The Actuary

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Bowditch

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including many in Bowditch's own handwriting, are in the Baker Library, Harvard Business School, Boston, Massachusetts.

While Bowditch's title was simply that of "Actuary", he was responsible for the entire management of the company in a way that would be characterized today by the title Chief Executive Officer. The company was one of the very early life insurance companies in the United States. It underwrote life insurance and also offered a variety of trust services. It was in the latter sphere that the company was most successful; of its assets, in excess of $6 million by the time Bowditch died, the major part was associated with its trust business. Profits, part of which were given to support the Massachusetts General Hospital, came primarily from the investment income in its trust business. Bowditch personally supervised the investment operations. He was a shrewd judge of investment quality and aggressively pursued mortgage loans in rural Massachusetts at a time when such loans were widely regarded as excessively risky.

Bowditch prepared most of the company's financial reports and its advertising and promotion material, and his staff generally consisted of not more than 10 persons. One is left with almost a feeling that he emptied the wastebaskets, too.

One responsibility Bowditch did not have because it did not exist, was supervising a field force. In those days marketing life insurance by agents was regarded as unseemly; it was not practiced by his company.

A remarkable aspect of Bowditch's career was that he was almost entirely self-educated with but a few years of formal schooling. His scientific achievements were recognized in several ways, such as by election to the presidency of the American Academy of Arts and Sciences, honorary M.A. and LL.D. degrees from Harvard, and appointment as an overseer of Harvard. The long list of his achievements and honors in mathematics and science makes one suppose that he might have made outstanding contributions to the field of actuarial science.

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THE 1979 ANNUAL REPORT OF THE TRUSTEES OF THE U.S. SOCIAL SECURITY PROGRAMS — OASI AND DI

by Dwight K. Bartlett, III

Ed. Note: We welcome this review by the new SSA Chief Actuary. A companion article on HI and SMI will appear separately.

This report, the 39th, measures the financial soundness of the Old Age and Survivors Insurance (OASI) and Disability Insurance (DI) programs, employing three sets of demographic and economic assumptions—labelled optimistic, intermediate, and pessimistic. The principal elements in these assumptions are displayed in the following table.

Principal 1979 OASDI Trustees Report Long-Range Cost Assumptions

ITEM	OPTIMISTIC	INTERMEDIATE	PESSIMISTIC
Fertility	Ultimate 2.5 reached in 2005	Ultimate lifetime rate of 2.1 children born per woman in 2005 from 1.793 in 1979	Ultimate 1 5 reached in 2005
Mortality	Average annual improvements of 50% of intermediate improvements	Improvements similar to 1969-76 continued to 1981; similar to 1951-69 thereafter forever Overall improvement 32 7% by 2050	Average annual improvements of 150% of intermediate improvements
Disability Incidence	No increase over estimated 1977-78 experience rates	Ultimate 10% increase over estimated 1977-78 experience rates	Ultimate 20% increase over estimated 1977-78 experience rates
Disability Termination	Actual 1973-77 experience rates	Actual 1973-77 experience rates	Actual 1973-77 experience rates
Annual CPI Increases	Ultimate 2%	Ultimate 4% in 1984 graded from 9.4% in 1979	Ultimate 6%
Annual Gain in Real Earnings	Ultimate 2.25%	Ultimate 1.75% in 2000	Ultimate 1 25%
Unemployment	Ultimate 4%	Ultimate 5% in 1983 graded from 6% in 1979	Ultimate 6%

For the next five years (1979-1983), under the optimistic and intermediate assumptions both trust funds maintain reserves and receive revenues adequate to meet current obligations. But under the pessimistic assumptions cash-flow problems begin in 1983 in the OASI fund, its reserves having declined to 8 percent of annual disbursements. Year-end reserves would not even cover a single month's benefits. In contrast, the DI trust fund would have adequate cash on hand even under the pessimistic assumptions, with reserves actually growing substantially.

For the medium-range future (1979-2003), the optimistic and intermediate assumptions continue to show income exceeding expenditures in both funds. Under the pessimistic assumptions, the OASI cash-flow problems would persist until 1991 or 1992, diminishing then because of the increase in tax rates scheduled for 1990.

