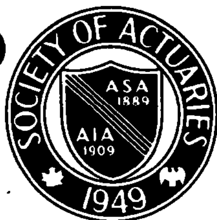

The Actuary

The Newsletter of the Society of Actuaries

VOL. 21, No. 1 January, 1987

A HALF-CENTURY OF MEMBERSHIP

Six who will join the Half-Century of Fellowship Club during 1987 are:

Clemens G. Arlinghaus
John J. Finelli
Lloyd K. Friedman
Muriel Mudie
Henry F. Rood
R. Arthur Saunders

These are the survivors of the 17 who attained Fellowship (in one of the Society's predecessor organizations) in 1937.

Associates who first qualified in that same year are:

Lincoln C. Cocheu
J. Gordon Fletcher
Richard A. Getman
Humbert J. Graziadei
Leon L. Long
Graham C. Thompson

With the addition of these 12, the half-century of membership clubs total 148 — 105 FSAs and 43 ASAs. These populations are slightly below those of a year ago, indicating that 1986 deaths more than offset the new members.

Other characteristics of these veteran, but mostly retired, members of our profession:

1. The median duration of the membership status is 55, but ranging from 50 to 67. Our most senior members, Bill Barber and Jim Hoskins, became Fellows in 1920.

2. The median age attained during 1987 is 82. Thirty were born before the turn of the century, and will be 88 or older. The eldest is Arthur E. Babbit, now 97 — the youngest, the above-noted R.A. Saunders, a Fellow at the tender age of 24, and not yet 74 today.

3. No less than ⅓ of the 105 Fellows became so in or before the calendar year

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BOOK REVIEW

Demography Through Problems, by Nathan Keyfitz and John A. Beekman. 1984. 136 pages (Springer-Verlag).

Reviewed by Robert L. Brown

Readers should have no need for a lengthy review of the depth of knowledge these two distinguished authors have in the field of Demography. In total, they possess over a century of writing, research, and teaching experience in this field.

The topics covered in this book include: Populations that are not Age-Dependent; The Life Table (much of which is a review to someone having studied Life Contingencies); Use of Stable Theory; Births and Deaths under Stability; Projection and Forecasting; Stochastic Population Models.

In the preface the authors point out that "The book...is an experiment in the teaching of population theory and analysis". Of the 136 pages, only 18 are given over to narrative. The rest of the text consists of a "sequence of problems (338) where each is a self-contained puzzle, and the successful solution of each puts the students in a position to tackle the next, as a means of securing the active participation of the learner and so the mastery of a technical subject".

Whether the book is completely successful in this regard may be open to debate. We have used the text at the University of Waterloo for the last two years and have been totally delighted with it. It is brief but clear and almost without error (I have found only one!).

However, a text that is suitable in a lecture/tutor environment does not necessarily translate perfectly into the correspondence mode of the Society.

And more's the pity. Since the totally

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RECENT SOCIAL SECURITY AND MEDICARE ENACTMENTS

By Robert J. Myers

The massive Tax Reform Act of 1986 and the Omnibus Budget Reconciliation Act (both enacted into law in October) contain a number of significant changes in the OASDI and Medicare programs. Also, in the legislative process a number of significant matters were passed by one body of Congress, but were not agreed to in conference; such matters are sometimes indicative of action which may occur in the future.

The principal effect of the Tax Reform Act on the OASDI program was an indirect one. The lower income tax rates reduce the transfer (of income taxes received on part of SS benefits) to the OASDI funds. The result will be slightly decreased income to these funds, representing 0.07% of taxable payroll on a level-cost basis.

The Tax Reform Act also contains provisions with regard to the coverage of ministers and members of religious orders. Such persons who had previously opted out on grounds of religious principles or conscience are permitted to withdraw their election and be covered in the future. The requirements for newly ordained pastors opting out were tightened.

The Budget Reconciliation legislation contains a number of changes. The major OASDI change was the permanent elimination of the "3% trigger" for providing the cost-of-living adjustments each December, resulting in a 1.3% COLA first payable in early January 1987. Elimination of the trigger requirement also affects the maximum taxable earnings base and the exempt amounts in the retirement test, which increase only when a COLA is granted.

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The Actuary

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LONG-TERM CARE

We are pleased to see what appears to be a real interest among some actuaries and some insurers in insurance for long-term care. A Society seminar on this subject was held in October, and one of its faculty wrote an article for this newsletter (Heidi Rackley: December). We consider this article a fine introduction to a complex and difficult, but important, subject.

