



The Newsletter of the
Society of Actuaries

VOL. 24, NO. 9
OCTOBER 1990

THE SOA LIBRARY Actuary

FSA may be a marital asset

by Craig A. Miller
and Arnold F. Shapiro

A new view of the FSA designation shows it can be considered joint marital property, shared between a husband and a wife. A recent finding of the Supreme Court of New York determined that the professional distinction of being awarded a Fellowship in the Society of Actuaries during a marriage, and the resultant enhanced earning capacity, was marital property subject to equitable distribution in a divorce action.

Findings of this type raise many legal and actuarial issues. Legal questions which must be resolved are:

- Does the FSA designation constitute property?
- If it does constitute property, can it be shared or transferred?
- To what extent can a former spouse share in the monetary value of a Fellowship designation?

The primary actuarial problem is the determination of the monetary value of an FSA or ASA designation.

The valuation basis

Although an FSA designation is non-transferable and has no market value per se, it generally enables its holder to earn more money over his or her working lifetime than would otherwise be the case. Those who resist classifying the designation as marital property may be more apt to recognize the property value of the enhanced earning capacity it may provide. Given this interpretation, the problem becomes one of quantifying this enhanced earning capacity.

At least three valuation methods might be used to determine the

Continued on page 5 column 1

Election results in

Donald R. Sondergeld was selected President-Elect of the Society of Actuaries for 1990-91.

Sondergeld is Executive Vice President at Mutual Benefit Life Insurance Company, Newark, N.J. He served as an SOA Vice President from 1988-90 and a Board member from 1985-88.

Chosen as Vice Presidents were Michael J. Cowell, David M. Holland, and Harry H. Panjer.

Cowell, Vice President and Corporate Actuary with UNUM Life Insurance Company, Portland, Maine, served as SOA Treasurer from 1986-90. Holland is President of Munich American Reassurance Company, Atlanta. He served as an SOA Board member from 1985-88. Panjer, a member of the SOA Board from 1987-90, is Professor in the Department of Statistics and Actuarial Science at the University of Waterloo, Waterloo, Ontario.

Selected for seats on the Board were Shane A. Chalke, Yuan Chang, John A. Fibiger, Stephen G. Kellison, Mary S. Riebold, and Robert W. Stein. Chalke is President of Chalke Incorporated, Chantilly, Va.; Chang is Vice President of Metropolitan Life



Donald R. Sondergeld

Insurance Company, New York; Fibiger is Chairman, The Museum of Science, Boston, Mass.; Kellison is Chairman, Department of Risk Management and Insurance, Georgia State University, Atlanta; Riebold is Managing Director of William M. Mercer, Inc., New York; and Stein is Partner, Ernst & Young, Philadelphia.

As a result of Section elections, each of the eight special interest Sections have added three new

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THE Actuary

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Society of Actuaries

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Does the increase in normal retirement age reduce benefits?

by Robert J. Myers

One of the most significant changes made by the Social Security Amendments of 1983 was an increase in the Normal Retirement Age (NRA), which is the earliest age that unreduced retirement benefits are payable. The NRA continues at age 65 for persons who attain that age before 2003. Thereafter, it increases by two months for each later year-of-birth cohort, reaching age 66 for those who attain age 62 in 2005 (i.e., attain age 66 in 2009). The NRA remains at age 66 for those who attain such age in 2010-20 (i.e., born in 1944-54). For later year-of-birth cohorts, the NRA increases by two months for each cohort until reaching age 67 for those who attain age 62 in 2022 and after. At the same time, the actuarial-reduction factors for those who first claim benefits before the NRA are extended to allow for the possibility of five years of early retirement. Specifically, 70% of the unreduced benefit will be payable at age 62 when the NRA is 67, as contrasted with the 80% currently applicable for the NRA of 65.

Under present law, individuals who do not retire when they reach the NRA receive Delayed-Retirement Credits (DRC). These are at the rate of 1% for each year of delay for anyone who attained age 65 before 1982, 3% for those who attained age 65 in 1982-89, and then increasing by 0.5% steps

for each two-year "age-65 attainment" cohort until reaching 8% for the 2008 cohort (i.e., attains age 66 in 2009, which is the NRA for this cohort) and later ones. The DRC is not available for retirement deferred after age 70 (age 72 before 1984). Before the 1983 Amendments, the maximum DRC was 3% per year.

Those who opposed increasing the NRA beyond age 65 argued, and continue to argue, that this results in a reduction of benefits over the long run and is therefore undesirable. As with many things in life, the conclusions that one draws may depend upon how one looks at the matter.

Table 1 compares the benefits payable to persons attaining age 62 in 2022 and after as they would be under present law and if the NRA were left unchanged at age 65. The changes in the NRA as a result of the 1983 Amendments and the increases in the DRC as a result of the same legislation were not interrelated; one could have been done without the other. The comparison is made by showing the proportion of the Primary Insurance Amount that is payable for various ages at retirement from 62 through 70, assuming that the DRC provisions in present law are applicable in both cases. The actual monthly benefits amount is lower in all cases, generally by about 12-14%.

Table 1
Comparison of Benefits Payable For Individuals Attaining Age 62 in 2022 and After Under Present Law and if Normal Retirement Age Had Not Been Changed

| Age at Retirement | Proportion of PIA Payable | | |
|-------------------|---------------------------|---------------------------------------|--|
| | (1) Present Law | (2) Present Law if NRA Not Changed | (3) Reduction in Col.(1) as Compared to Col.(2) |
| 62 | 70% | 80% | 12.5% |
| 63 | 75 | 86 $\frac{1}{3}$ | 13.1 |
| 64 | 80 | 93 $\frac{2}{3}$ | 14.6 |
| 65 | 86 $\frac{1}{3}$ | 100 | 13.7 |
| 66 | 93 $\frac{2}{3}$ | 108 | 13.3 |
| 67 | 100 | 116 | 13.8 |
| 68 | 108 | 124 | 12.9 |
| 69 | 116 | 132 | 12.1 |
| 70 | 124 | 140 | 11.4 |

Consideration of only the benefit amount is not sufficient. The likely longer life expectancy of individuals retiring in the long-range future also should be considered. I believe this is the proper way to analyze the question of whether the increase in the NRA is unfair to future generations of retirees, just as I believe that cost-of-living adjustments to benefits do not represent "real" benefit increases or liberalizations.

Thus, two elements should be considered: the reduction in the monthly benefit amount and the increase in the value of the lifetime benefits payable as a result of lower mortality. To measure the latter element, the data for the expectation of life at age 65 for various future calendar years (based on the age-specific mortality rates of that year), as shown in Actuarial Study No. 105, Social Security Administration, have been used. Specifically, the figures for Alternative II (the intermediate estimate) have been utilized, and the percentage increases from the base year of 1990 to the various future years have been computed for females and males separately. The separate increases for females and males were simply averaged to obtain a composite figure (actually, very little difference in these increases by sex was present).

Ideally, annuity values at 2% interest (using such a "real" interest rate to reflect the presence of the statutory COLAs) should have been used, rather than expectations of life, but only the latter were available. Two counterbalancing elements are thus present: (1) the expectations of life that were used are for the mortality rates of the retirement year, and are

| Year of Birth | Year of Attainment of Age 65 | (1) Reduction in Initial Benefits Amount Due to Increase in NRA | (2) Increase in Total Benefits Payable Due to Lower Mortality ^{a/} | (3) Net Change in Total Benefits ^{b/} |
|----------------|------------------------------|--|--|---|
| 1937 or before | 2002 or before | — | 3.7% ^{c/} | + 3.7% |
| 1938 | 2003 | % 1.1% | 4.0 | + 2.9 |
| 1940 | 2005 | 3.3 | 4.4 | + 1.0 |
| 1945 | 2010 | 6.7 | 5.9 | - 1.2 |
| 1950 | 2015 | 6.7 | 7.0 | - 0.2 |
| 1955 | 2020 | 7.8 | 8.2 | - 0.2 |
| 1960 | 2025 | 13.3 | 9.4 | - 5.2 |
| 1965 | 2030 | 13.3 | 10.6 | - 4.1 |
| 1975 | 2040 | 13.3 | 12.9 | - 2.1 |
| 1985 | 2050 | 13.3 | 15.3 | — |
| 1995 | 2060 | 13.3 | 17.4 | + 1.8 |
| 2005 | 2070 | 13.3 | 19.7 | + 3.8 |
| 2015 | 2080 | 13.3 | 21.8 | + 5.6 |

^{a/} This represents the increase from 1990 mortality levels to the retirement period applicable in the particular case (see text for explanation of methodology)

^{b/} (100% minus Col 1), multiplied by (100% plus Col 2), minus 100%

^{c/} For retiree in 2002

not based on projected mortality, which would have produced higher figures, and (2) use of an interest rate would have produced lower figures. In any event, the method adopted should produce reasonable results because the derived figures are the relative increases, and both the numerator and denominator are similarly affected.