For the long-range future (1979-2053), the optimistic assumptions produce 75-year revenues exceeding expenditures on the average. There would be a 15-year period, 2025-2040, during which expenditures would exceed revenues. Under the

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intermediate assumptions, annual deficits begin to appear about 10 or 15 years after the turn of the century and continue through the remainder of the 75-year actuarial measuring period. On average throughout the whole period, the deficit would be about 9 percent of the expected expenditures. Under the pessimistic assumptions, a deficit similarly would appear around 2005-2010 and continue throughout the remainder of the measurement period; on average this deficit would be about 38 percent of expenditures.

The Trustees state "that a severe or prolonged economic downturn could jeopardize the short-range actuarial soundness of the Old Age and Survivors Insurance program." They recommend that "no reduction be made in the scheduled revenues of Old Age and Survivors Insurance and Disability Insurance trust funds without making provisions for offsetting reductions in expenditures or alternative financing arrangements", and that "it might be advisable to examine the need for flexibility to reallocate funds between the two trust funds in the short run."

Short-Range Projections

Shown here are income and outgo, as well as reserve balances, for 1978 and the next five years under the intermediate assumptions.

Estimated Operations of the Old-Age and Survivors Insurance and Disability Insurance Trust Funds, Combined, During Calendar Years 1978-83 (Intermediate Assumptions)

Amounts in Billions

Calendar Year	*Income*	*Disbursements*	*Net Increase in Funds*	*Funds at End of Year*	*Funds at Beginning of Year as a Percentage of Disbursements During Year*
1978	91.9	96.0	—4.1	31.7	37%
1979	106.4	107.6	—1.2	30.5	30%
1980	120.5	121.5	—1.0	29.5	25%
1981	140.3	135.2	5.0	34.6	22%
1982	156.9	148.9	8.0	42.6	23%
1983	170.8	162.1	8.7	51.3	26%

Annual deficits will continue through 1980, at which point revenues begin to exceed expenditures and trust fund balances start to rise again. The combined reserves expressed as a percent of annual outgo do not rise by much, however; they will hover around two-and-a-half to three months' benefits.

Medium and Long-Range Projections

The medium and long-range forecasts, representing 25-year and 75-year projections respectively, are sensitive to changing demographic and economic conditions.

The combined trust fund condition is actuarially sound over the next 25 years under all three sets of assumptions. Expressing the financial condition as a percent of taxable payroll (total earnings subject to social security tax), the Trustees project the following average surpluses through the year 2003:

Optimistic assumptions	1.75%
Intermediate assumptions	1.17
Pessimistic assumptions	.60

Under the pessimistic assumptions, those cash-flow problems in the OASI that begin around 1983, continue until 1991 or 1992. Then the problem fades because of additional revenues brought in by the scheduled 1990 tax-hike.

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Bowditch

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My investigation produced, however, no direct evidence of substantial actuarial work of an original and scholarly nature by Bowditch. He did publish a table for computing the interest on a trust deposit between any two calendar dates for any amount of deposit based on the principles of simple interest as a computational aid, which his Board of Directors authorized him to publish. Copies of these tables are still in existence. Apparently, his creative talents were directed, even in this period, to his mathematical interests. What shines through the extensive company papers that still exist, many of them in his own handwriting are his shrewd judgment and his human qualities.

Just as with present-day actuaries, one of the first items on his agenda as he assumed his responsibilities was to visit several of the life insurance companies of his time to familiarize himself with their work. The companies on which he called included the Pennsylvania Life Assurance Company in Philadelphia and the Union Insurance Company and the Mechanic Life Insurance and Coal Company, both in New York. The last named company was apparently more interested in its coal business than its insurance business since Bowditch's handwritten note of this visit concluded with "Finding myself not a very welcome guest, I asked no more questions." (Some insurance companies today might prefer to be in the coal business).

The other two companies were more significant factors in the life insurance business of that day. Both companies underwrote annuities and life insurance policies. Both companies used variations of the Northampton mortality tables as bases for both annuity and life insurance rates. Although some attempt was made to allow for the difference between annuitant and insured life mortality, Bowditch discerned that the allowance was not adequate. His financial analysis revealed that both companies were losing substantial sums on their annuity policies. The result was that the initial set of life insurance premiums he established for the Massachusetts Hospital Life Insurance Company was identical to the rates of the Pennsylvania Company but

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The results for the long-range projections, compared with those of last year's Report, are:

75-Year Projections of Combined OASDI Surplus (+)/Deficit(—) (% of taxable payroll)

	1978 *Report*	1979 *Report*
Optimistic assumptions	— .44%	+ .87
Intermediate assumptions	—1.40	—1.20
Pessimistic assumptions	—3.23	—4.69

Only the optimistic 1979 assumptions show the program in actuarial balance. As with the short-range and medium-range, the mix of conditions between the two programs has changed. As shown below, the DI results have moved from a deficit to a surplus condition while the deficit in the OASI program is slightly higher than was forecast in 1978, both under intermediate assumptions.