Those of us already elderly have come to realize that the financial problems associated with old age are not where we once thought. Social security and private pensions have gone far to provide the necessary income, and Medicare and its private sector supplements have done much to relieve our concern about the high cost of medical care. As long as they can live in their own homes and generally take care of themselves, most of our elderly find themselves in at least "comfortable" circumstances. Their greatest fear is the possibility of having to move into a nursing home.

Ms. Rackley has shown us that nursing home financing, at least as it exists today, comes from only two important sources: (1) the not-too-deep pockets of the affected person, or relatives, or (2) Medicaid. The latter is available only after the first source has dried up, leading to that especially unhappy situation — the one-time-self-sufficient individual whose financial resources have already been spent on custodial care, and who now has no alternative but public welfare (Medicaid variety). Although CCRCs (Continuing Care Retirement Communities) once offered guarantees as to long-term care, few of them are able to do so today.

It is heartening to know that the first steps toward the wide availability of long-term care insurance are being taken. It is only recently that insurance companies were in the field at all, and even more recently that the larger and better known companies have become involved. While it is true that long-term care insurance is in its infancy, that only an idemnity benefit is generally available, and that the requirement of a previous hospital stay makes too many ineligible, it is also true that a variety of kinds of services are covered, and the maximum period for which benefits can be paid has become rather long.

We can assume that insurers recognize the need for long-term care insurance, and that their natural reluctance to join this confusing fray stems from concerns about product development, underwriting, marketing, and especially pricing. Imaginative product design should assure a market, imaginative underwriting should be able to control anti-selection, and the statistics needed for adequate pricing should develop, once we have the courage to try.

Ms. Rackley ends her article with a challenge: "Actuaries have a unique opportunity to contribute to the development of products and services for this evolving market". We can only add a fervent AMEN.

C.L.T.

WORKDAY PROBLEMS

As claim manager for an insurance company writing group long-term disability contracts, I have the responsibility for my company's action in a dispute with a disabled claimant. The facts, as we see them, are these:

The certificate holder, a former employee of our group policyholder, has been disabled since 1979, and has been receiving monthly payments, after offset for Social Security, of about $400. These payments will cease in a few months when the claimant attains age 65.

Very recently we have ascertained that our claimant has also been receiving payments of about $100 monthly from a defined contribution retirement plan, sponsored by our group policyholder but funded through another insurer. Our group contract gives us the right to offset "periodic retirement benefits...under or by reason of any annuity or pension contract...in respect of which the policyholder shall have paid all or a portion of the cost or made payroll deductions."

We have written to the claimant telling her of this provision, notifying her that the payments for the few months remaining will be reduced to about $300, *and* asking her to refund the payments which should have been offset in the past. These amount to about $4,800.

The claimant feels that this offset, even though it may be justified by a strict construction of the policy language, should not be applied in the instant case. Her argument is essentially as follows:

1. Although she can understand the offset of any other *disability* benefit, she sees no reason for the offset of an *old-age benefit*, especially one that would not normally have commenced before the expiration of the disability coverage at age 65.

2. She claimed the pension at age 61, four years early, as she had the clear right (though no obligation) to do; but she would surely *not* have elected a smaller pension at age 61 (in lieu of a larger one at the normal age of 65) had she known about the offset. It has the effect of paying the $100 to us instead of

(Continued on page 3)

DEATHS

Peter R. Lane	ASA 1978
Carroll E. Nelson	FSA 1929

SOLUTION MANUALS — PROBLEM WORKSHOP

Solution Manuals by Dr. Ralph Garfield are now available:

PART 2 (Nov. '81 and May '82) $18; (May '83 and May '85) $20.

PART 3 (2 practice exams and solutions) $29; (Nov. '84) $14; (Nov. '85) $14; (May '86) $16; (Nov. '86) $17.

PART 4 (2 practice exams and solutions) $30; (May '84 and SOA practice exam) $32; (Nov. '85) $16.

EA-1 (May '84) $15; (May '85) $15; (May '86) $16.

An intensive three-day workshop for the Basic Pension Math Segment of the EA-1 exam will be given in New York City, April 24, 25, 26.

Order through, or get further information from, Actuarial Study Materials, Box 522, Merrick, NY 11566.

Workday Problems

(Continued from page 2)

to her. She could hardly be expected to be aware of the fine print in her certificate issued many years ago, and we gave her no warning of this provision when her claim was first filed.