Table 2 presents data for individuals retiring at age 65 in various future years. First, the reductions in the benefit amounts due to the increase in the NRA are shown (similar to the figures in Table 1). Next, the increases in total benefits payable due to the likely lower

mortality experience in the future are given (derived as indicated in the previous paragraphs). The last column shows the combined result of these two factors. In some cases, small increases in the total lifetime benefits occur, and in other cases small decreases (at the most, about 5%) occur.

It seems fair to conclude that, on the average, the increase in the NRA does not represent a significant "real" reduction in benefits. Some beneficiaries will have relatively small reduction, while others will be slightly favorably affected.

Robert J. Myers, a Past President of the Society, was Chief Actuary for the Social Security Administration from 1947-1970.

Open letter to *The Actuary*

To the actuarial profession:

You may know the old story about Daniel Boone's axe but permit me to remind you of it. A tourist went deep into the mountain country of Kentucky because he had heard that a mountaineer owned Daniel Boone's original axe. When he finally found the mountaineer, the man said: "Yes, this is Daniel Boone's axe. It has had three new heads and five new helves, but it is his axe." There is surely a

sense that the axe was really Daniel Boone's, but it is an interesting philosophical question to define how it was his.

The actuarial profession is exactly like Daniel Boone's axe. The students change, the Fellows change, the nature of the work changes, and administrators come and go. However, the actuarial profession continues as a unique entity, different from and greater than the efforts of any of its

constituencies: students, Fellows, administrators, corporations, public officials, and others.

Yet this is not the whole truth. If any of the constituencies flag in their efforts, then our profession will surely falter. If ever an axe head or a helve is not replaced then it is no longer Daniel Boone's axe.

But none of the constituencies will be allowed to falter. The Society

Social Security and Medicare trustees reports

by Bruce D. Schobel

On April 18, the Social Security and Medicare Board of Trustees issued its 1990 annual reports on the financial status of the programs. Soon afterward, the Society of Actuaries' Committee on Social Insurance decided to prepare an independent commentary on the reports. That commentary is summarized in this article, the complete version is available through the Society library. It also will be available at a panel discussion at the annual meeting in Orlando, Florida.

The committee first reviewed the assumptions, conclusions, and recommendations of the trustees, then added its own observations regarding the implications of the actuarial estimates. All of the figures in this article are based on the intermediate (alternative II-B) assumptions.

Actuarial soundness

Since 1989, the Board of Trustees has had no specific criteria for judging the actuarial soundness of the Old-Age, Survivors, and Disability Insurance (OASDI) and Hospital Insurance (HI) programs. To fill this void, the Committee on Social Insurance, working jointly with its counterpart committee of the American Academy of Actuaries, developed such tests last year:

- **Both OASDI and HI pass the committee's short-range test.** This requires that trust fund assets at the beginning of the year exceed six months' outgo for each of the first five years of the projection period. Both OASDI and HI met this requirement at the beginning of 1990, and the ratios are projected to rise during the short-range period (and for many more years, in the case of OASDI).
- **Both OASDI and HI fail the committee's long-range test.** This requires that the 75-year average income rate fall in the range of 95-105% of the 75-year average cost rate. For OASDI, the average income rate is 93.5% of the average cost rate, for HI, the corresponding ratio is only 47%.

Although the OASDI program fails the committee's test of long-range

actuarial soundness, the underlying financial problems are not expected to occur before about 2020. At that time, current income, excluding interest on trust fund assets, will fall behind current outgo. Redemptions of trust fund assets will begin before 2030, and in 2043, the trust fund is estimated to reach zero. After 2043, income will represent only about 80% of outgo.

The situation for HI is similar to that of OASDI, except that everything occurs much sooner. The trust fund grows for several years, starts declining in 1995, and reaches zero in 2003. After 2003, income is expected to fall further behind outgo, until it is less than half

Supplementary Medical Insurance

The Supplementary Medical Insurance (SMI) program is a special case because it is financed by enrollee premiums and government contributions based on those premiums. Premium rates are promulgated each September at the level needed to meet the program's obligations for the next year. Thus, one view is that the SMI program inherently is actuarially sound. The committee believes this view is too limited, however, and would prefer to show how large the long-range future obligations are likely to be. The existing report shows financial projections only through 1992.

Recommendations

The trustees believe that OASDI's financial problems are so far off that no action is needed in the near future. While the committee generally shares that view, we believe that describing the magnitude of the long-range problem in various ways is useful. Also, we believe that the public should be more aware of the shortfall that is projected to continue after all the baby boomers have retired and the trust fund is depleted. We do not advocate specific policy changes to meet that shortfall, but we believe it is likely to be met by a package of changes similar to those enacted into law in 1983. Such a financing package, timed to take effect around 2030, might include increases in the payroll-tax rate, the normal retirement age (from

67 to perhaps 69), and the percentage of Social Security benefits subject to income tax.

The trustees recognize the magnitude of the HI financing problems and recommend that Congress enact unspecified remedial measures soon. The committee considers the problem too large to permit the necessary changes to be made gradually. Again, the committee focused on financial results and does not recommend specific policy changes.

Assumptions

The 1990 annual reports, like those of the past 18 years, show financial projections 75 years into the future for OASDI and HI. As in the past, the projections for SMI extend for only three years. The financial projections in all three reports are based on four sets of economic and demographic assumptions. Most analysts and policymakers consider the intermediate (alternative II-B) assumptions to be most likely to occur.

The Social Security Act requires that the annual reports include statements from the chief actuaries of the Social Security Administration (SSA) and the Health Care Financing Administration (HCFA) as to the reasonableness of the trustees' assumptions. The chief actuary of SSA said the assumptions were reasonable in the aggregate. However, HCFA's chief actuary (who is a committee member) questioned the reasonableness of the 1.3%-assumed annual real-wage growth. He noted that, in the 30 years ending with 1988, annual real-wage growth was 0.9%.

The committee generally agrees with SSA's chief actuary that the trustees' assumptions are reasonable in the aggregate. In other words, financial projections based on assumptions chosen by the committee would not be much different. At the same time, HCFA's chief actuary is correct that assumed real-wage growth is well above the experience of the past 30 years. Higher real-wage growth may be justified by demographic arguments that the trustees considered, and annual real-wage growth during the seven years ending with 1988 was

1.9%. Still, the committee believes that the assumed improvement in economic experience should be emphasized, so that the public is not led to believe that the intermediate assumptions represent merely a continuation of the status quo.

Conclusion

The committee believes that the trustees have obscured the financial condition of the OASDI program and have not provided adequate information about the financial problems that are likely to begin in the 2020s and to continue indefinitely under present law. The trustees have done a better job of identifying the more immediate problems facing the HI program, although they do not recommend solutions. The assumptions on which the trustees based their findings are reasonable in the aggregate, although they anticipate significant improvements in the economy

Bruce D. Schobel, Chairperson of the Committee on Social Insurance, is an Actuary with New York Life Insurance Company.

Marital asset cont'd

economic value of a professional designation, the reimbursement approach, the resultant worth approach, and the best-use doctrine.

The reimbursement approach

In some states, the value of a professional distinction may be calculated upon a reimbursement basis, which is equal to the accumulated value of the direct and indirect economic contributions that went into attainment of the Fellowship designation. Economic contributions might range from the obvious, like cash, to the subtleties of the value of the housekeeping one spouse completed that allowed the other to study for actuarial exams. This method would provide what is akin to a book value for the license.

The resultant worth approach

To calculate an amount analogous to a market value, the resultant worth approach might be employed. Here, the projected future earnings with the Fellowship designation are compared

to future earnings projected without the FSA designation. The marginal benefit is discounted back to the valuation date using the appropriate demographic and economic factors.

Of course, the value of a professional designation can be contingent upon how useful it is to its holder. In the New York case, for example, it was argued that the FSA designation would play only a marginal role in the future career path of the defendant.

The best-use doctrine

An intriguing scenario results if the court trying the matter follows the best-use doctrine. In this case, the charge is to compute the enhanced earning potential that the Fellowship designation would provide, assuming that the actuary were to pursue a career making optimum use of the designation. In this instance, the value computed might have been increased by the excess of (1) a projected earnings stream, assuming best use of the Fellowship designation, over (2) another projected earnings stream, based on the actual facts and circumstances, considering all relevant contingencies and the time value of money.

Apportioning the economic value of the FSA designation

Assuming there is an economic value to the actuarial designation, which was earned during the marital period, the court must then determine what portion, if any, should be awarded to the nonactuary spouse.

Common law states will likely award no portion whatsoever to the spouse, since the actuary has exclusive title to the asset.

In community property states, an absolute constraint is that each spouse must be assigned one-half of the total economic value of the marital property.

In equitable distribution states, the courts will likely seek a fair distribution in consideration of the relative direct and indirect contributions of each party. Such was the objective in the New York case.

Findings of the New York Supreme Court

The court found that attainment of a professional distinction, such as Fellowship in the Society of Actuaries, is a marital asset.

The implication of this was not a foregone conclusion, however. The court first determined that the actuary "[was] a unique individual in that he studied on his own during working hours without interrupting his performance at his place of business. There was no cost attached to his studies and plaintiff-wife continued at her chosen occupation throughout her marriage. This was a short marriage in duration and she made no sacrifices with respect to her own educational or career goals. In addition, the testimony established that...the defendant-husband performed most of the [household] duties..

