp. 26. Both available gratis from Health Care Financing Administration, Office of Financial and Actuarial Analysis, Baltimore, MD 21207.

Booklet (1) was developed jointly by NAIC and HCFA. Booklet (2) tells one which offices within HCFA are responsible for various matters.

Journal of the Institute of Actuaries, Vol. 109, Part II, September 1982.

Contains the discussion in London of W. W. Truckle's questions on actuarial education and training that were summarized in this newsletter's April 1982 issue. Other subjects include the European Community, making mortality studies from observed data, and immunization. Borrow a copy from your nearest Institute member.

"Marketfacts". Issued monthly. Available from LIMRA for \$30. per year (\$75. by subscribers not in a member company).

This new LIMRA publication aims to keep readers informed on current events and trends in life insurance marketing. Looks well worth its subscription price for actuaries who have dealings with the field or agency department.

when a reserve turns out to be inadequate for a given non-level interest rate path. Not surprisingly, the book value of additional assets needed to make up the projected deficit will vary depending on the assets selected. But, the market values and present values based on a level discount rate are likely to vary also. Only the present values would be equal regardless of the assets selected.

(2) What about using discount factors of the form

$1/(1 + i_1)(1 + i_2) \dots (1 + i_n)$, where i_j is the assumed prevailing rate for year j . This would work satisfactorily only if the reinvestment strategy always called for one-year investments (and borrowings) and the assumed interest rates were short-term (one-year) rates.

(3) If the assumed reinvestment stra-

tegy under a non-level rate path is not symmetrical (i.e., if the method of dealing with negative cash flow is not the mirror image of the strategy appropriate to positive cash flow) or if the yield curve is not flat, neither accumulation nor discount factors may solve the problem. The progressive accumulation approach would, however, still produce valid results.

A paper which expands upon these ideas and contains numerical examples can be obtained by writing to me at my Yearbook address.

Ed. Note: Two mathematical papers on Internal Rate of Return in Respect of an Arbitrary Cash Flow have recently appeared in J.I.A., viz. C. C. Taylor, Vol. 107 (1980), 487, and H. O. Worger, 108 (1981), 285. □

AMERICAN EXPERIENCE

The Federal Register of October 18, 1982 contained the following announcement by the Veterans Administration:

For USGLI, premiums are based on the American Experience Mortality Table at 3½ percent interest. This mortality table was published in 1868 and was calculated from the mortality experience of a single insurance company. At almost all ages, but especially at the younger ages, this table overestimates mortality. The table is no longer an accurate measure of mortality as life expectancy has greatly increased since its publication. As a result, the mortality savings in the USGLI program have been significant. The guaranteed interest value of 3½ percent is likewise antiquated when compared with current interest earned from investments in United States securities. The net effect of the mortality savings and excess interest earnings is that premiums are no longer required to safely run the USGLI program.

The report of this announcement that turned up in the AARP News Bulletin of December 1982 expressed the matter in these words:

Despite bargain rates charged for the policies, the VA disclosed that World War I vets had been overcharged all along because premiums were based on life expectancy rates carried in the American Experience Mortality Table that were calculated in 1868 and had never been revised. . . .

An official connected with the insurance program commented that for years the VA has been aware of the imbalance surrounding the life expectancy tables and interest rate assumptions. Consequently, the spokesman continued, the agency has distributed annual dividends amounting to as much as \$500.

It strikes this reader that the whole matter might have been expressed more usefully than it was. Surely, the waiving of these premiums must be attributable more to the excess interest than to redundancy of the mortality element in the policy reserves. Furthermore, explanation that mortality rates are too high at the younger ages seems superfluous in discussion of contracts on the

1983 TABLE *a* IN PERSPECTIVE

by Robert J. Johansen

Ed. Note: Mr. Johansen is chairman of the committee that developed 1983 Table a, which NAIC has adopted for individual annuity valuation. The table's construction is described in the committee's report, circulated as a draft in 1981 and now published in TSA Vol. XXXIII; articles on it are in our April, May and June 1982 issues.

The table below compares the mortality rates at decennial ages in the 1983 Table *a* with those of, respectively, two prior annuity tables, an insurance table and a population table.