3. If we insist upon the offset, she will ask the pension insurer to reverse her earlier decision to claim benefits early, and make the pension effective at age 65. Once this reversal occurs, we will have no claim to an offset.

This claimant has not consulted a lawyer, and says she will not do so; but she seems to have an actuary with LTD experience advising her.

Given this situation, what should our decision be? Should we hold to our initial position, give in to hers, or work out something in between? ☐

BRAGG 1986 NONSMOKER AND SMOKER MORTALITY TABLES AND UNDERWRITING REPORT

By W. Allan Keltie

John M. Bragg has published the results of an inter-company study of the effect of cigarette smoking on Ordinary Insurance mortality. A questionnaire distributed in the Spring of 1985, to companies whose Ordinary business-in-force aggregated one-half of all such business in the United States and Canada, indicated an urgent need for information about non-smoker and smoker mortality for males and females separately and other relative information.

The new mortality tables represent the 1980-1984 experience of 15 small, medium and large companies who submitted data for analysis. With over 4.4 million policies exposed and 6,159 reported deaths, the study should give a reliable measure of current Ordinary mortality.

The 67-page report contains select (15 years) and ultimate mortality rates for individual ages 15 through 65 (anb and alb) at issue, males and females separately for nonsmokers and smokers.

In addition to mortality rates the report covers:

1. An analysis of the data.
2. Methods of construction of tables.
3. Closeness of fit of data to published rates.
4. Trends in smoking habits.
5. Effect of misrepresented smoking habits.
6. Defenses against such misrepresentation.
7. Comparison with other mortality tables.
8. Causes of death nonsmokers vs. smokers.
9. Underwriting Guide supplement (22 pages).

With the February 1986 deadline for companies to submit their experience, the publishing of the complete report on July 21, 1986 must be a modern record for a comprehensive inter-company research project of this magnitude. The tables will be updated as experience becomes available.

Copies of the report, protected by copyright, are now available to other companies at the same rate charged original subscribers to the project. ☐

SMOKER / NONSMOKER ERRATA

By Robert J. Johansen

In the report of the Committee on Smoker/Nonsmoker Mortality Tables, *TSA* 1982 Reports, p. 343, there is a discrepancy between the Appendix E and Appendix F mortality rates for ANB Male Nonsmoker age 71. Appendix E, which develops the Smoker and Nonsmoker rates, shows 38.31; Appendix F shows 38.91 or a 1.6% difference. Because the difference is so small and the Appendix F figures had already been adopted by the NAIC, the NAIC Life and Health Actuarial Task Force decided that no action need be taken.

Unfortunately, the corresponding Appendix F ANB CET mortality rate and the ALB age 70 and 71 CSO and CET rates were based on the Appendix E figure, 38.31. Thus, they are not obtainable by formula from the Appendix F figure. Again, the differences are small, as shown by the table below.

In a letter dated August 26, 1986, addressed to the Chairman and Vice-Chairman of the NAIC Life and Health Actuarial Task Force, I called attention to the discrepancies and suggested that, in view of the smallness of the differences, either the Appendix F figures or the formula figures be acceptable. The NAIC Task Force agreed and will recommend to the NAIC that the discrepency be noted and that either value be acceptable for all regulatory purposes.

Table	Age	Based on Appendix E	Based on Appendix F	Differences
CSO ANB	71	38.31	38.91	0.60
CSO ALB	70	36.44	36.73	0.29
CSO ALB	71	40.39	40.70	0.31
CET ANB	71	49.80	50.58	0.78
CET ALB	70	47.37	47.75	0.38
CET ALB	71	52.51	52.91	0.40

THE PENSION TAX SHELTER

By C. L. Trowbridge

That the qualified retirement plan has important income tax advantages, especially to the benefited worker, has long been well known. Employer contributions to such plans, as well as the investment earnings on the contributions, are not taxable to the individual until the benefits are actually paid. The tax on pension contributions is long deferred, the employee enjoying the interest on the lower taxes in the meantime. Employee contributions to these same plans, however, are not treated so favorably, only the interest, and not the contribution itself, being tax-deferred.

It has been public policy that retirement plans are to be encouraged, and that the tax laws are the vehicle for such encouragement; but it is also public policy that pensions cannot discriminate in favor of the highly paid. The myriad of rules surrounding "qualified" pension and profit-sharing plans is largely intended to prevent such discrimination.

Given the favorable treatment that the tax law has long given employees under qualified retirement plans, it is not surprising that the pressure to extend this favorable treatment has been great. This pressure has been exerted in at least two directions — the extension of favorable treatment to additional groups, and the substitution of the full tax deferral (on the employee contribution and interest) for the more limited deferral of interest only.