"With regard to defendant's attainment of his Fellowship in the Society of Actuaries, the court [found] that he is a uniquely bright and hard working individual and has earned his Fellowship as a result of his own superior intelligence and industry... Plaintiff-wife did not assist him in studying or make any other direct or indirect contributions which this court can rely on in finding that his acquisition of the Fellowship was a joint effort."

Thus, the court determined that the wife may not share in any enhanced earning capacity which might be generated by the Fellowship designation, since she did not contribute to its attainment.

Prognosis

As attorneys come to appreciate the monetary value of professional designations, there is likely to be increased litigation and commentary in the area. Moreover, as the courts across the country consider the question, the actuarial community will be challenged to contribute constructively to the evolving financial analysis and case law.

Arnold F. Shapiro is a Professor at Pennsylvania State University. Craig A. Miller, not a Society member, is President, Miller & Miller Consulting.

The complete actuary

Identifying the problem comes first

by Gregory S. Strong

As actuaries, we take pride in our ability to solve problems, ranging from simple mathematical and financial problems to the most complex business problems facing the organizations for whom we work or consult. At times it seems that problem-solving consumes most of our time. Has it ever occurred to you that sometimes we may solve the wrong problems? My experience through the years has been full of situations where I created a very poor solution because I solved the wrong problem. To my relief, others have related the same experience to me.

Any textbook on problem-solving techniques will confirm that the most brilliant solution is worth nothing if it does not address the correct problem. The importance of problem-solving skills for actuaries was reinforced by a statement made in the Report of the Task Force on the Actuary of the Future.

"Actuaries are increasingly faced with unstructured problems, where data is not readily available and where rigid analysis is counterproductive. Even where past experience exists, rapid change often reduces the usefulness of this experience in projecting results. Knowledge of the total business environment in which a program or institution functions is essential to making sound decisions."

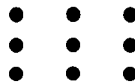
In many problem-solving situations, the participants approach a solution with a clear idea of what the problem is, but only from their own limited perspective. Rather than spending time properly isolating and agreeing on the problem definition, everyone is eager to solve it. With a heavy orientation toward task completion, they perceive that they will get more credit for solving the problem quickly than for making sure the solution addresses the right problem. Sadly, in too many situations, their perceptions are correct. The future difficulties created by not solving the correct problem often become the responsibility of another group of problem solvers: no one recognizes

the impact of the failure of the original process.

James Adams, in his book, *Conceptual Blockbusting*, describes several perceptual blocks that prevent the problem solver from clearly perceiving either the problem or the information needed to solve the problem:

- You see what you expect to see and block out new perspectives
- You have difficulty isolating the problem because of extraneous information.
- You define the problem too narrowly by placing too many constraints on it.
- You are not able to see the problem from various viewpoints.
- Your senses are saturated because you deal with the situation so frequently that you cannot recall pertinent detail.
- You fail to utilize all sensory inputs in solving the problem.

A good example of defining the problem too narrowly is the classic nine-dot puzzle where you must try to draw no more than four straight lines (without lifting the pencil from the paper) that cross through all nine dots.



Many people mentally draw a box through the outside dots and assume that the lines can't go outside the box, making the solution next to impossible.

Actuaries are not used to relying on all our senses for problem solving. We tend to be more familiar with problems that can be solved verbally or mathematically.

A product development actuary I know shared an example of how defining a problem too narrowly can lead to future problems. The head of the sales department at his company came to him and said, "Our commissions are too low and I'm losing agents to the competition." A task force was formed and the battle lines

were drawn. The sales department argued for higher commissions and the actuary argued to protect the policyholder from higher prices and the company from lower profits. The problem was solved by increasing premiums and reducing profit margins to accommodate the higher commissions needed. It is not surprising that sales decreased and agent turnover increased.

One year later the same task force addressed the problem again. This time it defined the problem as, "Our agents aren't making enough money and our turnover rate is too high." This simple change in the problem's definition led to a combination of program changes designed to improve agent earnings by increasing their productivity. A new lead-generation training course was introduced, a time management program was developed for agents, a new marketing program was developed for the company's primary market, and prices and commissions were reduced below their original levels. To convince the agents that the combination of changes would solve the problem, a transition program was created. The program guaranteed no loss of income during the first year of the program for an agent where a certain level of productivity improvement actually took place, based on submitted premiums.

The program was a great success for the agents and the company. My friend is now a firm believer in taking the time to properly define the problem before trying to solve it.

If you feel you could use better problem identification skills, consider attending the seminar, "The Problem Comes First," at the annual meeting in Orlando. The session will cover how to recognize a problem before it is obvious, how to turn a vague feeling of uneasiness into a clearly defined statement, how to discern if a problem is unique or a specific incidence of a larger problem, and how to do all of this within the context of a complex insurance organization.

Gregory S. Strong is Vice President-Financial Service, Minnesota Mutual Life Insurance Company.

Unified framework for policy values

by Douglas N. Hawley

Because many different bodies with different and conflicting interests specify what various life insurance cash values and reserves are, we have a complicated and inconsistent set of policy values. A few examples are:

1 GAAP reserve calculation is inconsistent between universal life and traditional life based on FASB's conclusion that they are significantly different, even though they may be considered as equal alternatives in the same sales situation.

2 FIT reserves are different from both GAAP and statutory reserves, although all are to some degree used to measure profit.

3 Alternative minimum FIT reserves may be different between stock and mutual companies for no good reason.

Other countries have a simpler and more consistent set of values because they have fewer conflicting governing bodies. The existence of several bodies invites short-term, contradictory solutions. I, for one, would welcome consideration of eliminating some of the overlapping regulation in the United States.

Here is a quick review of the players in the policy value game:

- *Cash values* – The National Association of Insurance Commissioners (NAIC) defines minimum values. In theory, these should represent a terminating policyholder's asset share. There is some tension with industry groups that may want to either reduce or eliminate minimums or eliminate the cash surrender requirement.
- *Statutory reserves* – The NAIC defines minimum statutory policy reserves to insure company solvency. I believe there have been more solvency problems due to overvaluing assets or undervaluing claims reserves than there have been from undervaluing statutory reserves. If true, one might conclude that the best reserve would be conservative and simple, and that solvency testing should be more concerned with valuing assets and claims reserves.

- *FIT reserves* – These are designated by Congress and implemented by the IRS. In fact, they are set to achieve target tax payments for stock and mutual companies. They are calculated much like minimum statutory reserves, but with a special federal interest rate. The picture is further complicated by lower GAAP-like reserves used in alternate minimum tax calculations.
- *GAAP reserves and assets* – These are defined by FASB and are purported to be appropriate for determining company profits. There are three separate methods, depending on the type of policy – whole life, limited pay policies, and universal-type policies. The underlying theory is that revenue should be recognized in relation to the performance of the company's function. Despite that premise, the company's principal function – sales – is not proportionally emphasized in revenue recognition.

For the moment, let us ignore the entrenched interests and trod all over their turf. How should these values be calculated? First we set a few axioms:

1. Simplicity is to be preferred over complexity unless there is an overwhelming necessity for complexity.
2. Objective values (gross premiums) are preferred over abstractions (guaranteed maturity premium).
3. Values should serve the purpose for which they are used.
4. The same values for different life policies should be calculated in a consistent fashion.
5. Where possible, one should be able to trace or explain the differences between different values for the same policy.
6. A life insurance company should be treated as any other business, rather than something special.
7. Different companies, say mutual or stock, large or small, should calculate the same value in the same way.
8. Hindsight (retrospective methods), when possible, is preferable to foresight.

Here are our policy values redefined.

- *Primitive cash values* – This can be considered the crude cash value, or in the usual case, the net GAAP value. It is an idealized and simplified asset share, including negative values as appropriate. The AAA Task Force on Standard Nonforfeiture Values deemed this the most accurate calculation of terminating policyholders equity. To be more precise, it is the accumulated gross premium, less charges for benefits and expenses. For simplicity, the expenses can be assumed to be percents of the gross premium and fixed amounts varying by duration. For some policies, accumulations would be revised monthly, for others, annually, as the policy structure dictates.
- *Minimum cash values* – If one assumes such will be mandated, they would be primitive cash values subject to:
 - a. Minimum interest
 - b. Maximum mortality depending on underwriting
 - c. Maximum expenses
 - d. No negative values
 - e. The elimination of trivial values
- *Actual cash values* – Calculated like minimum cash values, but possibly larger.
- *Minimum statutory reserves* – To properly insure solvency, this would be the largest (at time of calculation) of:
 - a. Actual cash value
 - b. Gross premium reserve
 - c. Net premium reserve
 - d. Cost on insurance to next anniversary

One notes that *b* and *c* could be subsumed by one prospective reserve using the larger of the net or gross premium. If the net premium, defined by statutory interest and mortality, is larger than the gross, then using *c* rather than *b* constitutes loss recognition or a deficiency reserve. Deficiencies should only be calculated over a period for which there were guarantees outside of

Continued on page 8 column 2

Elections cont'd

Council members with three-year terms They are.