Ratio of q_x by 1983 Table *a* to q_x in Table Listed

| Age | <i>a</i> -1949 (Ult.) ⁽¹⁾ | 1971 IAM ⁽²⁾ | 1980 CSO Basic ⁽³⁾ | 1980 U.S. White Population ⁽⁴⁾ |
|----------------|--------------------------------------|-------------------------|-------------------------------|---|
| MALES | | | | |
| 55 | .57 | .71 | .72 | .53 |
| 65 | .56 | .74 | .60 | .46 |
| 75 | .64 | .87 | .62 | .53 |
| 85 | .68 | .89 | .67 | .67 |
| 95 | .61 | .67 | .70 | .72 |
| FEMALES | | | | |
| 55 | .61 | .76 | .55 | .49 |
| 65 | .59 | .79 | .64 | .52 |
| 75 | .56 | .80 | .63 | .56 |
| 85 | .63 | .76 | .65 | .70 |
| 95 | .60 | .79 | .66 | .78 |

(1) TSA I, 386-389

(2) TSA XXIII, 496

(3) TSA XXXIII, 632.

(4) 1980 q_x 's at ages 85 and 95 are from Medicare experience.

In appraising the above comparisons with 1980 insured life and population mortality, readers should have in mind that 10% mortality rate reductions, to provide safety margins, were built into both the 1983 Table *a* and the 1971 IAM Table.

Note On Projections Beyond 1983

In our report, our Committee published a set of annual mortality improvement rates, called Projection Scale G, to permit carrying forward as far as the year 2000 the values of q_x in 1983 Table *a*. We suggest that projection Scale G values for ages not shown in the report be derived as follows:

1. For values at ages other than those ending in 2 and 7, interpolate linearly between the given values.
2. At ages 5 and 6, use the same 1.50 improvement rate as at age 7.
3. For ages above age 97, interpolate to a zero improvement rate at age 102.

New Model Regulation

At its Winter 1982 meeting, the NAIC adopted a model regulation, for use in states which permit the commissioner to specify valuation mortality tables, (i) permitting use of 1983 Table for valuing either individual or group annuities, and (ii) requiring it for valuing individual annuities issued after the regulation's effective date.

lives of veterans of 1918. Emphasis throughout the announcement and the reporting thereof on the nature of policy dividends would have avoided spreading the false notion that this was a belated remedy of many years of injustice.

E.J.M.

THEY EASED THE SUSPENSE

For, we believe, the first time ever, results for the fall exams were all mailed by Dec. 30. A fine piece of compassionate work by our Chicago staff and the E & E people involved.

"BECOMING AN ACTUARY"

The Society's Committee on Minority Recruiting has produced an attractive 17-page brochure, *Becoming An Actuary: Room To Move Ahead*, explaining what an actuary does, how to become one, opportunities, and relevant accounts of people who have become actuaries. For a copy, ask the Society office.

SIGHTINGS

Colin E. Jack found in the novel "The Master of the Mill", by Frederick P. Grove (1871-1948):

"He also began to indulge in large-scale philanthropy. A special office in the Realty Building was in charge of an expert actuary. Mr. Clark must have spent millions in that way."

Mr. Jack finds it unclear whether the money was spent on the actuary or on the philanthropy.

Philip J. Bieluch responded by letter to *Frequent Flyer* magazine (and they printed his correction of the writer's notion of actuarial certainty) when he saw this in their September 1982 issue:

"With actuarial certainty (Lufthansa's) management determined that its on-time arrival and baggage handling records were good enough" (so they could safely offer a service guarantee program to their customers).

Paul E. Buell observed in Carl Sagan's *Broca's Brain* (which he recommends) use of "actuarial" as a synonym for "demographic":

"(It) is easy to calculate that if each American has (a compelling perception of an imminent disaster to a friend or relative) a few times in his lifetime, the actuarial statistics alone will produce a few apparent precognitive events somewhere in America each year . . . The hits are recorded, the misses are not."

John W. Paddon and Robert C. Tookey, on opposite edges of the continent, both found in a crossword puzzle (the same puzzle) a clue "Actuaries' honor: Abbr.", the solution in three letters being the appropriate one.

SOME VITAL STATISTICS—CANADA

Colin E. Jack and David S. Williams kindly responded to our appeal for Canadian data corresponding to the U.S. figures in our October 1982 issue. Here are the Canadian figures, obtained from official sources.