This article is an outline of these two kinds of extensions of the qualified retirement plan tax-shelter, how they have occurred, and how they are now affected by the most recent changes in income tax law. The expansion of the pension tax shelter is one of the factors in a deteriorating tax base, a trend that the new tax law attempts to reverse.

Extensions outside the qualified area

The very first of the several extensions of the retirement plan tax shelter to other than employees under qualified plans came very early. State, local and federal goverments pay no income taxes, but they offer retirement plans, some of which are qualified, but some of which are not. As a practical matter, governmental retirement plans get the same favorable tax treatment, regardless of whether the plans are technically qualified. Whether a decision as to this matter was ever made via some rational process, or whether the extension of the qualified plan tax treatment to employees under non-qualified government plans was simply assumed, this author has no knowledge. Nonetheless it is clear that this was the result and that the same is true as to plans of other non-profit employers. Today, employees of entities that pay no tax usually enjoy the tax advantages of qualified plans, even when these plans are not qualified and even though the non-discrimination rules may not be met.

The tax deferral for business, government and non-profit employees having been well established soon after WWII, agitation soon began for giving the small businessman, the farmer, and other self-employed a similar opportunity. Eventually the laws were changed to give the self-employed a route to the tax deferral objective through what is known as the Keogh or HR10 plan.

With the extension of the idea to nearly any form of paid endeavor, and to owners as well as the employees, there remained only the employee of an employer without a retirement plan who could not somehow enjoy the tax advantages of pension deferrals. Even this hole was filled with the coming of IRAs in the 1970s. Although originally only for those who did not enjoy the tax deferral in some other form, IRAs later became available to most employed individuals, though subject to certain maximums, and to some penalties on early withdrawal.

Full deferral in lieu of partial deferral

Although the quite different treatment of employer and employee contributions has been generally sustained over the years, there has been substantial shifting out of the traditional employee contributions (with limited tax appeal) and into forms that are more fully tax deferrred. We will here look at some of the ways in which this shifting has taken place.

That non-contributory plans are more "tax effective" has been a part of the general wisdom for quite some time. The great majority of negotiated retirement arrangements are employer-pay-all, and contributory plans are less common, even among salaried employees, than they once were. As employers find it desirable to "improve" their plans, at least one of the ways they have of doing so is to absorb some or all of what otherwise would be an employee contribution. There has been, then, a drift toward fully tax deferred plans, entirely apart from any changes in the IRC.

More important, however, is another development. Employee and employer contributions are only marginally separable. Both arise from the compensation that the employer pays the employee for the services that the employee renders. Does it make any real difference whether an employee's salary is stated as 100, of which he contributes 6 to a retirement plan, while the employer contributes another 6; or, alternatively, the salary is stated as 94, while the employer contributes 12 to a non-contributory plan? The take home pay in both cases is 94, and in both cases the flow to the pension arrangement is 12. Only the tax is different. This simple illustration shows that employee contributions change to the better treated employer variety without too much difficulty, unless the IRS, in an effort to protect its tax base, takes heroic steps to prevent it.

The foregoing occurred to pension experts long ago, and gave rise to what this paper will call the VPC (voluntary pay-cut) approach. For some reason the VPC approach first developed for employees of 501c(3) organizations and was later extended to public school employees. Under certain conditions the law permits these employees to take voluntary reductions in pay, and to invest the difference in TSAs (tax-sheltered annuities). Why these groups were singled out for this especially favorable tax treatment, or why annuities were favored over other ways of investing retirement monies, may be a subject for debate, but the TSA has long been with us and still survives. Not only can the required employee contributions change their spots, but the employee can elect to make additional tax-deferred contributions as well. TSAs have been especially popular among the teaching profession.

Another form of essentially the same phenomenon has been the so-called

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The Pension Tax Shelter

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non-qualified unfunded deferred compensation plan. In some cases these plans cover broad employee groups and in some key employees negotiate with their employers that part of their compensation currently earned be deferred. Under certain conditions these deferred compensation plans are permitted, though in this situation the employer gets no immediate tax deduction. ERISA limits these programs to a select group of management and highly compensated employees.

Government and other tax exempt employers may adopt deferred compensation plans under Section 457. Such plans are theoretically unfunded, but as a practical matter are very similar to TSAs.

