The Actuary

The Newsletter of the Society of Actuaries

VOLUME 11, No. 2 FEBRUARY, 1977

NAIC EXAMINER'S HANDBOOK

by Lewis P. Roth

At the June NAIC meeting, the Executive Committee adopted the Financial Condition Examination Handbook and the Market Conduct Examination Handbook, both of which became effective on January 1, 1977. The purpose of the book is to update and simplify the examination process for all insurance companies.

Such examinations were recommended in the McKinsey & Company Report to the NAIC on Strengthening the Surveillance System (see *The Actuary*, January 1975). The recommendation that these examinations be conducted separately was not adopted. The examinations will be handled as a single unit and both procedure reports have been combined in a single handbook.

The introduction to the Financial Condition Examination Handbook states the following: "The basic purposes of an examination system are (1) to detect, as early as possible, those insurers in financial trouble and/or engaging in unlawful and improper activities and (2) to develop the information needed for appropriate regulatory action." The Handbook is a guide to assist State Insurance Departments in accomplishing these basic purposes. There are three key elements which this handbook attempts to systematize and they are: an early warning system, a system for scheduling examinations, and a system for planning and conducting the examinations.

In stating the procedures for scheduling examinations, a high priority will be given to (1) companies that have undergone a change in management, (2) companies that identify as "priority company" by the Early Warning System (for a description of this existing System see *The Actuary*, February 1976);

(*Continued on page 8*)

ACLI

These initials recognize the change from the Institute of Life Insurance to the American Council of Life Insurance. Individual copies of the following recent publications may be obtained from the Council at 277 Park Avenue, New York, N.Y. 10017. □

Pension Facts 1976

This annual report is the information source for the public on pensions and other employee benefits. The booklet contains an excellent and up-to-date bibliography.

TAP Report 14

This latest report in The Trend Analysis Program is on Changing Residential Patterns and Housing covering all aspects from Regional shifts in Population to Home Architecture. There is a section on Questions and Implications for Life Insurance Company Management.

1976 *Social Reporting Program of the Life and Health Insurance Business*

This is an account of the corporate social responsibility activities of the life insurance section of the American business community.

Freedom and Control in a Democratic Society

This is a report of a conference of chief executive officers of life insurance companies and academic leaders in June 1976, sponsored by the Graduate School of Business, Columbia University and the American Council. (Only a limited number of this report is available). □

Actuarial Meetings

April 13, Actuaries Club of Des Moines

April 14, Baltimore Actuaries Club

May 12, Baltimore Actuaries Club

Is attendance at your meetings falling off? Maybe it's because you don't send us your meeting dates to publicize.

SEX AND THE SINGLE TABLE

by Thomas G. Walsh

An excellent article, *Sex and the Single Table: Equal Monthly Retirement Income For the Sexes?* by Barbara J. Lautzenheiser, F.S.A., appeared in the Fall 1976 issue of the Employee Benefits Journal. It explains to non-actuaries the basic tool used by all actuaries — classification of risks for the purpose of determining the cost of any insurance benefit.

The article details the reasons for the actuary's classification practices and defends them. It also provides a good description of the current controversy concerning the use of separate annuity mortality tables for men and women. As the article emphasizes: the reason it costs more to pay pension benefits to females than to males is because females live longer, not because risk classifications are followed.

As Actuary for Teachers Insurance and Annuity Association, which is currently engaged in litigation because of the use of separate mortality tables, I was pleased to read this informed presentation of questions involved in this fundamental issue.

The legal and social arguments being used against risk classification are shown by the author to break down on further analysis. The legal argument is that the Equal Pay Act of 1963 and Title VII of the Civil Rights Act of 1964 implicitly forbid classification by sex. If this legal line of reasoning is followed to its logical conclusion, risk classifications for any grouping would not be permitted.

The social arguments include statements that any difference in mortality rates between males and females are cultural and hence will disappear over time. Another social argument states that many

(*Continued on page 2*)

The Actuary

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EDITORIAL

WE had a surprise visitor the other day in the shape of a Martian Actuary. After the usual exchange of actuarial pleasantries (using the Halo notation) we learned that our visitor was anxious to find out what the earthbound United States Actuaries were concerned about at this time. Since no one Actuary could possibly be worrying about all the existing problems and no one reader, even from Mars, could read, mark, learn, and inwardly digest the constant stream of actuarial publications, we thought it best to provide our Martian friend with a very recent issue of our contemporary *The National Underwriter*. We invited him to choose any subject reported on in this publication and we would try to explain the current situation in that subject.

