

NOTES ON OTHER ACTUARIAL JOURNALS

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ARGENTINA

Anales del Instituto Actuarial Argentino, Vol. 1, Part 1

WE welcome this new journal.

ACERBONI, A. V. *Valuación de las operaciones de capitalización, primas y reservas*, pp. 5-10.

GALÉ, J. G. *Sobre jubilaciones. El caso de los sueldos variables*, pp. 11-17. On pensions when the salary varies.

LASCURAIN, A. *Procedimiento para el cálculo de la tasa de interés en un tipo de renta cierta*, pp. 18-36. Gives approximations to the rate of interest in an annuity certain.

PEARSON, A. M. *El análisis de la ganancia en el seguro de vida*, pp. 37-52. A general discussion on analysis of profit.

SMOLENSKY, P. *Elección de la tabla de mortalidad para los asegurados argentinos*, pp. 53-60. Concludes that the Commissioners (1941) Standard Ordinary Mortality Table at $3\frac{1}{2}\%$ is a suitable basis.

GALÉ, J. G. *El Instituto Actuarial Argentino*, pp. 61-70. Presidential address at the first meeting 27 April 1950—mainly historical.

FRANCE

Bulletin Trimestriel de l'Institut des Actuaire Français
No. 198, March 1952

FRAISSE, J. *Remarques sur le calcul des réserves mathématiques*, pp. 23-93. Expresses $1-V$ in the form $(P+d)\ddot{a}$ and then uses constants to reach reserves (cf. Altenburger, etc.), displays the results graphically and examines approximate methods of valuing without grouping, dealing especially with the method given by Meier in 1943 and 1945 which is similar to that suggested by Tappenden (*J.I.A.* LXI, 63 et seq.).

No. 199, June 1952

NARDIN, J. *Une méthode de calcul des réserves mathématiques et de confection de l'inventaire au moyen de cartes perforées*, pp. 119-36. Describes the method adopted when the calculations are made individually in advance and mechanically.

LOISEL, J. *Quelques principes de contrôle du fonctionnement des sociétés de crédit différé*, pp. 137-60. Discusses the application of the Law of 24 March 1952 to 'deferred credit' Societies.

No. 200, September 1952

- RICHARD, P. J. *La représentation analytique des tables de mortalité*, pp. 177-268. The article has special reference to the work of Albert Quiquet to whose memory it is dedicated. It is of much interest.

GERMANY

Blätter der Deutschen Gesellschaft für Versicherungsmathematik

Vol. 1, Part 3

- SCHOBE, W. *Angenäherte Summation und Rekursion mittels der Lubbockschen Formel*, pp. 3-13. Develops formulae for approximate summation analogous to the three-eighths and Simpson's rules, respectively, in approximate integration. The derivation of the remainder terms is neat. Numerical examples are provided.
- HARLEN, H. *Geldwert und Lebensversicherung*, pp. 15-28. A useful review of measures to combat the effects of inflation on life insurance benefits. Most suggestions date back to the twenties (e.g. the Eighth Congress) and Spring's recent mathematical treatment (see *J.I.A.* LXXV, 251) synthesizes some of them.
- HEUBECK, G. *Prämienkalkulation für Kindersterbegeldversicherungen nach der Kollektivmethode*, pp. 29-35. Refers to a 1948 article by Schönwiese (see *J.I.A.* LXXVII, 471), in which the value, to a married man aged x , of a unit payable on the death of each of his children prior to age 21 is written as
- $$\sum_{t=1}^{21} f_{x-t}^m (1+i)^t | A_{0:\overline{21-t}|} + \sum_{t=0}^{\infty} v^t p_x f_{x+t}^m A_{0:\overline{21}|},$$
- where f_x^m represents the relative frequency of births per married man aged x . Tables are provided.
- REY, H. *Die Rechnungsgrundlagen für Versorgungsrenten 1942 von Dr. Schweer*, pp. 37-60. Announcing the forthcoming publication of pension fund tables prepared during the war by Dr. Schweer at $3\frac{1}{2}\%$ interest. Ill-health retirement and service mortality rates are high by British standards.
- SACHS, W. *Die Absterbeordnung als Mischungsergebnis*, pp. 61-68. Proves that, if the l_x column of an aggregate table is comprised of a linear combination of l_x 's each based on the mortality of specified diseases and each following its own Makeham law, the final result cannot be a Makeham l_x .
- LANG, R. *Die Untersuchung der Zufallsschwankungen in den Jahresergebnissen einer Versicherungsgesellschaft mit Hilfe der kollektiven Risikotheorie*, pp. 69-84. A numerical verification of the assumptions underlying Lundberg's collective theory of risk based on the annual sums at risk of an unnamed life office falling in during the years 1924-39. The conclusions drawn are favourable to the theory. We notice that, without re-insurance, but with a risk-premium loading of 10% and a risk-reserve of 130 times the mean sum at risk, the author finds the probability of eventual ruin to be 5%. Working on much more detailed figures from the Thule company in Sweden, Hultman (see *J.I.A.* LXXII, 526) arrived at a corresponding probability of about $3\frac{1}{2}\%$.