Another development along VPC lines is the currently popular 401(k) plan, little different in principle from the TSA, except that the conditions imposed are somewhat different, and one that can be adopted by most employers. The Internal Revenue Code imposes some rules preventing 401(k) plans from being primarily for the highly paid.

Finally, the IRA, mentioned earlier as the ultimate extension of the "tax-shelter for pensions" idea beyond the corporate employee group, is also the ultimate extension of the concept of getting employer contribution tax treatment for what *surely* are contributions from the benefited individual himself. To take advantage of an IRA no employer financing is required, though if there should be some, that is fine too.

Where we stand today

By now the tax code has become very complicated. As each of these new approaches is developed, special rules and regulations are written, and these tend to be inconsistent. These special provisions accumulate, since none of these various approaches is ever completely abandoned.

The very newest approach to tax-reform, the TRA of 1986, does relatively little to the retirement plan tax-shelter, which remains very much alive and well. Because certain other kinds of tax-shelter were badly hurt by the recent efforts to preserve the tax base, the importance of the retirement plan in the tax planning of the American people may well be increased, even though, as many have noted, the tax rates themselves will be lower.

We must not leave the impression that the new tax law left retirement plans unscathed, because it is clear that there is a certain amount of tightening with respect to some of the forms mentioned. Especially were some of the limits on the maximum amounts of VPC tax deferral reduced (eg 401k and 403b); and the conditions under which a person might defer income via an IRA were made more stringent. For the very messy details, consult your favorite Employee Benefit Plan Newsletter. ☐

A Half-Century of Membership

(Continued from page 1)

in which they attained age 25.

4. The geographical distribution of present addresses, by state or province, is:

Ontario	26
Florida	22
New York	16
Connecticut	12
New Jersey	11
California	7
Other states	41
Other provinces	11
Foreign	2
Total	148

Note that the Canadian proportion is 25%.

5. There are only three women in this select group, all born before 1900. The most senior in terms of membership is Esther Johnson, FSA 1926.

6. Among the 105 half-century FSAs are 10 past-presidents of the Society, and two past-presidents of the American Institute of Actuaries, one of the predecessor actuarial organizations.

7. Dan Lyons, FSA 1930, was recently recognized by the *Actuarial Review* as a 50-year FCAS. There may be others who are 50-year Fellows in both Societies, but if so we are unaware. ☐

Recent Social Security And Medicare Enactments

(Continued from page 1)

This legislation also makes clear that the cost of the provision that no beneficiary will receive a decrease in the benefit check, after taking into account the counterbalancing effects of the COLA and SMI premium increase, will be borne by SMI, not OASDI.

In the past there have been times when interest-bearing government obligations have been converted to non-interest bearing book entries, an action of the Treasury to avoid the public debt limit. This "disinvestment" or "delayed investment" issue created quite a stir in 1985. The Budget Reconciliation legislation restores any interest lost to the OASDI funds as a result of not being able to invest all net income at the beginning of October. The basis for depositing the OASDI-HI contributions by state and local governments was also changed, so that these will be transmitted by each entity separately rather than through centralized state agencies. The effect should be to speed up the transfer.

The Budget Reconcilation legislation made a number of changes in the Medicare program, although many of those related to the reimbursement of hospitals and other suppliers which will not be dealt with here. The change that will be most widely felt by beneficiaries is that the initial deductible for HI for 1987 will be less than would have occurred under prior law. This deductible would have been $572, but was lowered to $520. It is interesting to note than an arbitrary increase occurred for 1982; if this had not been made, and there were no decrease in the recent legislation, the result would have been $508. In the future, the deductible amount is to be indexed by changes in the hospital-cost "market basket" index, with adjustment to reflect changes in the case mix. The indexing was formerly done on the basis of the average per-diem cost for inpatient hospital services for the HI insured, but this has produced faulty results for the last two years, because the average duration of hospitalization has decreased significantly, thus causing an artificial rise in the average *daily*

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CALENDAR DAYS — WITHOUT A CALENDAR

By Peter L.J. Ryall

This article gives a concise, easily remembered way to determine the exact number of days between two specified dates, without reference to the number of days in each of the intervening months.

The following procedure will assign to any date in the 20th or 21st centuries (from March 1, 1900) a "day number" (DN).

(1) Write each date as a year-month-day triplet — y,m,d. (Use only the last two digits of the calendar year for 20th century dates, but after the turn of the century add 100). Examples: 87-1-25 and 102-7-15.

(2) Convert to a year beginning on March 1 instead of January 1 — y',m',d by subtracting 2 from m if m is 3 or greater, or adding 10 to m (and subtracting 1 from y) if m is 1 or 2. Examples above: 86-11-25 and 102-5-15.