His first choice was the heavily headed article on page 1:

HEW Eyes New Physician Fee Schedule

This led to an explanation of the Medicare program and the problems that had arisen in payment of physicians fees. The Secretary of HEW was proposing to set a fixed schedule of fees. The Martian said that this had been tried on Mars without success and asked how the U.S. proposed to control the fees. His attention was drawn to a quote from the HEW working paper: ". . . jawboning by the President would encourage physicians to accept the fees as full payment . . ." Our visitor interrupted to say how sorry he was to hear of the President's trouble with his jaw and that he hoped the physicians would take good care of him. The explanation that the President's mandible was in good order evoked a muffled reference to the Philistines. So we proceeded to the next topic,

Sex Bias: The Villain is Subtlety

The Martian explained that he had no bias about sex but he would like to know the American viewpoint. He was greatly disappointed when apprised of the contents of the article and he further confessed that his interest was encouraged by the amount of "eyeing" that was being reported; the HEW already mentioned and the other heading

VLI, Property Ins., Brooke Bill Eyed

He was sure that there would be at least some reference to "ogling" in the Sex Bias article.

The Martian was slowly losing interest and, when we started to explain that

ACLI Media Program

was not a television serial, a glance at his watch reminded him of a lunch date for which he could not afford to be late.

I wonder what's concerning the Martian Actuaries?

A.C.W.

Deaths

Edwin L. Bartelson
David L. S. Douglas
David G. Halmstad
A. Douglas Hitchcox

Sex and the Single Table

(*Continued from page* 1)

older women are living in poverty and that they need as many benefits as possible — thus, higher pension benefits should be paid to them.

Miss Lautzenheiser also discusses the Overlap Theory, which has been brought out in some court cases. The Overlap Theory states that since a high percentage (e.g., 80%) of persons in one risk classification (e.g., 1000 males age 65) will die at the same ages — overlap — as persons in another classification (e.g., 1000 females age 65), there is no justification for the use of separate tables. Because all the early deaths (not overlapping) are in the male grouping and all the later deaths are in the female grouping, the overlappers would offset the losses due to later female deaths with gains from early male deaths, spreading any remaining gain or loss over the males and females whose deaths do overlap.

That insurance costs must be determined on a prospective basis and not a retrospective basis (i.e., after the fact) appears to be an extraneous consideration to the overlappers. Since the same overlap effect occurs among two groups of males of different ages (e.g., 1000 at age 60 and 1000 at age 65), the logic followed by the overlappers would require "age-blind" mortality tables.

Miss Lautzenheiser also details the confusion that currently exists among the four federal agencies responsible for unfair sex discrimination in pension plans and thus points out the dilemma in which employers currently find themselves. She shows the fallacy of the so-called "Unisex" or "No-Sex" mortality table as a solution to the appearance of sex discrimination.

Reprints of the article may be had on request from Miss Lautzenheiser at Bankers Life Nebraska, Lincoln, Neb. 68501. □

COMMITTEE ON FUTURISM

by Roy R. Anderson

In October 1975 the annual meeting of the Society had the privilege of listening to Dr. Jay S. Mendell give an address on "The Actuary as a Futurist." Prior to that occasion it is doubtful if many of the Society members had ever heard of being a Futurist or of Futurism. This ignorance will now be dispelled because a Committee on Futurism has been appointed and the formal charge to the Committee reads:

> "The Committee will acquaint the Society of Actuaries with the activity known as 'futurism'. The goal will be to stimulate actuaries to adopt a broad view of the future in making their current decisions. In order to achieve this goal, the Committee will study changes in the total environment that are of interest to actuaries, speculate about their future effects, and interpret the interrelated consequences of these changes to those financial systems designed and managed by actuaries."

What is "Futurism"? It is *not* forecasting future events — such as the weather forecasting that some of us did years ago. Rather, "Futurism" is primarily the process of perceiving the events of the present that offer evidence that fundamental changes are now occurring in some of our "systems." Then, having perceived such evidence, we must interpret it. Finally, we may then suggest "alternative futures" — i.e., possible directions the changes may take us. Dr. Mandell's address (Record 1.4) gives part of the picture and the Trend Analysis Reports of the ACLI further illustrate the subject.