Futurism – Frank P. DiPaolo, Audrey L. Halvorson, G. Thomas Mitchell

Health – John M. Bertko,

Larry M. Gorski, Gregory N. Herrle
Individual Life Insurance and Annuity Product Development –

Anne M. Katcher, Thomas M. Marra,
Phillip K. Polkinghorn

Investment – Luke N. Girard,

Mark W. Griffin, David A. Hall

Financial Reporting – Douglas C. Doll,

David J. Drury, Paul H. LeFevre

Non-traditional Marketing –

Edward P. Mohoric, Joe B. Pharr,

Patricia L. Shapiro

Pension – Ronald Gebhardtsbauer,

Dale Grant, Larry Zimpleman

Reinsurance Section – John E. Bailey,

John T. Palmer, James D. Maughn

Return rate drops

Despite an increase in 1990 first ballot voting, the percentage of Fellows who returned second ballots in the 1990 elections dropped from the 1989 figures. Second ballots were sent to 6,356 Fellows and were returned by 2,720, for a return rate of 42.8% compared to a second ballot return rate of 45.8% in 1989, when 2,860 out of 6,241 Fellows voted. However, the rate of return for first ballots increased in 1990 to 36.5%, as compared to 30.9% in 1989.

Section voting, on the average, reflected approximately the same decline. The return rate for the eight Section Council ballots was 33.7% in 1990, down from the 37.1% return in 1989. The Reinsurance Section maintained the highest level of return among the Sections again this year, with a 41.1% return in 1990 and 43.1% in 1989.

Unified framework cont'd

statutory minima and maxima. With this definition, there would be no need for separate entries for cash values in excess of reserves or separate deficiency reserves.

- **Actual statutory reserves** – Calculated as the above, but at the company's discretion, larger
- **FIT reserves** – Minimum statutory reserves. There is no real justification to have separate reserves for FIT except to hit tax revenue targets. It seems more appropriate to base company taxes on what the company has earned according to a rational, conservative accounting method. If this basis is too conservative, GAAP values can be used.

There is a separate question of what income should be imputed to policyholders and when, and who should pay the tax on it.

- **GAAP values** – There is little or no reason to split a single policy into an asset and a liability, hence the primitive cash value could be used as the only GAAP value. It could be either an asset or a liability at different times. If two values are desired, they could be produced as follows:

- Calculate a policy reserve in the same fashion as the primitive cash value, but without expenses.
- Subtract the policy reserve from the primitive cash value to produce the policy asset.

If the gross premium is deemed inadequate, the policy asset could be decreased or the policy liability increased as necessary.

We need to consider something more important than this specific proposal. Could we be better served by one national insurance body, and if so, what would be the nature of that body? As it is, we are increasingly performing tasks that are inappropriate, redundant and inconsistent at the direction of various bodies.

Douglas N. Hawley is Insurance Consultant, Hawley Actuarial Software.

Open letter cont'd

of Actuaries is dedicated to extending our knowledge and presenting it to our students so they will be armed with the very latest information and methods for achieving success in their careers. Corporations eagerly solicit and invest in our students and entrust actuaries with tremendous responsibility. The actuary's domain is ever expanding into new areas to meet the changing challenges of the industries we serve.

Why are we telling this story? Because we need to realize that our profession is already a great one, it is one to be proud of, and one that provides an absolutely remarkable career opportunity. By now you all have heard that "actuary" was chosen as the most desirable job out of a long list of 250 jobs in *The Jobs Rated Almanac* in 1988. We need to feel that each of us is an essential part of this profession.

It goes without saying that it's important to show interest in the profession – serve on a committee, chair a workshop, support a local actuarial club. We also are asking you to reflect on the Actuary of the Future Task Force work.

If you would like to comment on this letter or the ideas of the task force, please contact the chairperson of the task force, Robert D. Shapiro, at his *Yearbook* address.

If you are interested in volunteering for committee service next year, please contact the appropriate committee chairperson listed in the *Yearbook*.

Let's strive to protect what we have worked so hard to attain. Be a publicist for the profession. Maximize the probability that we will all be able to look back on our careers and know that we made the best choice – that people respect what we have accomplished. Let's make sure that "actuary" remains at the top of the list. Let's sharpen the axe head and replace the helve before they break!

This open letter was prepared by Eric Rubin who serves on the Task Force on the Actuary of the Future. It expresses the hopes and sentiments of the task force.

Predicting population growth

by Linden N. Cole

Actuaries should be good at predicting future population growth. The accompanying tables show 20 years of data for students passing the first exam (once called Part 1, now called Course 100), new ASAs and new FSAs. Please note that some students passing the first exam will end up with the Casualty Actuarial Society and many others will drop out before reaching either ACAS or ASA. Please also note that the shift to the SOA's Flexible Education

System caused a one-time dip in new ASAs in 1987, and a one-time dip in new FSAs spread over 1988 and 1989. The numbers in the tables are taken from office records and may not match other presentations of the same data precisely, due to timing differences. The question to solve then is this: How many new ASAs and FSAs can we expect year by year between 1990 and 2000?

Linden N. Cole is Education Actuary, Society of Actuaries.

SOA New Students, New Associates, New Fellows

| Year | Students Passing Part 1 | New Associates* | New Fellows* |
|------|-------------------------|-----------------|--------------|
| 1970 | 1,008 | 216 | 143 |
| 1971 | 1,220 | 236 | 150 |
| 1972 | 1,363 | 304 | 149 |
| 1973 | 1,360 | 386 | 160 |
| 1974 | 1,459 | 380 | 148 |
| 1975 | 1,603 | 360 | 220 |
| 1976 | 1,654 | 354 | 394 |
| 1977 | 1,526 | 414 | 334 |
| 1978 | 1,523 | 448 | 313 |
| 1979 | 1,285 | 756 | 275 |
| 1980 | 1,249 | 671 | 412 |
| 1981 | 1,225 | 442 | 265 |
| 1982 | 1,337 | 423 | 265 |
| 1983 | 1,512 | 354 | 222 |
| 1984 | 1,620 | 480 | 211 |
| 1985 | 2,121 | 521 | 237 |
| 1986 | 2,590 | 554 | 264 |
| 1987 | 2,693 | 370 | 264 |
| 1988 | 3,329 | 639 | 268 |
| 1989 | 3,996 | 725 | 263 |

* By examination

The February and May exam results for 1989-90 were:

| Year | Students Passing Course 100 | New Associates | New Fellows |
|-----------------|-----------------------------|----------------|-------------|
| first half 1989 | 2,600 | 355 | 109 |
| first half 1990 | 2,965 | 443 | 132* |

* Examination requirement completed, need to complete September Fellowship Admissions Course

The Accountants' Handbook

by Everett D. Wong

The Accountants' Handbook, which will be available after October 1990, covers an extensive range of accounting topics. It is a working reference book of organized, factual information on accepted accounting concepts, principles, standards and practices, with a heavy emphasis on implementation problems. Each chapter addresses a different subject and is written by one or more experienced practitioners in the subject area. I, along with Vincent Amoroso and Paul Wirth, co-authored the chapter on retirement plans, which may be of interest to pension actuaries.

The handbook is now in its seventh edition. The previous edition was published in 1981. In the interim decade, Congress gave us TEFRA, DEFRA, REA, TRA, TAMRA and OBRA; and FASB introduced us to FAS 87, 88 and 96 and now the PBOP exposure draft. It may be an understatement to say that a rewrite of the retirement plans chapter in the handbook is overdue.

The new retirement plans chapter covers the following areas:

- An overview of retirement plans and the relationships among various FASB statements, including FAS 96
- Pension accounting for the plan sponsor under FAS 87
- Pension accounting for nonrecurring events such as settlements, curtailments, termination benefits, and business combinations
- Plan accounting under FAS 35
- Nonqualified plans, including a section on corporate-owned life insurance (COLI)
- A discussion of the FASB exposure draft on post-retirement benefits other than pensions (PBOP)

The retirement plans chapter covers the subject matter quite thoroughly, taking into consideration both the FASB Q&As and the Academy's standards. In addition to accounting basics, it discusses various real-life situations that practitioners may encounter. The following sample should give you a flavor of its content:

- If interest rates change in mid-year, can a plan sponsor remeasure the

Continued on page 11 column 3

Where should I publish my article?

by Kenneth A. McFarquhar

The Society of Actuaries produces many publications that serve a variety of purposes. The Publications Committee, of which I am director, encourages as many members as possible to write for them whenever they believe it will be for the betterment of the profession. However, we realize that determining which communication vehicle is the appropriate one to approach may be confusing. This article will describe the various SOA publications and their functions in the hope that this explanation will encourage the optimum number of submissions. We are considering a more permanent form for this information, possibly inclusion in the *Yearbook*, so it will be available whenever it is needed.

