

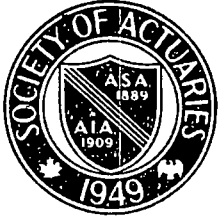


SOCIETY OF ACTUARIES

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FURTHER PERSPECTIVES ABOUT LONGEVITY

by Arthur Pedoe

Actuaries have been indebted to the Statistical Bureau of the Metropolitan Life for studies in vital statistics associated with the names of Dublin, Lew and Spiegelman and a recent study by Quint and Cody is in this tradition. It is headed *Preeminence and Mortality* and was presented to the Annual Meeting of the American Public Health Association last November. Jules V. Quint is Research Associate of the Company and retires next May after over 40 years in the Statistical Bureau.

The first sentence of the paper starts a train of thought: "It has been recognized since the early 1800's that there were wide differences in mortality by social class." I have a reference to a work by F. Corbaux in 1833: *On the natural and mathematical laws concerning population, vitality and mortality* which I understand deals with the mortality rates of different socioeconomic groups but on what statistics it is based I do not know. The first study known to actuaries is that by Dr. William Farr, Honorary Fellow of the Institute of Actuaries, and was made in 1851 as part of the work of the Registrar General's Office in England.

It does not require much prescience to recognize that education, standard of living, occupation and attitude towards healthy living determine the mortality of men and their families; these are all associated with the phrase "Social Class."

Some of the early life insurance companies were organized to take advantage of this. Andrew Webster has drawn my attention to J.I.A. 26.306 referring to an early prospectus of the *University Life* founded in 1825 which stated that of the

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GUIDELINES FOR PAPERS FOR THE TRANSACTIONS

by Josephine W. Beers

Chairman, Committee on Papers

Are you satisfied with the scope and the quality of the papers appearing in the *Transactions*?

If your answer is "yes," you need not read further; if it is "no," what are you going to do about it?

The Committee on Papers is charged with evaluating the papers submitted. We can do nothing about papers which are needed but which have not been written. Individual members might be asked to share their knowledge of particular subjects, but we believe that our Committee should not do the asking. It would be difficult for us to judge a paper fairly if we knew the identity of the author.

The Society members who, from time to time, have served on the Committee on Papers have expressed deep concern over both the gaps in our literature and the quality of the papers submitted. Various analyses have been made without, however, providing any suggestions for filling the gaps or improving the quality.

It may not surprise the members to learn that a very small percentage of our members, roughly 1%, submit papers. Even allowing for pressure of other duties, the percentage might well be a little higher.

The Committee is open to complaints from the members—we have had lots of complaints and few suggestions. Many of the complaints relate to the papers which are accepted and published, in particular to the large number of highly technical papers. The Committee has

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WASHINGTON STATE REGULATION: GOVERNING REPLACEMENTS

by F. E. Huston

Chief Actuary,

Washington Insurance Department

This discussion of the cost comparison formula is prompted by the following key observations in Stuart Robertson's excellent article in the November 1968 issue of *The Actuary*.

"Quite independently from the question of what interest rate the policyholder could earn, a case could be made for a 5% annual rate on the grounds that it is the rate specified in most policies for policy loan interest. The use of a 5% rate in the regulation's formula produces, except for the approximations noted (*), precisely the policyowner's cost for the insurance as it would be if he were to maintain a full policy loan. This is a cost figure that has meaning to the owner, and it is arrived at without subjective consideration such as the rate of interest that an investor might reasonably earn."

(*Possible minor refinements have offsetting effects, particularly since they apply also to the "proposed replacement." See final footnotes for details.)

The following interest bases are briefly discussed below in relation to replacement regulations: (1) The above "full policy loan" basis, (2) the bases used in this department's regulation, and (3) the "rate of interest that an investor might reasonably earn."

I. Full Policy Loan Basis

This basis, which gives the cost of the "decreasing term" element of the policy, was adopted by this department in September 1967 for a specific temporary purpose. A footnote required the net unit costs (after federal income tax) based on illustrative tax brackets of

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Longevity*(Continued from page 1)*

1,000 members of the University Club only 38 had died in three years which indicated "the profits likely to result from assuring the lives of members of the Universities." It was Charles Babbage, known to actuaries for his invention (1822) of an early calculating machine, called a "Difference Engine," who pointed out that on the assumption of the average age of 35, as the prospectus assumed, the 38 deaths were higher than would have been obtained had the mortality followed six of the existing mortality tables; the Carlisle Table would have given 31.3 deaths. This comparison of expected deaths based on a single average age is one of the errors perpetuated in the field of vital statistics.