At the Annual Meeting in Boston this Fall, the Committee is planning to conduct a Concurrent Session on "Futurism." The session will be introduced by an explanation of what Futurism is all about. Members of the Committee have taken individual responsibility for developing information on subjects such as energy, population and food, health care, health sciences, and "futures" organizations — e.g., the Club of Rome. We'll probably choose three of these for presentation in Boston.

The purpose of the Boston session will be two-fold. First, to give the membership an idea of how much is going on that will have tremendous impact on society — and on our Society of Actuaries. This is a message that has already been made evident by the work of the Trend Analysis Program of the ACLI. The second purpose will be to receive from the audience suggestions as to how best the Committee on Futurism can serve the membership.

The membership of the Committee is:

Donald R. Anderson	Sue W. Ogden
James C.H. Anderson	Bernard Ritterbush
George R. Dinney	Claude Thau
Wilfred A. Kraegel	Roy R. Anderson, *Chairman*

□

Competition No. 8

Dr. Ellen Torrance has called our attention to a rather serious emerging national problem:

> "In the year 1975 the U.S. population grew from 211.9 million to 213.6 million, and the number of FSA's grew from 2,575 to 2,779. Assuming the same rates of increase, by the year 2140 AD there will be more FSA's than people."

Rather than refer the matter to the Committee on Futurism (to be appointed) or to the Commodities Market, which is seeking SEC approval to trade in actuarial futures, we invite our readers to submit creative suggestions for bringing the problem under control.

The prize is "Actuaries and Financial Planning", a history of the profession and an examination of the actuary's role in human affairs.

Rules

1. All entries must be original (and printable).
2. The Editor and Competition Editor are *Ex-Officio* not eligible.
3. Only one copy please, to be sent to
   Competition Editor
   The Actuary
   Mail Drop 13-2
   1740 Broadway
   New York, New York 10019
4. Entries must be mailed by April 1.
5. Competition Editor's decision is sometimes puzzling. □

BOOK REVIEW

John A. Beekman, *Two Stochastic Processes*, Almquist & Wiksell, Stockholm, Sweden, 1974.

by Richard W. Ziock

The two stochastic processes referred to in the title are the Gaussian Markov and the collective risk stochastic processes. Both the theory and applications are examined. The applications include insurance, physics, electrical engineering, and statistics. Only applications in insurance and statistics will be of interest to actuaries.

The book attempts to cover a lot of ground in very few pages. One of the ways this is accomplished is by stating the more difficult theorems without proofs (although references for the proof are given). This is probably an advantage for most actuarial readers since that makes it possible to get a feel for the subject without getting bogged down in proofs. Another technique the author uses is to refer frequently to other sources in the literature. The heavy use of references should make the book very valuable to researchers.

Most mathematical books these days totally neglect the historical aspects of the subject's development. Happily this is not the case with this book, which has ample historical information.

A very positive feature of the book is the numerous problems at the end of each chapter and most of the problems have detailed solutions at the end of the book.

Mathematically the book is not simple, nor especially in parts is it truly difficult. It isn't easy to describe the mathematical maturity needed for any particular book. Perhaps my own experience is relevant. I first read this book in draft form about two years ago just before I commenced a year of course work which led to the M.S. degree in Mathematics. At that time much was not clear to me. Upon re-reading the book recently, after receiving the M.S., I found it much easier than previously. I suspect this will be approximately the case for many: the more mathematical background the better.

In the United States the book is available through the Halsted Press Division of John Wiley and Sons of New York.

Note: A more detailed review of this book will appear in the Transactions. □

OBSERVATIONS ON THE FUNDING STANDARD ACCOUNT

by William H. Crosson

The Funding Standard Account is the device employed by ERISA to assure compliance with the minimum funding standards of the law. In essence, it is the accumulation, with interest, of plan contributions by the plan sponsor less the minimum contributions required by the law. Credit items to the funding standard account include the previous year credit balance, if any; contributions by the plan sponsor; amortization credits, and interest on the credit items. Debit items include the previous year debit balance, if any; the normal cost; amortization charges, and interest on the debit items.

Offsetting of Amortization Charges and Credits

Combination of charges and combination of credits (discussed in the next section) are required if it is desired to offset amortization credit balances directly against amortization charge balances. The amortization period for the balance remaining after the offset will be the same as the amortization period of the larger balance before the offset. Offsetting can produce a significantly different amortization program for the smaller of the two balances. For example, if the remaining periods are 30 years for the charges and 15 years for the credits, the effect of offsetting would be to accelerate charges substantially (if the credits predominate), or to decelerate credits substantially (if the charges predominate). In either event, the funding requirements would be accelerated. If the remaining periods were 15 years for the charges and 30 years for the credits, offsetting would decelerate the funding requirements.