Objectives and standards of SOA publications

The primary objective of the Society's publications is to publish the papers, discussions, and studies of the Society of Actuaries to provide an accurate, informative, and permanent record of the activities of the membership in a time frame consistent with the nature and purpose of each publication. A secondary objective is to inform Society members of relevant developments that occur outside of Society activities. To meet these objectives:

- The Society's publications services, through regular publications and special publications arrangements where necessary, should enable publication of a broad range of material of direct or indirect interest to SOA members, ranging from scholarly papers and research works to quick news items.
- The style and production cost of each publication should take into consideration the nature, purpose, and audience of that publication.
- Overall direction, editorial policy, and technical review will be provided by editorial boards and committees of Society members.
- The publication process, including copy editing, printing, and distribution will be the responsibility of the Society office staff.



- Coordination and dialogue will be maintained with the Society leadership, committees, and sections to enhance consistency with Society objectives and response to membership needs.

The first group of Society publications are those to which individual members are encouraged to contribute articles, and the second group are those through which the Society transmits various forms of information to the membership.

Publications that accept contributions

• *The Transactions* •

This is the Society's "flagship" publication and only refereed journal. It attracts formal and scholarly papers that are refereed by five actuaries, and at least three of them must agree that it is worthy of publication. These referees may be members of the Papers Committee or experts who have been drafted for a particular paper. Currently the overall acceptance rate is about 50%. An annual prize is awarded for the best paper in each volume of this publication, and a triennial prize is awarded for the best paper written by a member within five years of Associateship. If you want to write a more scholarly paper and have it published, you should consider *The Transactions*.

• *The Actuary* •

Actuaries are probably most familiar with this publication. It is issued

monthly, except in the summer, and it offers a variety of items, including short articles on professional subjects, notices, letters, puzzles, and other brief items. If you want to write something of a general professional nature to communicate information, *The Actuary* could be your best choice.

• *ARCH* •

Research articles of varying length are published in this publication. Many of the articles are technical, but this is not a prerequisite for publication. A minimum amount of editing is done to the articles since *ARCH* is basically a vehicle for the dissemination of ideas. One issue each year is devoted to the papers that have been presented at the Annual Research Conference.

• *Section newsletters* •

Each Section publishes a newsletter that consists of short- to medium-length articles. Their primary purpose is to transmit ideas of interest to the Section membership as quickly as possible.

Publications used to transmit information

• *The Record* •

This publication is primarily a record of all discussions, except workshops, which take place at the four Society meetings each year. It also includes information regarding teaching sessions, Section meetings, seminars, etc. Therefore, the only way that you can be published in *The Record* is to

speak at a meeting. Special volumes of this publication are issued periodically if sufficient material exists that requires publication and is unsuitable for any other SOA publication.

• *The Reports* •

These contain various experience studies carried out by Society committees. *The Reports* are part of the *Transactions*, but are usually issued separately. They are open only to the committees that submit these reports.

• *Yearbook* •

The *Yearbook* offers information that would be useful to actuaries in their everyday activities. It lists members in alphabetical order and by area of employment, and also lists all committees, information on education, standards, etc

• *Index* •

This is a new Society endeavor. Beginning this summer, the SOA produced the first annual index of all SOA publications. The first volume issued in August is a single-source reference to all material published in 1989.

• *Study Notes* •

Study Notes are primarily for the education of our students, but they contain much material which could be of interest to the practicing actuary. They are written by various SOA members who have an expertise in a particular subject.

• *Miscellaneous* •

Examples of miscellaneous publications are the Valuation Actuary Symposium summary and *Our Yesterdays*, the history of the actuarial profession written by Jack Moorhead.

Kenneth A. McFarquhar is Actuary, Manulife Financial.

In memoriam

Richard A. Chadwick ASA 1966
C. W. Hartog FSA 1963
Esther Johnson FSA 1926
Irving Rosenthal FSA 1934
Donald Graham Stewart *ASA 1984

* * *

Just after the September issue was printed, *The Actuary* learned of the death of James M. Souness, President of the Faculty of Actuaries in Scotland. His interview with Editor Linda Emory was featured on the front page of that issue. A sportsman, Souness had recently retired as Chief Executive of The Life Association of Scotland, and was killed September 2 in a climbing accident in the Swiss Alps. The Society of Actuaries extends its deepest sympathy to family, friends and fellow Faculty members. This is a great loss to the profession, which Jim Souness served long and well, and to his friends and colleagues all over the world.

Research papers for Fellowship credit

The Education and Examination Committee recently awarded 30 Fellowship credits to Marina Adelsky for her paper, "Design and Pricing of Home Equity Line of Credit Insurance." This is the third such paper approved for Fellowship credit under this Future Education Methods (FEM) program.

Adelsky's paper presents the application of the asset share technique of pricing to a new group credit insurance product – Home Equity Line of Credit Insurance (HELOC).

The paper's objective is to provide useful tools when developing a new HELOC product, including projections for marketing and underwriting, distinctions between desirable and undesirable product design features, and development of premium rate structures. Several HELOC insurance projections are made to illustrate the effect of differences in underwriting, premium rate changes, etc., on the project's profitability.

The extensive description of HELOC design and underwriting features familiarizes the reader with this fairly new product and analyzes the HELOC insurance provisions that affect the assumptions used in pricing.

Asset share-type calculations are performed to illustrate how the technique works for the HELOC insurance

product described. The results are analyzed to determine the effects on the product's profitability of variation in product design, compensation structure, and premium rates. The impact of regulations imposed on this type of insurance by state insurance departments also is analyzed. Suggestions are made as to the product design and the rates.

Next, the calculations are modified to account for the stochastic nature of mortality and lapses. The effect of random fluctuations in these assumptions are analyzed.

The model can be adapted for pricing a variety of credit insurance products.

Copies of Adelsky's paper are available from Donna Richardson, Society staff librarian.

The committee would like to thank David B. Atkinson, Craig A. Merdian and Gary Fagg, who refereed this paper, and acknowledge Roy Goldman and Jay M. Jaffe, who served as Adelsky's supervisors and also provided the committee with reviews.

Students interested in the Research Papers program should consult Appendix 2 of the Fellowship Catalog. Applications for Research Papers can be obtained from the Society of Actuaries office.

Accountant's Handbook cont'd

PBO, and so on, using a new discount rate and revise the pension expense for the remainder of the year?

- What is the proper financial statement disclosure for a plan sponsor which accrued a pension expense different from the FAS 87 amount?
- If the FAS 87 pension expense is not finalized until the fourth quarter, in which quarter should the plan sponsor expense the difference between the correct amount and the amount already accrued in the first three quarters?
- How is a settlement that is related to a disposal of business measured differently from one which is not?
- Does a settlement occur if an employer transfers assets and liabilities (e.g. for retirees) between two of its plans?

The Accountants' Handbook by Douglas R. Carmichael. Published by John Wiley & Sons, Inc., New York (201-469-4400, ext. 2499), 7th edition, 1990, two volumes.

Everett D. Wong is Senior Manager, Peat Marwick Main & Company.

Convertible debentures: try them, you might like them

by Robert A. Nix

Convertible debentures (RDs) occupy a small part of the investment field. For the week ended June 1, 1990, bond volume on the New York Stock Exchange (NYSE) was \$133 million, of which RDs accounted for \$17 million, or 13%. I like RDs because they can provide good yields, great total returns, and a little less troubled sleep than I get with common stocks. And, the commission rate is lower.

What is an RD?

An RD is a bond secured by the full faith and credit of the issuing corporation that is convertible into common shares at a fixed price, the Conversion Price. For example, the USX, 5¾% of 2001, (X . RD), is convertible at \$62.75 per share, or 15,936 shares per \$1,000 face of RD. The Conversion Value of X . RD at the market close on June 1 was thus 15,936 times the common price of \$33.75, or \$537.84. The price of X . RD was 73, or \$730 per \$1,000 face, so there was a Conversion Premium equal to $(\$730 - \$537.84) / \$537.84 = 35.7\%$. This premium can be regarded as the price paid for the downside protection inherent in the RD, i.e., the yield of similar straight bonds which acts as a brake on the RD price. Some might regard the premium as the price of a long-term call on the stock, but I don't think this analogy works well, since the premium increases as the call possibilities become more remote. Normal bond call provisions are typically included in an RD, it might be callable at 105 in 1990 decreasing evenly to 100 in 1997, but would not be called below Conversion Value. Some RDs are subordinated to senior debt.

What happens to RDs when stock prices change?

If the price of X common moves up by \$1, then X . RD should move up by \$15.936 per \$1,000, or about 1½%, to 74½% as quoted. It won't necessarily work that way on a week-to-week basis, but any big move in the common should be accompanied by a corresponding move in the RD. As the share price moves closer to the conversion price and beyond, the premium tends to narrow and finally disappear.

while the yield becomes nominal. Essentially, at that point, you're buying the stock. At June 1, Compaq, (CPQ . RD), had a premium of -.4% and the yield to maturity was 2.0%, reflecting an RD price of 183, a conversion price of \$65 and a share price of \$119.375. It was recently called. On the other end of the teeter-totter, Pittston, (PCO . RD), had a premium of 146.6%, a price of 90, a conversion price of \$50 and a share price of \$18.25, a long way from \$50. The yield was 10.6%. The highest yield among the RDs I track was 15.3%, a junk number. This belongs to financially troubled Prime Motor Inns, (PDQ . RD) 6 5/8% of 11, quoted at 46, down from 87¼ six months before. It bottomed at 33¼ during the first week of May. The stock went from 28½ to 11¼ over the same period, bottoming at 7¼.