Study of Fellows

In T.A.S.A. 39 (1938) John R. Larus gave a mortality study of Fellows of the Actuarial Society of America. There were only 120 deaths. A grouping by age attained using four U. S. white male population tables corresponding to the exposure of the Fellows in four periods from 1889 to 1937 gave the following results.

Attained Age	Actual Deaths	Actual/Expected
-49	15	40%
50-59	22	77
60-69	26	65
70-79	41	125
80-	16	101

In TSA XV and previously in TSA XII I gave the ratios of actual to expected deaths by social class from official investigations in England and the U.S.A. (white lives); the comparison being with the general population mortality tables. The period was 1949-53 for the former and 1950 for the latter.

England and Wales

I Professional and highest ranks of business	86%
II Managerial, owners of businesses, farmers, accountants	92
III Skilled occupations, clerks and salesmen	101
IV Partly skilled and agricultural workers	104
V Unskilled and labourers	118

U.S.A.

1. Professional	82%
2. Technical and managerial	84
3. Clerical, sales and skilled workers	96
4. Semiskilled	97
5. Laborers except farm and mine	120
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Agricultural workers	83

It is clear there are wide differences between the mortality of the professional (and business executive) and the unskilled labourer as one would expect. A cautionary note was outlined in TSA XII that statistical investigations of this kind, where we attempt to correlate figures from the census and death certificates, have their pitfalls: the apparent mortality of the higher social classes is exaggerated, which would increase the ratio of actual to expected for their class. The reverse would apply to the lower social classes. In fact the actual differences are greater than indicated in the previous table.

On the other hand the whole trend of social legislation is to increase standards of living and improve working conditions so that socioeconomic differences and hence the mortality differences they engender should decrease. However a reference in Quint and Cody's paper that such differences have been eliminated in Amsterdam, remembering that Holland has one of the lowest death rates in the world, arouses one's skepticism.

Who's Who in America

Quint and Cody made a 12 year follow-up for the years 1950 to 1961 of some 6,000 distinguished professional and business men in *Who's Who in America* (one sixth of all men named) and worked out the ratios of actual to expected mortality for a number of professions and occupational groups using as the base the general U. S. white male population mortality tables for the same period. The overall ratios were as follows.

Ages		Ages	
45-49	58%	65-69	68%
50-54	53	70-74	75
55-59	56	75-84	73
60-64	61	85-	75
Ages 45 and over 70%			

Note the lowest ratios in the 50-59 age groups. They state that "this contradicts

the belief in some quarters that the mercilessness with which men may drive themselves during their 40's to outstanding positions in their careers is reflected in broken health when they are in their 50's." But these distinguished men are the cream of our civilization and must be considered as outstanding in health and virility to have got to the top of their professions and fields of activity.

Below are shown the ratios of actual to expected deaths of these *Who's Who in America* men subdivided by profession using as mortality base the general U. S. white male population table as used above. The numbers exposed are also given.

Profession etc.	Number	Actual/Expected
Business Executives	1,249	71%
Professors & College Heads	1,204	62
Lawyers and Judges	540	73
Men of Letters and Journalists	434	90
Clergy and Church Officials	345	62
Physicians and Surgeons	341	78
Scientists	337	55
Whole Sample	5,800	70

Ratios are also given in the paper of actual to expected deaths based on Guralnick's 1950 study of occupational mortality in the U. S. population. We are aware of the low mortality of the clergy as the above table indicates but when it is stated that at ages 45-64 the outstanding clergy in Quint and Cody's study record a mortality of 56% of that for all white clergy in the U. S. in 1950, presumably base on Guralnick's Study, my statement re the pitfalls in this type of work is stressed.

Men of Genius

Let us go further up the scale and deal with men of the highest achievement—the genius or near genius. The following observations are from an essay by Lord (Russell) Brain, F.R.S., the eminent neurologist. "The belief that there is a correlation between genius and mental disease is very old. . . . Insanity and genius tend to excite a somewhat similar emotional reaction because they seem to be the result of mental processes which the ordinary man does not share."

The form of insanity which is most closely related to genius is *cyclothymia*

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RETIREMENT INCOME PLANS TOPIC OF DES MOINES MEETING

by T. A. Hinchliff

Lloyd A. Wooldridge of the Bankers Life agency in Des Moines was guest speaker at the December 1968 meeting of the Actuaries' Club of Des Moines. Mr. Wooldridge, formerly a Trust Officer with a large Des Moines bank, spoke about retirement income plans. His remarks focused on three issues: (1) pension vs. profit sharing; (2) insured vs. uninsured; and (3) individual vs. group.