(3) Calculate DN = [365.25 y'] + [30.59 m'] + d, where [ ] means "greatest integer in". Continuing same examples:

DN January 25, 1987 = 31411 + 336 + 25 = 31772
DN July 15, 2002 = 37255 + 152 + 15 = 37422

(4) The difference between the DN's is indicative of the number of days between. In our example July 15, 2002 falls 5650 days after January 25, 1987.

The third term of the algorithm for day number is self-evident. The first term will be understandable if one recognizes that a year has 365 days, except one extra day in every year divisible by 4. The integral part of the 30.59 is the 30 days that are part of every month (except February); but the decimal .59 needs further explanation. It is needed to correct for the 31 days in 7 of the 12 months, and will be explained in reference to the following table.

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
m'	1	2	3	4	5	6	7	8	9	10	11	12
a	1	0	1	0	1	1	0	1	0	1	1	
b	0	1	1	2	2	3	4	4	5	5	6	7
c	.59	1.18	1.77	2.36	2.95	3.54	4.13	4.72	5.31	5.90	6.49	7.08

Line a shows the extra day for each of the 31-day months. The length of February is omitted, since it is recognized implicitly as the balancing period at the end of the year.

Line b accumulates the extra days of line a for previous months.

Line c is .59m'. When the decimal fractions are dropped from line c, it reproduces line b.

If the coefficient .59 is reduced below 7/12, the 7.08 on line c becomes less than 7, and the day numbers for February become too low: if the .59 is increased to 3/5, the 2.95 and 5.90 on line c are increased to 3 and 6, and the day numbers for July and December become too high. The .59 is therefore not unique. It can be replaced by any amount greater than or equal to 7/12 but less than 3/5.

It is also possible to apply a similar algorithm in reverse. Here the DN is the given and the date is to be determined. The DN of the date 1000 days after January 25, 1987 must be 32772, but what date has a 32772 DN? Here the algorithm is as follows:

$$\frac{DN(y', m', d) - 30.1}{365.25} = y' + f1 \quad , \quad 0<f1<1$$

$$\frac{[365.25\ f1 + 31]}{30.59} = m' + f2 \quad , \quad 0<f2<1$$

$$[30.59\ f2 + 1] = d$$

This means that, for DN = 32772,

$y' = 89$ and $f1 = .6424$

$m' = 8$ and $f2 = .6630$

$d = 21$

$m = 10$

The desired date, 1000 days after January 25, 1987, turns out to be October 21, 1989.

Here one must remember to convert from years beginning in March to the traditional year beginning in January.

I leave to readers how the 30.1 and 31 figures were derived, giving as clues only that the former could just as well have been any value greater than 30 and less than or equal to 30.25, and that March 1, 1900 (when y',m', and d are 0,1,1) is day 31.

The DN algorithm presented here works fine without further correction for dates in the 20th and 21st centuries because the Gregorian correction does not affect the leap-year 2000. The omissions of the 1900 and 2100 leap-years (years divisible by 100 but not by 400) require a small correction if the range is to be extended beyond these two centuries. Even this matter can be accounted for if we add a fourth term to the procedure for DN. The additional term is

$$- [.75(1 + [.01\ y'])]$$

I am indebted to a colleague, Beda Chan, for the observation that the DN also indicates the day of the week. Divide the DN by 7, and write down any remainder. If the DN is divisible by 7 the corresponding date is a Monday; but each unit of remainder advances the weekday by one. Our earlier examples, January 25, 1987 and July 15, 2002, fall respectively on a Sunday and on a Monday.

I have also become aware, but only after I had worked this out for myself, that others have worked along simila. lines. Texas Instruments has a method that handles leap-years and the Gregorian correction in much the same way as mine, but deals with differing month lengths quite differently; and their formulae are much more difficult to remember. □

Recent Social Security And Medicare Enactments

(Continued from page 5)

cost, as the higher costs of the first few days were averaged over a shorter period.

SMI benefit coverage was slightly liberalized by including as a covered expense the services of independent occupational therapists, similar to the previous provision for physical therapists; but SMI benefits were deliberalized slightly by providing that services in Ambulatory Surgical Centers would be subject to the usual cost-sharing.

The procedure for Medicare being secondary to private group insurance was extended to certain of the disabled.