For the 65 RDs I follow, all currently rated BB+ or better by S&P and traded on the NYSE, the average premium was 36.8%, a price of 96, and yielded 8.2%, as of June 1. In the previous week, the same numbers were 38.4%, 95⅜ and 8.3%. I track 30 RDs traded in Toronto and the numbers as of June 1 were 56.8%, 85¾ and 10.8%. In New York, the variation in premium was -1.7% for Norton to 376.2% for MACOM. No one has come up with an index future for RDs that I know of, although it wouldn't surprise me if someone did.

I computed the correlation coefficient, r , for each of 20 RDs priced under 100, where y is the RD price and x the share price, using 30 successive Friday closing prices. The size of r , ranging from 0 to +1, gives an indication of how successfully a straight line can be fitted to the data; larger values of y are associated with larger values of x , and smaller values of y with smaller values of x . The results varied from .24 to .99, with the higher values of r usually associated with high-volatility stocks. (Note that I also compute relative volatility for stocks, based on the S&P 500.) The value of r for PDQ . RD was .99 and the relative volatility of the stock was out of sight at 15.3. For Southeast Bank, an organization with loan problems, the

numbers were .97 and 8.0. The USX results were .64 and 1.2 — not much volatility beyond the markets. But for Wendy's, the values were .25 and 3.3, so the relationship is not always there. On the upside, Cray Research was .98 and 4.6. Of the 20 r values, 16 were over .5. I think the lesson here is that you'd better be right on the stock if you expect to be a superior RD player, especially when it's volatile.

How to play the RD game

I look for RDs with premiums of 15-35%. Any less and I might as well buy the stock; any more and I might have to wait a long time before the conversion feature begins working for me. A pick-up in current yield of at least 3½% or 4% over the dividend yield is attractive. Prospects for the share price seem to be most important. Lower interest rates won't hurt.

Volatility in prices of RDs is less than in share prices. The average 52-week low of the 20 RDs referred to was 76% of the high, while the same number for stocks was 60%. Turned over, these numbers are 132% and 167%. Some sophisticated players short the stock or buy puts and go long the RD, figuring that if they're right on the stock, they'll make a net gain on the downside, or if they're wrong, the loss is limited, particularly when the share price is close to the conversion price so that the RD will behave more like a stock in the upside.

I have a position in four RDs, bought over February/March 1990, and my annualized return, omitting commission and accrued interest from the calculation was 9.64% as of June 8. You can always play games in calculating returns and probably any return calculation over a short period is meaningless. The average commission cost was .65%, so if I'm in and out over a year, the total is 1.30%, twice in a year is 2.60%, which is a lot.

John Bragg's book, *Protecting Against Inflation and Maximizing Yield*, came up with 15% as the annual compound return from the Retrospective Best Strategy among bills, long treasury bonds, and common stocks over the last century. To me, that 15% return is the measure of a great investor. J. M. Keynes (a name ubiquitous in investment books) is reported to have done 13% over 1919 to 1945. If you can do that over 15 or 20 years, there aren't many like you. I think RDs are as good a vehicle as any for trying.

Robert A. Nix, F.S.A., is retired.

Dear Editor:

Long-term care is universal concern

The need to provide long-term care to old-age pensioners, in the case of the Philippine Social Security System (SSS), social insurance for Filipino private sector workers, is very much felt. At present, about 40% of our old-age pensioners are receiving the minimum monthly pension of ₱500 (approximately \$22) which, they claim, is not even sufficient to provide them with the basic necessities of daily living. Thus, when these retirees start to require long-term care due to "elderly disability," they are left financially desperate.

To address this need, the SSS has just recently taken the following measures. (1) the grant of a supplementary pension of ₱300 (\$13) a month to total permanent disability pensioners, and (2) the extension of the Medicare Program to include old-age pensioners and their dependents without requiring contributions. The supplementary pension is intended for the disabled member's regular medication, aids or appliances (e.g., wheelchairs, crutches, artificial limbs) and/or carer's provision. The Medicare benefits, on the other hand, are limited only to hospital confinements and the program does not cover expenses incurred from home nursing care and other outpatient medical needs.

Definitely, the supplemental pension, being a guaranteed cash benefit, better addresses the problem of long-term care. In fact, suggestions have cropped up that would also enable retirees to enjoy additional cash benefits such as providing automatic pension increases at ages 65, 70, 75, 80, and 85. This alternative may not be appropriate, considering that the degree of "elderly disability" varies from person to person depending on the availability of comprehensive private medical care and on personal habits, as well as on living conditions. Thus, a person aged 70 who is still of good health may not require as much long-term care as a person aged 65 but of poorer health.

Providing long-term care to retirees is of universal concern and must be given great importance by social security administrators worldwide.

Ramon A. Aggabao, Manager, Actuarial Department of the Republic of the Philippines Social Security System and a Fellow of the Actuarial Society of the Philippines

Documentation on George Huggins

In my letter in the June 1990 *Actuary*, I state that George A. Huggins deserves significant credit for the original U.S. actuarial involvement in pensions. I mention (1) his part in the actuarial development of the initial pension program of what has now become the Benefits Plan for ministers and lay employees of the Presbyterian Church (U.S.A.) and (2) his subsequent involvement in pension programs for other religious denominations as a consulting actuary beginning in 1911. In his reply, Jack Moorhead raises two main points. First, he suggests that religious denominations had developed pension plans many years before Huggins's involvement. Second, he asks for documentation. This letter summarizes the more detailed reply I have sent directly to Jack Moorhead.

In connection with the first point, I consider the Ministerial Sustentation Fund of the Presbyterian Church in the U.S.A., with which Huggins was involved, to be a pension plan because it had a defined benefit, the employer provided 80% of the funding and the employee (the minister) the other 20%, and funding was determined on an actuarial basis.

Benefit programs of churches prior to the adoption of the Ministerial Sustentation Fund were generally relief or welfare operations under which only needy individuals received benefits and only to the extent of money collected annually for that purpose and/or of interest on endowment funds. Therefore, actuarial theory was not involved.

Moorhead mentions that the Presbyterian Ministers Fund was launched in 1759, a century and a half before Huggins worked in the Fidelity Mutual Life Insurance Company. In my opinion, this is not germane, since the Presbyterian Ministers Fund is an insurance company and has been since 1759. The fact that its present and predecessor names contained the word "Presbyterian" has led to much confusion over the years. It was not and is not an organization of the Presbyterian Church nor is it a pension plan. It was founded by Presbyterian ministers and laymen, but that does not convert it to a church pension plan. Its purpose was to provide benefits to meet the needs of ministers and widows by selling them insurance on an individual basis. Moorhead has provided ample evidence that actuarial involvement in life insurance in the United States

began more than 100 years before Huggins founded his consulting actuarial firm in 1911. However, this has nothing to do with my suggestion that Huggins took part in the original actuarial involvement in pensions.

As for Moorhead's request for documentation, I have supplied him with a number of exhibits from our company archives showing that (a) Huggins was involved actuarially to a significant degree with the Ministerial Sustentation Fund (MSF) as early as 1905 (and probably earlier) while he was an actuary with Fidelity Mutual; (b) as early as 1910 he was apparently being paid by the MSF for services rendered, separately from his employment with Fidelity Mutual; (c) in 1911 Huggins left the employ of Fidelity Mutual and became a consulting actuary to the MSF and (d) by October of 1912 at the latest, Huggins was involved with the establishment of pension plans for other religious denominations.

My purpose is not to cast any doubt on the statement that George B. Buck deserves credit for his actuarial involvement in pensions in 1913. I only want to show that George A. Huggins was comparably involved in parallel efforts and deserves recognition for his pioneering efforts along with those of his friend, Buck. Moreover, Huggins subsequently clearly became the national authority on church pensions, both actuarially and otherwise, as the result of his development of the more modern pension programs of most major religious denominations in the country. In his response in *The Actuary*, Moorhead recognized the important position of churches in the development of pension plans. They now involve billions of dollars in assets. For example, the MSF Board (after several name changes) has become the Board of Pensions of the Presbyterian Church (U.S.A.) and had assets of \$2.4 billion according to the last listing in Pensions and Investments, which showed it to be the 140th largest pension plan in the country.

In my opinion, Huggins's original involvement and later dominant position relating to church pensions would seem to justify his being included in any historical treatment of the actuarial profession in North America such as Moorhead's book *Our Yesterdays* or the historical summary presented in the Society of Actuaries Yearbook.

Michael Mudry

Continued on page 14 column 1

Dear Editor cont'd

APL inappropriate for *Transactions*

I would like to comment on the practice in recent years of including APL programs in the *Society Transactions* and other actuarial literature. While APL is a useful tool for certain computing tasks, it is an inappropriate medium for a professional and scholarly journal such as the *Transactions*. It lacks support for "structured" programming, that is, features which encourage the expression of algorithms in a systematic and readable fashion. In fact, APL is well known as being the single most unreadable programming language ever invented.