Combinations of Amortization Charges (Credits)

A reasonable way to perform a combination would be to do it in such a way that the total amount remaining to be amortized and the total annual amortization instalment both remain unchanged, with the remaining amortization period being determined by the formula:

$$n = \text{colog} \left[1 - \frac{i}{(1+i)\,f} \right] \div \log\,(1+i)$$

which is derived from the basic formula $f\ddot{a}_{\overline{n}|} = 1$, where f denotes the ratio of the total annual amortization instalment to the total amount remaining to be amortized, i denotes the valuation interest rate, and n denotes the weighted average remaining amortization period.

Combination of amortization charges (credits) in this way has the net effect of accelerating the charges (credits) to the funding standard account, but this acceleration effect is deferred until such time as one of the component unamortized balances is scheduled to become completely amortized. It thus appears that unless there is to be an offsetting of amortization charges and credits, there is no compelling reason for considering combination until this time arrives.

The Full Funding Limitation Credit

The Full Funding Limitation (FFL) as of the end of the plan year is the excess, if any, of

(A) the accrued liability under the plan *over*

(B) the lesser of

(1) the fair market value of the plan's assets, and

(2) the valuation basis value of the plan's assets.

If the actuarial cost method is the aggregate cost method, under which the accrued liability may be defined as equal to the plan assets, this formula does not make much sense, so for this cost method, it is suggested that the FFL be determined according to the entry age normal cost method. If there is a debit balance in the Funding Standard Account that exceeds the FFL, as of the end of the plan year, the excess amount is credited to the Funding Standard Account, and all remaining unamortized charge and credit balances are cancelled.

An important difficulty with this FFL is that it cannot be determined until the end of the plan year, and thus it cannot be relied upon to provide relief from the minimum funding requirements for that plan year. It should be noted that the FFL as of the beginning of the plan year (including the normal cost for the year) is a component in determining the maximum deductible contribution for the year since the deduction for the year may not exceed the Full Funding Limitation as of the beginning of the year. Thus, for consistency, there needs to be an interpretation of the FFL credit that is based on the FFL as of the beginning of the year.

Thus, it is reasonable to conclude that the intent of the law would be satisfied by determining a supplementary FFL credit as follows:

If there is a debit balance in the Funding Standard Account, as of the end of the plan year (after applying the FFL credit, if any, as of the plan year, as described above), tha exceeds the excess, if any, of

(A) the FFL as of the beginning of the year together with interest on such limitation to the end of the plan year, *over*

(B) the contributions by the plan sponsor during the year together with interest on such contributions to the end of the plan year,

such excess amount of debit balance in the Funding Standard Account is to be credited to the Funding Standard Account as a supplementary FFL credit, and any unamortized charge and credit balances *remaining from such balance outstanding as of the beginning of the year* are cancelled. The FFL as of the beginning of the year is the excess, if any, of

(A) the sum of

(1) the accrued liability as of the beginning of the year and

(2) the normal cost for the year, *over*

(B) the lesser of

(1) the fair market value of the plan's assets as of the beginning of the year or

(2) the valuation basis value of the plan's assets as of the beginning of the year.

The Alternative Minimum Funding Standard Account

If there still remains a debit balance in the Funding Standard Account after recognition of any FFL credit and any supplementary FFL credit, then the alternative minimum Funding Standard Account may be calculated to see whether there is a zero debit balance therein, or a debit balance that

(Continued on page 5)

(Continued from page 4)

is less than that in the Funding Standard Account. However, there is an eligibility condition to be satisfied before the alternative minimum Funding Standard Account can be used. The eligibility condition specified in the law requires some interpretation, and the following interpretation is suggested:

A plan which uses an actuarial cost method that determines a minimum plan contribution required to avoid an accumulated funding deficiency which, in each year (beginning with the first year to which the funding standards of ERISA apply and ending with the year at the end of which the alternative minimum Funding Standard Account is to be calculated), is not less than the corresponding minimum plan contribution determined by using the entry age normal cost method, may maintain an alternative minimum Funding Standard Account for the plan year.