Table I. Births, Deaths, Marriages and Divorces Per 1,000 Population

| Year | Births | Deaths | Marriages | Divorces |
|-------|--------|--------|-----------|----------|
| 1972 | 15.9 | 7.4 | 9.2 | 1.5 |
| 1975 | 15.8 | 7.3 | 8.7 | 2.2 |
| 1978 | 15.3 | 7.2 | 7.9 | 2.4 |
| 1980* | 15.5 | 7.2 | 8.0 | 2.6 |

*1981 figures not yet available

Table II. Motor-Vehicle Deaths

| Year | Number of Deaths | Death Rates | | |
|------|------------------|------------------------|-------------------------------|---------------------------|
| | | Per 100,000 Population | Per 100 Million Vehicle Miles | Per 10,000 Motor Vehicles |
| 1972 | 6,221 | 28.5 | 6.84 | 6.56 |
| 1977 | 5,253 | 22.6 | 4.57 | 4.19 |
| 1978 | 5,429 | 23.1 | 4.49 | 4.35 |
| 1979 | 5,863 | 24.8 | 4.66 | 4.70 |
| 1980 | 5,461 | 22.8 | 4.35 | 4.02 |

Not forgetting that the figures in Table I are crude rather than age-adjusted, it may be concluded that Canada has advantage over U.S.A. in lower death and divorce rates. As to Table II, the trends in death rates, though not the absolute values, are similar; Canada has laws requiring seat-belt use, but her reduction in maximum speed limit was not as sharp as in the U.S.A.

E.J.M.

John C. Angle sent us a sad epitaph from a stone in New York's Woodlawn Cemetery, though there's no reason to blame the episode on female actuaries:

"George Spencer, 1894-1909: Lost life by stab in falling on ink eraser, evading six young women trying to give him birthday kisses in office of Metropolitan Life Building."

Harry L. Sutton, Jr. retrieved an article in the Sun Newspapers of Edina, Minn., that our career encouragement people ought to put into their kits. It's about Pamela S. Woodley's progress to Fellowship, and her views on how worthwhile it all was.

John Donohue (LIMRA), a constant reader and occasional critic, sent us, from the Hartford Courant, this about a hapless basketball team:

"The Hawks lost an estimated \$3 million last season and had the charisma and glamour of an actuary convention."

Raymond B. Biondi and Harvey Sobel both found in a comic book, *Justice*

League of America (No. 210), a tale about aliens in outer space who are watching disasters take place on earth, as predicted by their actuary.

Jack E. Wood tells us that in a satirical article, "Yoga for Masochists", (*Atlantic Monthly*, Oct. 1982) this appears:

"But the truly enlightened Maso-yogi need not court hazard; there are ample opportunities to experience transcendental pain in daily life. . . . Among devotees, a feeling like boredom can be honed to the razor's edge of pain. So we see legions of Maso-yogis engaged in actuarial work, bus-conducting, and local government."

Raymond E. Sharp is undecided whether a comment in Joseph Weizenbaum's *Computer Power and Human Reason* should be taken as a compliment:

"Understanding something always means understanding it at a certain level. An actuary uses some fairly sophisticated mathematical tools whose fundamentals he almost certainly doesn't understand or care anything about." □

COURSES AT GEORGIA STATE

Georgia State University will offer seminars for these Spring exams:

| | |
|------------|------------|
| Part 2 | Part 5A |
| Part 3 | Part 5B |
| Part 4 SOA | Part 6 SOA |
| Part 4 CAS | Part 6 CAS |

Get particulars from Prof. Robert W. Batten at his Yearbook address.

LETTERS**Committee On Discipline**

Sir:

The flurry of information about discipline in your December issue — the Board's reprimand, the article by former Discipline Committee Chairman Bragg, and the report of a new version of Guides and Opinions—makes it perhaps timely to re-examine the role that the Society ought to play in disciplining its members.

The reprimand was for misrepresenting status as an Enrolled Actuary—certainly a serious charge, but should the Society be into this as policemen? That actuary's activities may have amounted to unauthorized practice under ERISA, and might lead to Federal action for improperly signing a Schedule B. What has this to do with the Society?