Mr. Wooldridge suggested the primary advantage of the pension over the profit sharing arrangement was that the pension provided for a definite benefit. He tempered his preference for the pension approach by explaining that the suitability of the pension or the profit sharing method for a given group depended upon the nature of the employees making up the group. The natural candidate for a profit sharing plan was in his estimation a young, dynamic, salaried group with an average age in the early thirties.

The profit sharing approach has been advocated as having the advantages of increasing employee incentive and reducing turnover, but Mr. Wooldridge questioned whether these advantages materialized. The requirement of full vesting of benefits after 10 years of service on profit sharing plans has tended to promote turnover. Also, employee misconceptions of why their allocations differ from year to year or why the value of their funds may decrease due to market fluctuations have in many instances created adverse sentiment among employees.

In resolving the issue of "insured vs. uninsured" plans, Mr. Wooldridge discussed two key measures of a plan, namely, administrative expense and investment return. Drawing on his experience as a Trust Officer, he enumerated several unique problems banks have in managing investment accounts.

One problem arises in exercising central control over a great volume of individual trust accounts involving differing investment objectives. A second problem is the "red tape" involving approval of investment recommendations. A third problem results from the influence the commercial department of the bank may

bring on investment decisions in order to maintain good relations with current and prospective clients.

Attracting and holding good people is another problem of the department. Here the difficulty stems from the fact that historically trust departments have not been extremely profitable. This in part results from the practice of charging bank fees which do not reflect the costs of investment management. The last problem mentioned by Mr. Wooldridge was that bank and management people must devote too much time to non-trust duties.

He conceded that the purely investment costs might be less for a bank, but contended that the costs the client must pay for document drafting, employee communication material, and actuarial work more than offset this cost advantage. By comparison, the administrative expenses in the insurance company are coordinated under a single operation with the resultant lower overall cost to the client under the insured plan.

Mr. Wooldridge asserted that insurance companies can offer a higher investment yield on fixed dollar investments primarily because of the "direct placement" method of making investments. He also said that insurance companies are doing better than banks in the equity field since bankers are generally more conservative in this area.

Concerning the issue of "individual vs. group" Mr. Wooldridge said the individual approach is more flexible but also more expensive. He sees a trend toward more and more group since employers are quite cost conscious.

In the discussion that followed Mr. Wooldridge's remarks, it was pointed out that little reliance should be placed on simple comparisons of investment yield rates between banks and insurance companies because the methods of valuing assets in banks and insurance companies are different. In addition, the contention was made that the best yield rate in the first three or four years does not indicate the best long run rate.

In answer to a question, Mr. Wooldridge asserted that profit sharing plans definitely need a lifetime payout mechanism if the retirement funds are sufficient to provide reasonable incomes. It was his contention that most retirees want annuities. □

ACTUARIAL MEETINGS

- Mar. 4, 1969, Actuaries Club of Philadelphia.
- Mar. 13, 1969, Baltimore Actuaries Club.
- Mar. 19, 1969, Actuaries Club of Des Moines.
- Mar. 27, 1969, Actuaries Club of Hartford.
- Apr. 10, 1969, Baltimore Actuaries Club.

Longevity

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denoting a temperament characterized by alternating moods of elation and depression. Noted cyclothymes were James Boswell, George Fox, the founder of Quakerism, Goethe, Robert Mayer who discovered the law of conservation of energy, Dr. Johnson and Dickens. Isaac Newton at the age of 50 suffered from a mental disorder characterized by depression and delusions.

In Quint and Cody's study "Men of Letters" (authors, writers, critics and historians) gave a relative mortality ratio to the whole group of 122%. Lord Brain commented that "all creative writers are nervous." He took the 150 poets represented in the Oxford Book of English Verse born between 1700 and 1862 and noted that their average age at death was 70 and concluded that their longevity did not differ significantly from that of the general population.

Let us conclude with a tribute to men of genius who have enjoyed longevity. Verdi composed his opera Falstaff at the age of 80. Edison took out his 1033rd patent at age 81. Oliver Wendell Holmes, Jr. was still active on the U. S. Supreme Court at age 90. Titian painted his final masterpiece "Christ Crowned with Thorns" in his 95th year. □

Bulk Copies of the Actuary

We have received several requests for individual numbers of *The Actuary*. These can be obtained from the Society's office at a cost of 35 cents per copy.

Companies and consulting firms wishing to purchase copies in bulk for distribution to prospective actuarial students may obtain these at \$20 per 100 copies of a single issue. Any interested party should get in touch with the Society's office.