FEDDERSEN, B. *Reserveaufbau und unterjährige Schätzung der Reserveveränderung in der privaten Krankenversicherung*, pp. 85-97. The recurrence relation for sickness insurance policy values is

$$l_{x+t-1}(t-1)V_w + P_w - K_{x+t-1} (1+i) = l_{x+t} \cdot {}_tV_w,$$

where K_x represents the mean amount payable in sickness claims at age x . This formula is modified and applied to link the total reserves at successive valuations. The results are used to provide estimates at inter-valuation epochs.

GIESE, A. *Einmalprämiensystem in der Lebensversicherung*, pp. 99-104. A study in the essential equivalence of single and annual premium assurances.

ZWINGGI, E. *Beiträge zum Zinsfussproblem*, pp. 105-13. Derives a relation connecting the endowment assurance premium at interest i with that at interest i_0 , where $v = v_0 + \epsilon$, namely,

$$P_{w\overline{n}(i)} = P_{w\overline{n}(i_0)} \exp \left[(\gamma_1 - \lambda_1) \epsilon + (\gamma_2 - \lambda_2) \frac{\epsilon^2}{2!} + \dots \right].$$

The parameters γ_j and λ_j ($j = 1, 2, \dots$) involve the successive sums of the C and D columns at i_0 . The numerical results appear to be an improvement over those of the author's earlier paper (see *J.I.A.* LXXVII, 128). The extension to ${}_tV_{w\overline{n}(i)}$ is obvious.

FISCHER, K. *Der XIII. internationale Kongress der Versicherungsmathematiker*, pp. 115-20.

HOLLAND

Het Verzekeerings-Archief

Vol. XXIX, No. 1, 1951-52

SCHELTEMA, C. *Verzekeeringsdag 1951. (Belegging van gelden door het levensverzekeeringsbedrijf in het bedrijfsleven)*, pp. 1-21. Reports a discussion at the Insurance Institute on life-office investments in industry.

ROOIJEN, J. P. VAN. *Het extrapolatieprobleem in de statistiek*, pp. 22-38. General considerations on extrapolating time series.

JAGER, J. DE. *Over additieve verzekeringen*, pp. 39-65. Considers a generalized money-purchase assurance where the benefit payable on survival to age y is written as

$$\rho_y = \int_x^y \kappa_{s,y} dP(s) \quad \text{with} \quad P(x) = 0 \quad \text{and} \quad P(s) \nearrow.$$

A formula is derived for the policy value at age x . Emphasis is laid on the mathematical techniques developed.

Vol. XXIX, No. 2-4, 1951-52

STELLER, E. *Valuation of a loan when part of the principal still has to be paid by the investor*, pp. 73-74. The (Makeham) valuation formula

$$\frac{g}{i} C + \left(1 - \frac{g}{i}\right) K$$

still holds good when some of the constituents of K are negative.