The determination of the balance in the alternative minimum Funding Standard Account, as specified in the law, requires some interpretation, and the following is suggested:

Credit items to the alternative minimum Funding Standard Account include the contributions by the plan sponsor and interest thereon, while the debit items include the previous year debit balance, if any, (if used to determine the accumulated funding deficiency in the previous year), the lesser of the normal cost for the year and the normal cost calculated on the unit credit method, the excess, if any, of the present value of accrued benefits over the fair market value of the plan assets, as of the beginning of the year, and interest on the debit items.

The accumulated funding deficiency is the lesser of the debit balance, if any, in the Funding Standard Account and the debit balance, if any, in the alternative minimum Funding Standard Account.

If the accumulated funding deficiency was determined at the end of the previous year by the alternative minimum Funding Standard Account, and is to be determined at the end of the current year by the Funding Standard Account, then there must be a credit made to the Funding Standard Account arising from the alternative minimum Funding Standard Account. The law's description of this credit requires interpretation and the following is suggested:

In the case of a plan year for which the accumulated funding deficiency is determined under the Funding Standard Account, if such plan year follows a plan year for which such deficiency was determined under the alternative minimum Funding Standard Account, the excess (if any) of any debit balance in the Funding Standard Account over any debit balance in the alternative minimum Funding Standard Account, as of the end of the previous year, together with interest on such excess, is to be credited to the Funding Standard Account.

It is to be noted that if such a credit is made to the Funding Standard Account, then the amount of the credit must be set up as an unamortized charge balance to be amortized over 5 years. It is believed that the amortization charge must begin in the year after the credit is made to the Funding Standard Account, and also that the amortization must remain even if there were a FFL credit and/or a supplementary FFL credit to the Funding Standard Account in the same year as the alternative account credit.

Minimum Contribution Required to Assure Avoidance of an Accumulated Funding Deficiency

Having gone through a discussion of the Funding Standard Account, we are now in position to determine the bottom line — the minimum plan contribution for the following year that will assure the avoidance of an accumulated funding deficiency.

The minimum contribution that will assure avoidance of an accumulated funding deficiency is the least of A, B, and C, where

(A) is the minimum contribution required to avoid a debit balance in the Funding Standard Account, and is the sum of

(1) the debit balance, if any, in the Funding Standard Account,

(2) the normal cost, and

(3) the amortization charges,

less the sum of

(4) the credit balance, if any, in the Funding Standard Account,

(5) the amortization credits, and

(6) the excess, if any, of any debit balance in the Funding Standard Account over any debit balance in the alternative minimum Funding Stanard Account,

(B) is the minimum contribution required to avoid a debit balance in the alternative minimum Funding Standard Account (if eligible for the use of this account), and is the sum of

(1) The debit balance, if any, in the alternative minimum Funding Standard Account (but only if the accumulated funding deficiency at the end of the previous year was determined by the alternative minimum Funding Standard Account),

(2) The lesser of

a. the normal cost and

b. the normal cost determined on the unit credit method,

and

(3) The excess, if any, of

a. the present value of accrued benefits, over

b. the fair market value of the plan's assets,

and

(C) is the FFL as of the beginning of the following year, and is the excess, if any, of the sum of

(1) The accrued liability and

(2) The normal cost,

over the lesser of

(3) The fair market value of the plan's assets and

(4) The valuation basis value of the plan's assets, together with interest on such least amount from the beginning of the year to the date or dates of payment. □

LETTERS

Actuarial Responsibilities

Sir:

In perusing the December issue of *The Actuary* as I frequently do with publications of this type, I barely glance at the letters to the editor, obviously skipping those with very complicated mathematics but sometimes almost overlooking one or two. The innocent caption of Gil Fitzhugh's letter almost caused me to skip over it but my scanning quickly turned to reading.

I think he has hit the nail squarely on the head. We have spent so many years defining our public and codifying our responsibilities thereto that we have perhaps overlooked some of the thoughts he has expressed.

Would it be presumptuous to suggest that Gil Fitzhugh's letter be utilized as a guest editorial?

Thomas E. Murrin

* * * *

Sir:

Gilbert Fitzhugh's call to a higher sense of actuarial responsibility (in your December 1976 issue) is excellent and deserves the attention of us all. It puts me in mind of his address more than a decade ago to a joint meeting of the Boston and Hartford Actuaries' Clubs which left a lasting impression upon me.