75-Year Projections of Separate OASI and DI Surplus (+)/Deficit(—) (%) of taxable payroll)

	1978 *Trustees' Report*		1979 *Trustees' Report*	
	DI	*OASI*	*DI*	*OASI*
Under intermediate assumptions.	—.14%	—1.26%	+.21%	—1.41%

The changes in surplus/deficit position of the two trust funds reflect primarily lower 1979 assumed rates of incidence of disability and mortality, reflecting recent favorable trends in these factors.

Copies of the 1979 Trustees' Report may be obtained by writing to the Office of the Actuary, Room 707 Altmeyer Building, 6401 Security Boulevard, Baltimore, Maryland 21235. □

Death

Raybon E. Turner—FSA 1974

C. E. isn't C.A., he's C. G.

Groeschell is Competition Editor, so in a sense he is C.E. But only by the editor's mistake was he shown twice in our April issue as Charles A. Groeschell. Our apologies to Charles G. Groeschell—we are happy to set this record straight.

PENSION MATHEMATICS

A new and up-to-date edition of the Barnett Berin book "The Fundamentals of Pension Mathematics" has just been published by William M. Mercer, Inc. The text has been edited by Lawrence N. Bader and the problems, including some new problems, by Kevin Cheslack-Postava. The cost of the 124 page book is $9.50. Letters should be sent to Pension Mathematics Book, William M. Mercer, Inc., 1121 Avenue of the Americas, New York, New York 10036. □

THE FUTURE AND YOU

Actuaries interested in attending the First Global Conference on the Future, July 20-25, 1980 in Toronto, would be well advised to register early. As the capacity for plenary sessions is limited, early registrants will receive preferential admission.

Individual registrations will cost $115.00 until *September* 30, 1979 and $145.00 after that date. Members of the World Future Society or the Canadian Association of Future Studies are entitled to a $20.00 reduction in fees. U.S. residents are expected to pay in U.S. funds, while Canadian residents may pay in Canadian funds.

Any actuaries who wish to register or who are interested in more details about this conference should contact the undersigned. Cheques should be made payable to the First Global Conference on the Future, Inc., and sent to:

Donald R. Anderson, F.S.A., F.C.I.A.
Finance Director
First Global Conference on the Future, Inc.
c/o D. R. ANDERSON ASSOCIATES
390 Bay Street, Suite 2020
Toronto, Ontario, Canada
M5H 2Y2 □

John O'Connor

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A job description? Yes, there's one of course. It's impressive; it's labyrinthine. We gather that its content has been the topic of some discussion and revision during Ardian Gill's Search Committee's discussions with John. We'll say this for it — its twenty-seven "principal accountabilities" ensure that O'Connor will have few idle moments.

Will he visit actuarial clubs and attend meetings of Society committees? Yes, he expects to do some of both, but less at the outset than later. He sees his immediate goal as applying his acquired management skills to ensuring prompt and effective staff help, to the end that Society projects shall smoothly and quickly become Society accomplishments.

The Yardstick

That job description says that John O'Connor must understand the needs of the profession and the functions of our several actuarial bodies; that he is to organize and direct the staff; and that there'll be scope for him to display the skills of a "communicator." We predict that as our members become acquainted with him, the expectancy will spread that his personal and professional qualities will prove ample match for these requirements. And members will find it pleasant to welcome him to our top staff post, and to do what each of us can to help him achieve a full measure of success and satisfaction in discharging his key role in the Society.

E.J.M.

Fact & Fable

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We're not where actors (dead) are
into,
Nor are accountants what we're kin
to.
We don't breed birds, we're not
uncouth,
"All right!" you bite, "What do you
doeth?"
Aha! Insurance-product pricing.
(Silence.) Isn't that enticing?

. . . . and thanks to James H. Hunt for sending in Ms. Fant's article. □