If the Committee on Discipline was enforcing the Guides, which one? Perhaps Guide 5a, engaging in an "activity which can reasonably be regarded as being likely to attract professional work unfairly". It's more likely the violation is of Guide 1a: "The member will act in a manner to uphold the dignity of the actuarial profession and to fulfill its responsibility to the public". The mandate for the Committee in our Constitution's Article VII is even more vague—it may investigate any aspect of a member's professional practice or any "actions affecting the interests of the actuarial profession". (Note that there's no requirement that such actions *adversely* affect the profession's interests).

Mr. Bragg neatly summarizes the case for confidentiality of the Committee's work, but at least for Enrolled Actuaries there is no confidentiality. The first question on the renewal form for enrollment (preceding even that about having filed income tax returns) is, "Have you ever been the subject of a disciplinary pro-

Deaths

David G. Goddard, A.S.A. 1935
Erston L. Marshall, F.S.A. 1919
John P. Tillinghast, F.S.A. 1946

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ceeding before any professional society?". That form is signed under penalty of perjury. Furthermore, an admonished un-Enrolled Actuary looking for a job might not be comforted by the confidentiality rules after observing that eleven Committee on Discipline members are at least vice-presidents of insurance companies and five are in major consulting firms.

Confidentiality may also be rendered ineffective by the practice of using "joint investigating committees of two or more bodies", which Mr. Bragg mentioned two years ago (*Record*, Vol. 6, No. 4, 1320). If proceedings are confidential, how do the other bodies find out about them?

Our new Statement of Purpose, also in last December's issue, properly describes us as a learned body. But the fourth of our listed responsibilities, "To maintain and enforce a code of professional conduct for members", has nothing to do with the rest of the Statement.

Gregg L. Skalinder

* * * *

Babbage

Sir:

The account of Charles Babbage (Dec. 1982 issue) brings to mind the attention that some of us who were privileged to work in the early stages of computer applications in insurance used to pay to that great man's trail-blazing. For example, I had this to say in a talk to my company colleagues in 1960:

What is really important about Electronic Data Processing machines is the concept upon which they are based. Most predecessor machines, such as punched card machines, could perform only limited (individual) functions: one machine would sort cards, another would reproduce them, another would tabulate them, yet another would perform arithmetic.

TRANSACTIONS NEEDED

You'd render a public service if you would help to supply the U.S. Health Care Financing Administration with *Transactions* that you no longer need and they don't have. Write to Roland E. King at his Yearbook address, or phone him at (301) 594-2826.

Dr. Babbage attempted to build a mechanical machine that would automatically carry out a long sequence of operations. His machine had three parts: store, mill and control. The store was the part that held the data to be worked on, as well as the instructions to be followed. The mill worked on the data as commanded by the instructions. The control stepped the machine through its various phases.

Performing logical operations means ability to compare two things, and to have the next step depend upon whether they are alike or different. The machine must have the same elements as the Babbage machine: store, mill and control. Repeated comparisons and branching one way or another depending upon the results, can yield the answer to any problem solvable by logic.

Mathematics is one kind of logic. The operating rules of a business are forms of applied logic; so are sciences in general. Thus, although the speed that electronics permits is important, the idea embodied in the machine comes first, a necessary forerunner of using high speeds.

Charles Babbage's attempt failed because the construction problems were too great for his era. But time has demonstrated the wisdom of his idea, and the soundness of the symbolic logic devised by Babbage's contemporary, George Boole.

Walter L. DeVries

* * * *

Pension Definitions

Sir:

C. B. H. Watson (Jan. issue) has added helpfully to the discussion of pension terminology, but in doing so he attributes to me a definition of "cost" that I don't use or recommend. The thrust of my letter was to support the Academy Commit-

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Letters

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tee on Terminology by sticking to "pension plan contribution"; the word "cost" doesn't even appear in their list.

Mr Watson favors us with "actual cost", "apparent cost", "pre-tax cost", "true cost" and "opportunity cost". He does indeed add two definitions of cost:

- 1) $B + E = \text{actual cost of the plan}$
- 2) $C = \text{pre-tax cost to the employer}$

and, expressing his doubt that one can ever speak in advance of the true cost, he of course refrains from attempting to define it.