But when Mr. Fitzhugh suggests that the standards embraced by actuaries of bygone days were higher than those today, I'm not so sure the comparison is valid. Today's actuary has, I think, a much more difficult task than his or her forebear of the days that Mr. Fitzhugh is recollecting. The pace of bewildering change, the materialism that has much of life insurance in its grip, the keener criticism from outside — all these confront the 1977 actuary with unprecedentedly difficult questions of personal decision.

I have just completed a busy two-year term at the helm of the Academy's first Committee on Discipline. My conclusion from that experience is that, although indeed we cannot afford to be complacent, a desire to do what is right for those who put their trust in us continues to burn strongly in the bosoms of the great majority of actuaries.

E. J. Moorhead

* * * *

Sir:

Just a note of hearty support for the letter by Mr. Fitzhugh.

Part of my work involves the regulation of group pension plans under the pension legislation of one of the provinces. In the reworking of the guides to the profession on group pension plans, in the arguments over implicit and explicit assumptions, I have been becoming increasingly concerned over the emphasis on the employer or client relationship to the actuary. There seems to be great concern over the necessary flexibility for that relationship while the responsibility to the plan beneficiaries and the ultimate security of their benefits receives only passing attention.

D. S. Rudd

* * * *

Society Examinations Seminars

GEORGIA STATE UNIVERSITY

Seminars for Parts 4, 5, 7B (G and I), of the Society Examinations will be held between April 4 and 30, 1977.

Complete information may be obtained from:

PROFESSOR ROBERT W. BATTEN
Georgia State University
Department of Insurance
School of Business Administration
University Plaza
Atlanta, Georgia 30303
Telephone (404) 658-2725

NORTHEASTERN UNIVERSITY

Seminars for Parts 4, 5, 7B, (G and I), 9A, 9B(US), and 9C(US) will be held between February 28 and May 9, 1977.

Complete information may be obtained from:

DEAN GEOFFREY CROFTS
Graduate School of Actuarial Science
Northeastern University
360 Huntington Avenue
Boston, Mass. 02115
Telephone (617) 437-2324

Reorganization

Sir:

I have a suggestion relative to reorganization which seems to me an obvious lesson from the experience of the American Academy of Actuaries. The Academy was formed through considerable effort and expense; yet it failed in its initial purpose of obtaining a Federal charter. Its achievements to date though substantial, have been partial and disappointing.

So — let's set the question of reorganization aside and instead set up committees, joint committees where appropriate, and hire consultants assigned to the tasks of achieving some of the goals of reorganization, especially those dealing with proper government recognition of the profession. I think it's fairly safe to predict that the forms of that recognition, when achieved, will differ markedly from the forms now contemplated by the reorganization proposal. At that point reorganization can be undertaken based on reality, not hope, and we will have avoided another expensive failure like the Academy.

Robert J. Randall

* * * *

Actuaries Are Not For The Birds

Sir:

I very much enjoyed Don Rholl's birds-eye view story in the December issue of *The Actuary.*

Were it true that birds of a feather flock together, that would help Big Daddy. But, alas, they don't. They seem not to realize that such would help Big Daddy and his friends know their feeding habits. Worse yet, they seem to fail to realize it would help themselves, lest they starve for not having the chance to feast on the particular worms and insects they need for sustenance.

Oh, many of the birds would chirp response to that charge of lack of self-enlightenment that it is exactly that identity they wish to preserve. But their failure does indeed seem to be that they don't realize that "it is not only fine feathers that make fine birds." Big Daddy and his friends some day soon surely will look beyond the many beautiful types of plumage and examine the beaks and feet to see which bird's fit for which type of service.

(*Continued on page 7*)

Letters

(*Continued from page 6*)

And, I fear, at that point the birds may too late realize they worried too much about plumage and too little how they might best serve the forest.

'Tis far better that the birds emphasize what birds are uniquely qualified to do, lest rodents and other creatures over-run the woods. For if that occurs, they can preen all they want, while they squawk and eventually vanish.

Bartley L. Munson

* * * *

Too Many Old People

Sir:

Arthur Pedoe has contributed yet another interesting and informative note entitled "Too Many Old People" in the December issue of *The Actuary*. I believe that a few additional facts might enlarge the future demographic picture.

Mr. Pedoe states that the proportion of the population in the United States aged 65 and over is 10%, and it is increasing. He also points out that almost half of the population may be assumed to be non-productive because they are under age 20 or over age 65, and implies that this will be an increasing burden in the future.