A more appropriate choice would be a language such as Pascal or Modula-2. Pascal was created specifically for the purpose of teaching programming. (In fact, it would be very suitable for the actuarial exams.) Modula-2, on the other hand, although every bit as readable and structured, adds features needed for developing large real-world programs.

The structured programming features of these languages include a disciplined approach to variable typing, a rich variety of data structures (including user-defined data types), a powerful set of control statements, and modular program design.

Presenting algorithms in such a language would result in vastly improved levels of clarity and accuracy.

An additional problem with APL is that most of its implementations are interpreted, as opposed to compiled. This means that the run time of an APL program will be many times longer than that of a corresponding Pascal or Modula-2 program.

Both Pascal and Modula-2 have low-cost and easy-to-use implementations for the IBM-PC and Macintosh environments.

Robert Clemens

Another view of APL

Most actuaries are faced with day-to-day problems calling for experiments or investigations which could be completed on a personal computer. However, in the absence of facilities to specify and control such work without being personally involved, actuaries may be concerned about accepting responsibility for the results.

One solution would be for the organizer to write his or her own program in APL on a personal computer. However, the organizer may

have neither the time nor the inclination for detailed programming.

Delegation of APL programming raises the problems of communication and responsibility. Also, the compactness and flexibility of APL can lead to the development of personal styles which may make it difficult for new staff to take over the work.

APL can be a powerful tool for those who become closely involved in programming, but requires a simple and reliable method of control if the actual work is to be delegated to others.

For simpler problems, many have resorted to spreadsheet systems. But spreadsheets create even greater control problems.

The record of the instructions governing spreadsheet development is hidden in the value and formula specifications of the individual spreadsheet cells. These specifications are produced by the operator, using a wide variety of keyboard entries and screen manipulation, with considerable scope for error and omission. To be efficient, an operator requires both training and practice, and must be familiar with a voluminous manual of instructions.

There is no concise record of the sequence of operations, no assurance that the results are what the organizer intended, and no guarantee that the spreadsheet will produce the same result every time.

An indication of the experience and training required to operate a conventional spreadsheet system is given by the two-day seminar organized by the Canadian Institute of Actuaries and the Conference of Actuaries in Public Practice. This was designed for actuaries already proficient in using Lotus 1-2-3, and the recommended preliminary reading was a volume of 1,145 pages.

For a solution to this problem, we should go back to the process used by actuaries and others before modern computer facilities became available.

This was a form of spreadsheet operation in which calculation proceeded column by column, according to headings set up by the organizer. These headings specified the calculation method from outside data, or from values developed in previous columns.

The calculations were normally carried out independently by two clerks, and the results were compared. Additional tests were applied by way of totals and consistency with other information. The column headings

provided a clear description of the process, and would produce the same results if repeated by others.

A system that utilizes the computer's abilities, with full control for any part of the process delegated to others, is required. It must:

- Have a separate specification table, using a simple but powerful code, so the organizer of the work need only produce a draft of the table for execution by an unskilled operator
- Guarantee that the results comply with a printout of the specification table, regardless of the process used by the operator to develop the table.
- Require no elaborate reference manual or keyboard skill on the part of either the organizer or the operator.
- Provide all the facilities of display and printing available with other spreadsheet systems.
- Incorporate powerful tested actuarial functions for use in specifications.
- Require no knowledge of APL, but permit the use of APL expressions and user-defined functions if desired.

I have developed a system called SPREADAPL to meet the above requirements and can provide further details.

Sidney H. Cooper

Is ASPA an 'actuarial society'?

In the July/August 1990 *Actuary*, the first sentence in the article titled "New public relations campaign set for 1990" started with "An advisory group representing six North American actuarial societies..." The article then identified the American Society of Pension Actuaries (ASPA) as one of these six organizations. Less than 30% of ASPA's members are actuaries by their standards. Can a group with more than 70% nonactuaries be an "actuarial society?"

ASPA should receive a PR award because it calls itself something it is not, the public believes it, and the actuarial profession accepts it.

However, shouldn't the actuarial profession feel somewhat queasy about all this? I'm not questioning the credentials of actuaries belonging to ASPA. It's also a compliment to the profession that a nonactuarial group wants to call itself an actuarial society. Those issues aside, possibly the first order of business for the 1990 public relations campaign should be exposing imposter actuarial societies before somebody else lifts the veil.

Larry D. Keys

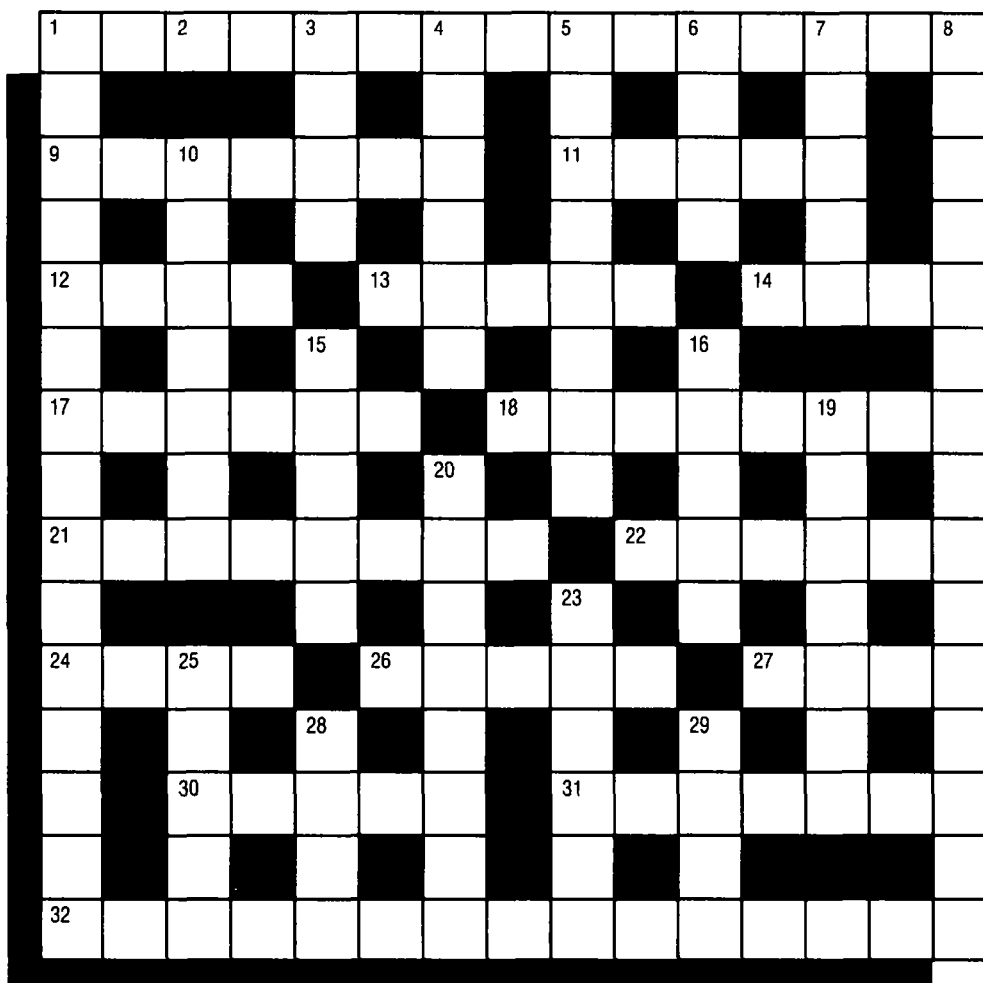
ACTUCROSSWORD

Across

1. Let an art rich act in 1941 declaration (8,7)
9. How to convert into net variable annuity (7)
11. Regal sort of 5 (5)
12. Form of gambling support (4)
13. Give a girl a ring—how to catch her (5)
14. Cheese usually in balls—always made the wrong way (4)
17. The same 51 no good—lazy (6)
18. Choice of some examinations, more than 24 (8)
21. How one salvages a place of entertainment (3,5)
22. Cut of two states and part of Edmonton (7)
24. Origin of many tales (4)
26. Main parts of Cambridge and Princeton surrounded by water (5)
27. Bias 24 attend (4)
30. Piece of Fresno velveteen, quite new (5)
31. A modern Lee of combat but not of war (7)
32. 27s recording obligations to Society (9,2,4)

Down

1. Utica is adorable in professional manifestations (9,6)
3. On the --- is at 24 (4)
4. His coming predicted by O'Neill (6)
5. A great wonder Rhodes had it (8)
6. "Sounds and sweet ---, that give delight" (Tempest) (4)
7. General direction starts State capital and ends State (5)
8. With Calculations on Professional Guides and mine cost more (15)
10. Irritates in a pointed way (7)
15. Form of writing studied by 1 down (5)
16. Secure fragmented examinations if taken the wrong way (5)
19. Butterfly setter of note (7)
20. Like the bars that provide no meeting places (8)
23. "The fault, dear ---, is not in our stars" (J. Caesar) (6)
25. It's easy to get 100 in a small church (5)
28. Prima donna turns keen to help—about five (4)
29. Edible complaint (4)