- STELLER, E. *Short-circuiting actuarial computations*, pp. 75–86. Advocates the use of a five-year period as unit in population forecasting and in certain annuity calculations.
- HOEK, U. H. VAN DER. *Enkele opmerkingen betreffende het verband tussen de sterftewet en het aantal waargenomen doden bij een open groep*, pp. 87–96. Develops well-known formulae for the derivation of q_x and μ_{x+t} ($0 \leq t \leq 1$) in terms of observations. Corrects a 1927 mathematical error of Insolera in this field.
- JANSEN, J. H. C. *Evenwichtslijnen in de sociale verzekering*, pp. 97–114. In the Dutch disability pension law the insured (unretired) population consists of two categories depending on whether, or not, contributions are being paid. In the second group are included, e.g., the unemployed and individuals who become disabled before 150 weeks' contributions have been paid. The problem of forecasting costs thus involves estimates of the future proportions at each age in each of these categories. The theme of this article is essentially a comparison between an 'individual' and a 'collective' approach.
- KRIJGER, C. G. *Verzekering van abnormale risico's*, pp. 115–29. Considers the application of the rating of lives by varying the age and the rate of interest in the case where the extra risk is a specified percentage increase in μ_x for the first t years and a different percentage thereafter. A Makeham graduation is assumed, and attention is paid to the relation between the two percentages if the interest and age changes involved are both to be upward.
- ROOIJEN, J. P. VAN and HULLU, A. DE. *Afronding volgens Makeham van de sterftetafel G. B. M. 1947–1949*, pp. 130–37. A Makeham graduation is made of the Dutch male population table of 1947–49 (cf. *J.I.A.* LXXIII, 437). Commutation columns are provided at 3% interest.
- WIT, G. W. DE. *Een toepassing van Pearson's χ^2 -criterium*, pp. 138–45. The standard χ^2 technique for testing the difference between two relative frequencies is here applied to some fragmentary statistics on under-average lives saved from the National Life Assurance Bank in the bombing of Rotterdam. Four categories of lives are distinguished (standard, sub-standard but no rating, rated, reinsured with the specialized Hoop company), and each age from 31 to 60 is considered separately. Each pair of under-average classes is compared, age by age. More refined methods of analysis are available.

PORTUGAL

Boletim do Instituto dos Actuários Portugueses, Vol. VI, 1951

- CARVALHO, C. A. F. *A statistical study of certain characteristics of population change*, pp. 7–53. A mainly expository account, written in 1938, of the deterministic renewal theory of populations. A novelty is the assumption that the total population is a quadratic function of the gross reproduction rate. Without allowing for decreasing mortality rates, the forecast population of England and Wales in the year 2001 is set at 36 $\frac{3}{4}$ million.
- JECKLIN, H. *Considérations sur l'allure de variation des réserves d'assurances à primes régulièrement variables*, pp. 55–62. If an n -year capital redemption assurance is effected with annual premiums decreasing in A.P. with

common difference of i times the initial premium, the policy value at duration t is t/n . This result is made the basis of an approximation to the policy value of an endowment assurance subject to annual premiums decreasing in arbitrary A.P.

FRANCO, A. A. G. C. and COSTA, M. A. F. *Investigação sobre a mortalidade portuguesa*, pp. 63-145. Using familiar techniques the authors construct and graduate eight sex-specific mortality tables based on the five decennial Portuguese censuses 1900 to 1940, and the associated deaths. Improvement in mortality is not noticeable until about 1925 and even thereafter is comparatively slight except for females at the child-bearing ages. The 1940 census also permitted the derivation of mortality rates according to marital status.

SANTOS, M. C. G. DOS. *Ensaio duma tábua de morbidex portuguesa*, pp. 147-55. Central sickness rates in 'working days' were derived from four mutual associations of factory workers in Barreiro (2905 lives). Sick-pay was limited to one year and there was a link-up period of 12 months.

LEÃO, A. *Regime financeiro do Seguro Social*, pp. 157-89. Continuing his paper in the previous volume (see *J.I.A.* LXXVIII, 137), the author argues that reserve accumulation is an inappropriate method of paying for social security benefits. Monetary depreciation and investment difficulties are two reasons emphasized.

SCANDINAVIA

Skandinavisk Aktuarietidskrift, 1952, Parts 1 and 2

SVERDRUP, E. *The Limit Distribution of a Continuous Function of Random Variables*, pp. 1-10. Rigorous proof with application of the general theorem to derive known results.

WALSH, J. E. *Large sample validity of the binomial distribution for lives with unequal mortality rates*, pp. 11-15. A comforting conclusion. The value used for q is the average probability of death.