According to the latest population projections made by the Bureau of the Census (*Current Population Reports*, Series P-25, No. 601), the intermediate estimate based on improving mortality and ultimate fertility at "exact replacement" level shows that the aged population will increase slowly from 10.5% at present to 11.9% in 2010, and then rapidly until reaching a level of 16.5% in 2030 and thereafter. At the same time, however, the population under age 21 will decrease relative to the population at the working ages. The ratio for those aged 20 and under and those aged 65 and over to the total population will actually decrease from the present 47.4% to a low of about 42% in 30 years, and then will rise slightly to an ultimate level of about 45%.

In the other two projections of the Bureau of the Census, which bracket the intermediate estimate, the proportions of the population at the non-working ages are not too different. Thus, where very low fertility is assumed, the ultimate proportion is about 44%, whereas when very high fertility is assumed, it is about 48%. Accordingly, there seems to be not so much of a problem of increased dependency over the long-range future as some might imagine when they consider only the aged population.

Robert J. Myers

* * * *

UNDERWRITING THE FELINE RISK

A true test of one's actuarial ingenuity
Will be found in the pricing of a feline annuity.
The cat, you see, lives nine times over;
Man lives but once, but generally dies older.
How many lives has the critter been through?
And once you find out, what then do you do?

You must be certain that you have the facts
Relevant to your given class of cats.
If the annuity is to be soundly underwritten
You'll need the cat's history from the time it was a kitten.
From said report, which the vet has supplied,
You'll know how often this feline has died.

Many an actuary has become very confused
When faced with calculating the feline q's.
Try as he might, the formulas refuse
Until he discovers the feline μ's.
The resulting curve is that of a helix
Appropriately named the Curve of Felix.

Once you've got everything commewtated
You'll no doubt be pretty damn frustrated
A trivial exercise and nothing more?
True, but more than likely, it'll be on Part 4.

J. G. Hubbell

Riskfree Selection

Sir:

I feel no discussion today among actuaries of problems in predicting future mortality among annuitants could be complete without considering the research of C. D. Sharp, FIA. The following report on that research appears in JIA Vol. 103, Part II.

Loren G. Logan

"Mr. C. D. Sharp was reminded that a number of years ago he had been very much concerned with the mortality of annuitants and had wondered whether it would be practical for the insurance company to sort annuitants into the good lives and the bad lives. Just at that time he was in Hawaii and met an American lady (to whom he referred as Mrs. G.) who was a graphologist. He was much impressed by her abilities and he was even more impressed when she told him that she could diagnose disease from handwriting. Half jestingly, he had asked if she could estimate longevity from handwriting, to which she had replied that she could. The speaker was so impressed by the lady that on returning to London he had arranged for a statistical test.

"One hundred cases, all male lives who had effected annuities at age 65, were taken, 50 of whom had died and 50 of whom were still living. The lady was asked to examine their signatures and indicate whether the people were likely to be short-lived or long-lived. Mr. Sharp quoted from the notes made at the time: 'Reverting to the first experiment carried out in London, on the 100 cases where she was asked, among other things, to select those annuitants likely to live longest, it will be seen that there was only 1 death in 25 cases.' She was remarkably accurate in the way she sorted out the short-lived and the long-lived. Obviously their data were small and perhaps there was some special reason, so they ran another test. Of the 35 cases where Mrs. G. had indicated a short expectation, 29 were dead, and of the 25 where she indicated a long expectation only 1 was dead. In some cases she had been doubtful and those had been treated rigorously as errors. Mr. Sharp did not think on the statistics he had given he could claim any great breakthrough, particularly as he was not altogether clear how he would use the results even if further experiment established the validity of the approach. Perhaps some young actuary who wanted to spend an entertaining few months of his professional life could be given some material to work on!"

Editor's Note: Mr. Sharp should not give up. The following appeared in a recent issue of "The Economist."

Handwriting Analysis

by Consultant Graphologist advising Companies, Banks Management Consultants and private individuals internationally. Confidential reports on character and potential of prospective personnel and associates . . . □

NAIC Examiner's Handbook

(*Continued from page 1*)

(3) companies that the department considers troubled based on (a) results of prior financial condition examinations, (b) results of examinations or other indicators of market conduct (c) information from other states or outside sources, (d) concentration on business in high risk lines and (e) significant changes in operating results or in the mix of business.