September's Solution

O F R E E L O A D I N G E
 G L R E Y M R A
 E R A D I C A T E B E A S T
 E M C P R R N I
 B I N A R Y S H O R T E N
 B N E E G G
 R E G A T T A S C L E R I C
 O O H R P T E R
 O Y S T E R F I D O R A D O
 M R D R S W
 S U P R E M E A S S I S T
 T I F A R L U D I
 J I A H O T R I A H E D I O N
 C R R H T E F E K
 K O V I R I S T I P I F I D Y

R Jenner, W Jones, R & J Koch, M Kreuter, L Laderman & D German, J Larkin, W Luther, R Maguire, R Makin, P & J May, G & D Mazatis, H Migott, B Packer, J Prescott, M Roth R & A Jones, N Shapiro, B Sherwood & E Jones, J Sittig, P Thomson, N Tint, R Weitzenkamp, M Whitby, and A Witts **Juna:** A Amodeo, D Baldwin, M Bennett, J Braue, M & D Brown, J Brownlee, D Campbell, G Cherlin, F Clarke, C Conradi, L Cralle, J Darnton, Mrs C Edwards, K Elder, F Finkenber, R Frasca, C Galloway, A Garwood, S Harder, C Hawes, G Horrocks, J Hunt & R Bayles, A P Johnson, L Laderman & M Roth, C Marler, R A Miller, R Nolle, J Paddon, L Rae, J Ripps, H Rohifs, A Rosseau, C Wasserman, A Weishaus, and Anonymous

100% SOLVERS — **May and June:** J & M Accardo, W Allison, D Apps, D Bailie, J Beaton, T Boehmer, G Cameron, R Carson, S Colpitts, L Comeau, F & M David, B Dibben, N Fischer, P Gollance, J Grantier, M Grover, C Hachemeister, P Hepokoski, W Hill, R Hohertz, HTI Hogs, O Karsten, A Keys, C & P Kroll, D Leapman, W Lumsden, M Lykins, M MacKinnon, P Marks, R C Martin, B Rickards, J Roszkowski, J Schwartz, G Sherritt, J Singer, M Steinhart, H Tate, Mrs J Thompson, B & J Uzzell, M Vandesteeg & A White, C Walls, D Weill, A Whiton, D S Williams, and H & F Zaret **May:** L Abel, J Ackov, K Baker, W Britton, D Carlisle, S Dulle, M Eckman, O Gupta,

Send solutions to. Competition Editor, 8620 N. Port Washington Rd (312), Milwaukee, WI 53217



ACTUCROSTIC

- A Battled, contested _____
2 79 224 143 96 179
- B What critics write _____
27 174 87 125 203 226 158
- C Of major importance and significance _____
167 86 37 19 183 109 237 212 127

104 60 148
- D Create, originate, make sure _____
25 139 176 72 222 118 48 162 8
- E Hemispherical roofs _____
6 114 198 169 69
- F Simple truth, what's what (3 wds) _____
171 187 84 24 108 42 208 94

137 234 56 3
- G Most sincere compliment we can pay _____
66 124 225 88 164 101 12 197 150
- H Constantly, opposites (3 wds) _____
115 141 160 20 200 39 173 78

215 100 57
- I Quiescent stage between caterpillar and butterfly _____
233 85 47 145 182 163 13 210 131
- J Eccentricity _____
129 61 151 30 209 111
- K A ruling woman _____
38 228 65 22 201 132 154 110 92
- L Doesn't take advantage of an opportunity (3 wds) _____
186 33 116 232 73 155 99

205 134 54 7
- M Strikingly out of the ordinary _____
90 117 229 5 156 188 68 53 204 140
- N Anarchist, revolutionary _____
67 190 35 219 144 50 16 102
- O Close tightly (2 wds) _____
120 17 221 77 161 32 49
- P Explain something in detail _____
153 192 9 133 217 63 43 95 184
- Q Fond of, stuck on (2 wds) _____
40 106 213 64 23 220 83 235 136
- R Freedom from pretense or guile _____
34 138 207 157 14 172 51 181 70 195
- S A room with sound reflecting walls (2 wds) _____
45 58 122 93 113 230 149 193

74 21 185
- T Horse, old joke, platitude _____
31 227 80 196 10 142 59 107
- U Corpulent, pudgy _____
4 211 199 55 130 97 28 236 177 168
- V Court proceedings with some error or prejudice _____
202 18 98 44 170 146 123 191
- W One who takes infinite pains - and gives them to others _____
152 206 26 180 214 112 238 75 41 128

1 175 91
- X Babies cry when they are _____ _____
135 82 218 36 165
- Y Asprns, writing pads _____
119 178 11 52 159 216 81
- Z Tidal action (3 wds) _____
62 105 89 194 147 166 29 76 223 121
- AA New lease on life _____
46 231 189 15 103 126 71

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|---|-----|---|-----|---|-----|---|-----|----|-----|---|-----|----|-----|---|-----|---|-----|---|-----|----|-----|----|-----|----|-----|---|-----|----|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|--|--|
| 1 | W | 2 | A | 3 | F | 4 | U | 5 | M | 6 | E | 7 | L | 8 | D | 9 | P | 10 | T | 11 | Y | 12 | G | 13 | I | 14 | R | 15 | AA | 16 | N | 17 | O | 18 | V | 19 | C | | | | | | |
| 20 | H | 21 | S | 22 | K | 23 | Q | 24 | F | 25 | D | 26 | W | 27 | B | 28 | U | 29 | Z | 30 | J | 31 | T | 32 | O | 33 | L | 34 | R | 35 | M | 36 | X | 37 | C | 38 | K | 39 | H | 40 | O | | |
| | | 41 | W | 42 | F | 43 | P | 44 | V | 45 | S | 46 | AA | 47 | I | 48 | D | 49 | O | 50 | N | 51 | R | 52 | Y | 53 | M | 54 | L | 55 | U | 56 | F | 57 | H | 58 | S | | | | | | |
| 59 | T | 60 | C | 61 | J | 62 | Z | 63 | P | 64 | Q | 65 | K | 66 | G | 67 | N | 68 | M | 69 | E | 70 | R | 71 | AA | 72 | D | 73 | L | 74 | S | 75 | W | 76 | Z | 77 | O | 78 | H | 79 | A | | |
| 80 | T | 81 | Y | 82 | X | 83 | Q | 84 | F | 85 | I | 86 | C | 87 | B | 88 | G | 89 | Z | 90 | M | 91 | W | 92 | K | 93 | S | 94 | F | 95 | P | 96 | A | 97 | U | 98 | V | | | | | | |
| 99 | L | 100 | H | 101 | G | 102 | N | 103 | AA | 104 | C | 105 | Z | 106 | Q | 107 | T | 108 | F | 109 | C | 110 | K | 111 | J | 112 | W | 113 | S | 114 | E | 115 | H | 116 | L | 117 | M | 118 | D | 119 | Y | | |
| 120 | O | 121 | Z | 122 | S | 123 | V | 124 | G | 125 | B | 126 | AA | 127 | C | 128 | W | 129 | J | 130 | U | 131 | I | 132 | K | 133 | P | 134 | L | 135 | X | 136 | Q | 137 | F | 138 | R | | | | | | |
| 139 | D | 140 | M | 141 | H | 142 | T | 143 | A | 144 | N | 145 | I | 146 | V | 147 | Z | 148 | C | 149 | S | 150 | G | 151 | J | 152 | W | 153 | P | 154 | K | 155 | L | 156 | M | 157 | R | 158 | B | | | | |
| 159 | Y | 160 | H | 161 | O | 162 | D | 163 | I | 164 | G | 165 | X | 166 | Z | 167 | C | 168 | U | 169 | E | 170 | V | 171 | F | 172 | R | 173 | H | 174 | B | 175 | W | 176 | D | 177 | U | 178 | Y | 179 | A | | |
| | | 180 | W | 181 | R | 182 | I | 183 | C | 184 | P | 185 | S | 186 | L | 187 | F | 188 | M | 189 | AA | 190 | N | 191 | V | 192 | P | 193 | S | 194 | Z | 195 | R | 196 | T | 197 | G | 198 | E | 199 | U | | |
| 200 | H | 201 | K | 202 | V | 203 | B | 204 | M | 205 | L | 206 | W | 207 | R | 208 | F | 209 | J | 210 | I | 211 | U | 212 | C | 213 | O | 214 | W | 215 | H | 216 | Y | 217 | P | 218 | X | 219 | N | | | | |
| 220 | Q | 221 | O | 222 | D | 223 | Z | 224 | A | 225 | G | 226 | B | 227 | T | 228 | K | 229 | M | 230 | S | 231 | AA | 232 | L | 233 | I | 234 | F | 235 | O | 236 | U | 237 | C | 238 | W | | | | | | |

LAST MONTH'S SOLUTION Mickey Mantle (Quotable) From Sidelights, "Hall of Famer Mickey Mantle after learning that Kansas City Royals' star Bo Jackson had settled for a one million dollar salary after asking for one million, nine hundred thousand dollars in arbitration 'The money Bo Jackson didn't get this year is more than I made in my lifetime as a player'" The (Memphis) COMMERCIAL APPEAL, April 16, 1990