Physician fees recognized under SMI were frozen from July 1984 through April 1986. A small increase was given thereafter to physicians who accepted assignments from all patients, but the freeze extended through 1986 for others. Under the new legislation all physicians receive a 3.2% increase in their recognized charges for 1987, with future changes to be based on the Medicare Economic Index. The result will be that nonparticipating physicians will always have a prevailing charge structure 4% lower than participating physicians; and they can increase their charges to Medicare patients by only 1% in 1987, unless their 1986 charges were less than 115% of the 1986 "recognized" charges.

Now, turning to matters that passed either the House or the Senate but were not enacted, perhaps the most significant dealt with the subject of disinvestment of the assets of OASDI, HI, and SMI Trust Funds. The House, by a vote of 401 to 0, passed a very strict provision that would absolutely have prevented disinvestment (in H.R. 5050, the Social Security Administrative and Investment Reform Act of 1986).

The Senate was about to adopt similar language in other legislation, but had second thoughts when some Senators realized that this could bring about the intolerable situation that OASDI benefit checks would not go out in the event of a congressional hassle over the public debt limit. As a result, the Senate passed a provision permitting disinvestment *only* if this were necessary to pay OASDI benefits in a timely manner and only to the extent necessary to do so (with later complete restoration of the previous status quo as to the investment portfolio and interest income). Neither the House nor the Senate, in the busy closing days of the session, would compromise, and so both measures died.

The same House legislation as the disinvestment provision had extensive language establishing the Social Security Administration as an independent agency, separate from the Department of Health and Human Services. Advocates of this legislation (including the author) believe that this is very desirable, so as to have fewer bureaucratic layers on top of the SSA and to have a bi-partisan Board administering it. Although a number of Senators had previously supported this approach, insufficient time was available for any further action.

The Social Security Amendments of 1983 removed both OASDI and HI from the Unified Budget, beginning with fiscal year 1993. The advocates of this approach (including the author) supported this action on several grounds. First, these programs are supported with their own sources of revenue and did not (and would not) contribute to budget deficits over periods of years. Second, any changes in the programs should be made for program reasons, not budget ones. The operations of OASDI were, by legislation in 1985, removed immediately from the Unified Budget (but are, anomalously, included in the determination of whether the deficit-reduction targets under the Gramm-Rudman-Hollings Act are met). The House-passed budget reconciliation legislation provided for similar treatment for the HI Trust Fund, but this was not agreed to by the Senate.

Beginning in April 1986, all new hires of state and local governments have been compulsorily covered for HI. The Senate adopted a provision in the budget reconciliation legislation that, beginning in 1987, *all* state and local government employees would be so covered. At one point in the legislative maneuvering, the House and Senate conferees agreed on this matter, except that the tax would be phased in; but in the end the provision was deleted from the legislation. □

LETTERS

Two Professions?

Sir:

The October Editorial "Are We Two Professions?" raises a very relevant question at the start of the new "financial services" era.

With all the professions gradually encroaching into each other's territory (except that defined on a statutory basis), small professions like the actuarial profession can ill-afford to split. Surely we need a combined front not only in our own countries, but on a worldwide basis, to survive, to market and to sell ourselves.

We need a simpler and more understandable definition of our skill. Currently we tend to be judged by what we do, e.g. pensions experts, rather than by reference to what we are able to do and what skills we possess.

The actuary puts a value on all the financial aspects of the future whether this be for:

Companies or individuals
Life insurance companies
General insurance companies
Pension funds

(or indeed any organization with the need to assess the worth of a future liability or asset or the financial implications of a given course of action).

Any "risk" can be valued (using actuarial techniques) on this basis.

If an accountant assesses the cost and implications of the past years' results and trading, an actuary assesses the financial impact of the future. This, I submit, is what we should be promoting.

I would be grateful for any views.

W.N. Anderton
Surrey, England

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Mortality Among Actuaries

Sir:

During recent years I have seen various tabulations in *The Actuary* concerning the membership of the Society of Actuaries and of its two predecessor organizations. These tabulations are nostalgic to me and I believe they are provocative to our most recent members. It must be of interest to the new Fellows admitted to the Society of

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Letters

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Actuaries in 1976 to realize that they outnumbered the entire membership of the American Society of Actuaries in 1939, at which time I first began to study for the actuarial examinations.

Until now I have restrained myself from making any comment or observation. The September issue printed an article on Mortality Experience Among Actuaries by Mohamed F. Amer. The November issue included a letter on Age at Fellowship by Charles N. Walker. I have worked with each of these individuals, and I know that each possesses the expertise to recognize the flaws inherent in their analyses. At the same time, I must admit that each was working with limited data, and it is often the function of the actuary to proceed with available data, however limited, in order to arrive at the most logical conclusion based on such data.