We actuaries have no agreement on 1) because many of us define Cost as $B + E - I$. We have no agreement on 2) because some actuaries say that the employer's cost should include foregone investment income, hence $\text{cost} = C + I$ which equals Mr. Watson's $B + E$.

If we'd just stop splitting hairs over what "cost" means and use "pension plan contribution", life would become simpler. Mr. Watson's two costs become rephrased as

- 1) $B + E$ represents the total pension fund disbursements to be met from pension plan contributions and investment income thereon;
- 2) $C = \text{employer's pension plan contribution, which is tax-deductible.}$

I am sorry that I misled Mr. Watson as to my motives. My letter was replete with uses of "pension plan contribution" rather than "cost". Most plan sponsors think of their contribution as their cost, i.e., their outlay (Webster's Dictionary treating these as synonymous), but since actuaries don't agree I must avoid using "cost" and must substitute the non-offending "pension plan contribution".

Gerald Richmond

* * * *

Language Aptitude

Sir:

For some years before 1960, our students had to demonstrate reasonable mastery of simple English as Part I of our examinations. I have long believed that the language aptitude test proved itself an excellent predictor of future success in our profession.

At our Orlando meeting last spring I had occasion to say so. Nobody there challenged this assertion, but when a reader of the *Record* queried me, I have

**1983 ACTUARIAL RESEARCH
CONFERENCE**

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had to confess that I am unable to remember where I picked up the idea.

I hope readers can furnish evidence—one way or the other.

If my statement proves to have been true, an even more interesting question arises: Why did we drop the exam in English? If it was to make room for our profession's increasing amount of technical knowledge, surely we made a mistake.

My purpose at Orlando was to urge a broader and more humanistic Course of Reading. In my avocation as a futurist I have come to realize that actuaries may be perceptually locked into present systems, tending to picture the future as an extrapolation of the past. Also, many of us are too preoccupied with values expressible in dollars.

Roy R. Anderson

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Motives

Sir:

When criticizing the professional work of some rascal whose opinions differ from our own, we must take care to refrain from imputing motives. In their paper on the assumptions in the 1980 Social Security Trustees' Reports (*TSA XXXIII* just released), Roland E. King and Clifford K. Powell assert (pp. 112-113) that the official summary of those Reports "was prepared by the actuarial staff of SSA as part of a public relations effort to convince the public that the Social Security program was not in serious financial trouble".

If that were true, the PR effort must have been in vain. But really, we SSA actuaries aren't all that conspiratorial.

The summary was begun in 1980 by Chief Actuary Dwight K. Bartlett, III, because he wished to publicize the contents of the Trustees' Reports more wide-

ly, not as part of an Administration PR effort. In a sense it was a formalizing of efforts by his predecessor, A. Haeworth Robertson; neither of these actuaries is known for soft-peddling Social Security's problems. Nobody higher up has ever urged the actuaries drafting the summary to play down the system's financial troubles.

Richard G. Schreitmueller

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WARE TEFRA

Sir:

This is a word of caution for pension actuaries eager to endorse simplified pension plan amendments to comply with TEFRA.

A problem arises if the amendment states that the maximum benefit will be limited to that allowed by IRC Sec. 415, which provides automatic cost-of-living increases after 1985.

If assumptions include an inflation factor, the common result for pay-related plans is a projected benefit larger than the current year's maximum but within the maximum expected at benefit distribution time. But ERISA's Title I still requires plans to fund for the benefits to be provided; it isn't concerned with whether contributions are tax-deductible. (TEFRA disallows deduction for the part of the projected benefit in excess of the current year's maximum.)

Hence, unless the plan's language rules out automatic cost-of-living increases in the maximum benefit, the sponsor may be forced (by Title I) to contribute more than the currently deductible amount.

As an example, assume a plan with one participant whose salary is \$120,000 and whose benefit starting in 1992 is a life annuity of 60% of average (high 3-year) compensation. The projected benefit is about \$110,000, the current maximum is \$90,000 but in 1992 will probably exceed \$120,000.

So, if the plan isn't carefully worded, the contribution will have to be made to fund a \$110,000 benefit but the deduction will be only that to fund \$90,000. I suggest that plans adopt the specific dollar maximum and be amended each year it's increased.

Lawrence Mitchell