The Handbook puts particular emphasis on the review of other audits, internal controls, examination of computer-based operations, analysis of operating trends and a search for unusual or unfamiliar items.

The section on internal controls which includes the review of EDP based operations is very comprehensive and could be used by a company's own internal audit department for the purpose of establishing a good control system. There is also a welcome new section on statistical sampling which is quite comprehensive and, if used, could substantially cut down on examination time.

A separate section on understanding and evaluating reinsurance is included. It appears that such understanding and examination should fall within the regular program of internal controls and other checks and balances, but, for some reason, reinsurance seems to be highlighted in a special way. I wonder why?

The second part of the Examination Handbook is an entirely new approach to regulatory audits. It is called the Market Conduct Examination Handbook and it deserves high praise. As pointed out in the Handbook itself, "one of the department's major responsibilities is to reduce the frequency and the severity of insurance practices that may adversely affect policyholders and claimants in this state." Why such an examination has not been conducted in the past is hard to imagine, but I, for one, certainly applaud this type of examination.

Details concerning how the state can fulfill this responsibility by detecting problems as soon as possible and taking action necessary to minimize their practices are given as an aid to the examiner. These problems are categorized into four key areas: (1) sales and advertising, (2) underwriting, (3) rating, and (4) claims.

The purpose of the Market Conduct Examination, as explained in the Handbook, is to collect information in these four key areas to determine whether action need be taken against the particular companies or whether remedial legislation should be proposed. The actual procedure for carrying out this Market Conduct Examination is also given in the Handbook and includes such items as a review of the company's marketing material with regard to whether or not the company is complying with laws and regulations regarding sales and advertising.

In the underwriting/rating area, the examiner is to look for such items as proper rate classification, proper use of exclusionary riders, unfair discrimination with respect to any particular segment of the market, and undue delay during the process of issuing the policy.

With regard to consumer or other related complaints, the company will be advised to use a complaint register and the review will consist of determining patterns which may exist among the files reviewed and assurance of compliance with policy provisions and other regulatory requirements. The reviewer will also examine a sample of applications rejected or declined and a sample of policies cancelled or not renewed to determine compliance. The examiner is also instructed to review the company's claims practice by line of business for compliance with statutes, rules and regulations and the company's loss settlement guidelines. A sampling of both open and closed claims files will enable the examiner to complete a coordination of benefits survey, a closed for payment or denial survey, a litigated file survey, and a draft or check endorsement survey.

Throughout the Handbook, examples of problems are given and methods of uncovering unusual items are listed.

Both Handbooks are comprehensive and should make for a more thorough and more efficient examination of the company's affairs than we have seen in the past. However, the industry and most Commissioners continue to recognize the fact that the success of any program to improve procedures will depend on well trained and competent examination personnel. The NAIC does have the power to establish standards of qualifications it will accept for Convention Examiners. A report on the Qualifications, Classifications, and Suggested Compensation for its own examiners was adopted at the June NAIC meeting becoming effective January 1, 1977. Since the need for adequate training is a basic element of the problems, discussions have been held regarding a training course to be made available for new examiners.

One final point on state examinations: the NAIC Subcommittee on Manual Revision is in agreement with the industry position that would get us away from requirements that all companies be examined on a prescribed or mandated schedule and that each and every examination be a full and complete one. The Subcommittee did not, however, accept the position of the insurance industry that the Report of Examination be short and concise.

Copies of the Handbook are available from the NAIC Central Office, Publications Department, 633 W. Wisconsin Avenue, Suite 1015, Milwaukee, Wisconsin 53203, $30. Supplementary updates will be sent to Handbook subscribers whenever revisions are called for because of new problems or techniques. □

ERISA and IRA

Individual Retirement Accounts, Actuarial Note No. 1-77, U.S. Railroad Retirement Board, Chicago, Illinois, January, 1977, pp. 6.

This note summarizes the principal eligibility conditions for individual retirement accounts under the Employee Retirement Income Security Act of 1974 including the liberalizations under the Tax Reform Act of 1976.

All employees not eligible to participate in a qualified pension plan are eligible to set up an IRA. It is interesting to note that the Railroad Retirement system is not considered a qualified plan; therefore, railroad employees are eligible for IRA's except where an employee is participating in the private pension plan of an individual railroad or a pension plan from nonrailroad employment or self-employment.

Free copies of this note may be obtained from the Bureau of the Actuary, Railroad Retirement Board, 844 Rush Street, Chicago, Illinois, 60611. □