ARFVEDSON, G. *A semi-convergent series with application to the collective theory of risk*, pp. 16-35. The author continues his work of 1950 in the same journal (see *J.I.A.* LXXVII, 128) and gives numerical estimates of the probability of ruin, etc.

STEFFENSEN, J. F. *Inequalities in Makeham-graduated Tables*, pp. 36-47. Simple and sufficiently narrow limits are given for the error involved in

$$\bar{a}_x = \ddot{a}_x - \frac{1}{2} - \frac{\mu_x + \delta}{12} + R,$$

and, *inter alia*, the author considers

$$\mu_x \bar{a}_x \rightarrow 1 \quad \text{and} \quad 0 < \bar{P}_x < \mu_x + \log_e c.$$

WHITTLE, P. *Some Results in Time Series Analysis*, pp. 48-60. In a paper published in 1951 the author developed statistical tests for discriminating between certain types of hypotheses and now gives a connected presentation with proofs in outline.

DALENIUS, T. *The problem of optimum stratification in a special type of design*, pp. 61-70. In papers in the same Journal 1950 and 1951 (see *J.I.A.* LXXVII, 305 and LXXVIII, 370) optimum stratification is discussed and the present paper considers a special type of sample design of practical interest when sampling business establishments in order to estimate retail trade or sampling income earners to estimate mean income.

PENTIKÄINEN, T. *On the net retention and solvency of insurance companies*, pp. 71-92. Inflation in Finland has reduced the real value of the margin of solvency and as solvency is dependent on reinsurance the problem of maximum net retention arises. The study is based on a number of numerical reports concerning the risk sum distributions in some typical Finnish insurance companies and some fairly simple rules are evolved. The figures shown in examples in Table 1 relate to fire, marine, life and accident insurance.

Nordisk Försäkringstidskrift

Vol. XXXII, No. 3, July 1952, includes the following:

PHILIPSON, C. *Expense calculations in a life office*.

HELLEMAN, H. *A Survey of statistical methods and problems in Norwegian non-life insurance*. Attention is drawn to the fact that motor insurance has remained favourable in Norway since the war and the reasons for this surprising fact are given as the reduced intensity of traffic, restrictions on importation of cars and on free driving because of fuel rationing, better upkeep of the fewer cars and better driving. In view of the importance of road-safety this part of the paper is especially worth studying.

PAKKILA, J. *Finnish Fire Insurance during the 1940's*. This is of historical interest because of the economic consequences of two Finno-Russian wars.

Vol. XXXII, No. 4, October 1952 includes

GRUDER, O. *Methods to reduce the non-effectance rate of under-average life assurance*.

SODERBERG, T. C. N. *Wadstrom, a pioneer of Swedish Insurance (1708-93)*, an article of considerable historical interest.

SWITZERLAND

Mitteilungen der Vereinigung schweizerischer Versicherungsmathematiker

Vol. LII, Part 2, 1952

WEGMÜLLER, W., SCHULER, W. and WIESLER, H. *Schweizerische Volkssterbetafeln 1939/44 nach Landesteilen*, pp. 125-51. The χ^2 test is used to test for mortality differences in the years 1939-44 between the German- and French-speaking cantons and the canton Tessin. It is concluded that the apparent heavier mortality in the French-speaking cantons between ages 20 and 60 is real. Commutation columns are provided at 3% for each of these groups of cantons (males and females separately).

ZWINGGI, E. *Prämien und Deckungskapitalien in der Todesfallversicherung, wenn die Beiträge nur bis zum Todestag geschuldet sind*, pp. 153-60. Develops approximate relations for endowment assurance net premiums and policy values in the case where premiums are payable annually with repayment of the 'unearned balance' at the time of death. These relations are in terms of 'continuous' net premiums and policy values, and numerical examples show how accurate they are.

LAH, I. *Noch einige praktische Interpolationsformeln des Zinsfuss-problems von hoher Präzision*, pp. 161-72. Refines and generalizes a previous article (see *J.I.A.* LXXVIII, 139).

UNITED STATES OF AMERICA

The Society of Actuaries, 1951 Reports of mortality and morbidity experience
Report of the Committee on mortality under ordinary insurance and annuities, pp. 1-71. The data are analysed into standard ordinary insurance and deferred annuities (and settlement options) between 1945 and 1950 anniversaries.