Mohamed has done a fine piece of work to produce an abridged life table based on the scant data which appeared in the February 1986 issue. That data reported numbers of new Fellows year by year from 1920 to 1936 inclusive. It also included the number of survivors to 1949 and to 1986. One fact which Mohamed probably did not know is that nine of the terminations, representing the difference between the number of new Fellows and the survivors to 1986, resulted from resignation, rather than death. But my more serious complaint is that he used a single life table as a standard of comparison to cover an exposure period of more than 65 years.

I will grant that the 1958 CSO table was based on experience that was nearly central to the period of exposure we are dealing with. To use such a table on a stationary population when no convenient alternative is available can be excused as an expediency. When the exposure consists of a closed group that is aging over a period of 50 years, it fails to take into account the nature of the progression of mortality rates over those 50 years. The small overstatement in the mortality rates for the young ages during the 1920's, 1930's, and 1940's does not begin to compensate for the substantial overstatement in the mortality rates for the older ages in the later years.

The importance of this can readily be seen by looking at three of our important mortality standards: the 1941 CSO, the 1958 CSO, and the 1980 CSO. The difference is apparent by comparing the sums of the values of q for ages 25 through 49 and for ages 50 through 74. Although the individual sums differ substantially, when given equal weight the differences are minimized. For the case in point, where the older ages are more heavily weighted toward the more recent table, the inequality becomes a serious concern. The sums themselves for the 1941 table are .14637 and .91941; for the 1958 table they are .08857 and .73681; and for the 1980 table (using male lives) they are .07466 and .59439. The impact of this change on a closed block of business is quite striking.

As an observation, I have found it to be a mistake that is not uncommon, even among expert students of mortality, to derive a composite mortality ratio by weighting the individual ratios by the volume of exposures. The accurate way, however, is to weight the individual ratios by the volume of deaths. More than 50% of the deaths in the group under consideration here occurred in 1969 or later.

Mohamed also presumed that the average age for attaining Fellowship was no less than 30. Chuck Walker explored this by the only means conveniently available to him. He referred to the obituary notices in the *Transactions* to get dates of birth, and hence average age at Fellowship. He reported the results of an analysis of a sample of 97 cases. He does not indicate the method of selection of the sample, nor does he comment on the validity of Mohamed's presumption. The sample size was quite adequate if it was randomly selected. If the sample was biased towards recent deaths, it would include an inherent bias toward a younger age at attainment of Fellowship. What is lacking is the consideration of the dates of birth of the 100 or more survivors, and what would be the effect of including these individuals when calculating the overall average age of Fellowship.

When age is measured as the age nearest birthday, it so happens that the average age at Fellowship of the deceased members of our group is fractionally over 31. For the survivors, however, the average age is more than three and one-half years younger — less than 27.5. For the aggregate group, including the nine who withdrew, the average age is fractionally less than 30 — in fact, 29.85.

These numerical observations of mine are limited to those who became Fellows in the years 1920 to 1936 inclusive. They are based on dates of birth for this group and they reflect the imposed delay until attainment of age 25 on a rather substantial number of our younger students. This restriction was apparently overlooked in the case of at least nine of the group in question, seven of whom are still living and I will not mention their names. They themselves know who they are.

At least eleven of our past presidents completed their examination requirements prior to age 25, including William Anderson, as was reported by Chuck Walker. Actually, five of our past presidents were admitted to Fellowship between 1920 and 1936 at age 25 following a delay after successful completion of the examination requirements. It is also true that at least three of our past presidents were inadvertently admitted as Fellows before age 25. One of those was the late John S. Thompson Sr., and another was Dennis Warters, also deceased. The third is still living and I will not mention his name.

John H. Cook

Book Review

(Continued from page 1)

justified removal of *"Introduction to Demography"* by Spiegelman, there has been virtually no truly Demographic material on the Associateship syllabus and little in total. Demography is important enough to all actuaries (and vital to many) that it at least warrants elective status in the new flexible syllabus.

This book was plainly written specifically for that reason. It obviously satisfies the page-count paranoia of the Society, but only by introducing some pedagogical weaknesses. Without at least an accompanying study note, this text may prove difficult for the correspondent student.

However, for those with special interest in Demography, I highly recommend this carefully presented text and sincerely hope that it will someday find its place on the Society's syllabus. □