Report of the Committee on group mortality and morbidity, pp. 72-113.

Separate treatment is given to

- (1) Group life insurance.
- (2) Conversion upon termination of group master policy.
- (3) Group accident and health insurance.
- (4) Group annuity mortality.

Report of the Committee on aviation, pp. 114-24.

Transactions of the Society of Actuaries

Vol. IV, 1952

NESBITT, D. J. and VAN EENAM, M. L. *Insurance for face amount or paid-up insurance amount if greater*, pp. 1-16. A common type of insurance in the U.S.A. consists of a deferred annuity of \$10 a month with an immediate death benefit of \$1000 or the cash value of the policy, whichever is greater. The authors introduce an alternative under which the death benefit is \$1000 or the paid-up value of the policy, whichever is greater. Numerical illustrations are provided.

TROWBRIDGE, C. L. *Fundamentals of pension funding*, pp. 17-43. Considers various possible methods of paying for 'past and future service' in a pension plan. The possibilities range from no funding ('pay-as-you-go') to 'complete' funding where interest on the fund is sufficient to pay benefits as they fall due. The taxability of employer contributions is given cursory notice.

GINGERY, S. W. *Special investigation of group hospital expense insurance experience*, pp. 44-112. A study of 24,144 employee, and 43,902 dependant, claims to hospital expense benefits in 1950. An analysis is made of average durations in hospital, hospital charges and insurance benefits paid. Data on claim and continuation rates are used to construct standard claim cost and continuation tables.

MACLEAN, J. F. *Mortality experience of Bankers Life Insurance Company of Nebraska 1945-1950*, pp. 113-27. Mortality during the years 1945-50 was 81.8% of that expected on the 1946-49 Select and Ultimate Basic Table (*T.S.A.* II, 505).

RASOR, E. A. and MYERS, R. J. *Valuation of the shares in a share-and-share-alike last survivor annuity*, pp. 128-30. Shows that

$$\sum_{r=0}^m \frac{1}{r+1} a_{\frac{[r]}{w:xyz...(m)}} = a_w - \frac{1}{2}(a_{wx} + a_{wy} + a_{wz} + \dots) + \frac{1}{3}(a_{wxy} + a_{wyz} + \dots) - \dots$$

This result is contained in a similar problem considered by Toja (1907, *Boll. Ass. Ital. Increm. Sci. Attuar.* xvii, 23).

The number contains a digest of informal discussions on the Annual Statement, Underwriting, Group Insurance, Retirement Plans, and Agency Compensation. There is also a digest of a presentation by the Committee on New Recording Means and Computing Devices.

Vol. iv, June, 1952

HOUSEMAN, R. F. *Some practical aspects of the calculation of employer contributions under Group Annuities of the deposit administration type*, pp. 231-45. A type of group annuity business in the U.S. is a contract under which employers deposit contributions with an insurance company subject to a guaranteed minimum interest rate. At retirement part of the fund is used to purchase an immediate annuity for the amount of pension under the plan. The paper describes the practical details of calculating the employer's annual deposits under four different 'tax-deductible' methods of funding.

PETERSON, R. M. *Group Annuity mortality*, pp. 246-307. Constructs a group annuity table for 1951 (*Ga-1951*) based on mortality over age 65 in the intercompany group annuity experience of 1946-50. The Jenkins-Lew *a-1949* table (see *J.I.A.* LXXVI, 168) was employed under age 60. Commutation columns are provided at 2½% and 'projection scales' developed.

LARSON, R. E. *A method of calculating group term dividends*, pp. 308-16. Describes a work-sheet for the calculation of group insurance dividends. It is assumed that no employer should be charged with more than 150% of his basic premium in any year of unfavourable mortality.

DUNCAN, R. M. *A retirement system granting unit annuities and investing in equities*, pp. 317-44. A teacher whose pension is insured with the Teachers Insurance and Annuity Association may now have up to 50% of the contributions on his behalf paid into an 'equities fund'. That part of his pension eventually derived from this fund will be based on market prices of these equities at the time the individual pension payments are made. The paper provides details of the arguments which led to the formation of this fund and of the calculation of the annuity units.

This number contains a digest of informal discussions on Annuitant mortality trends, Life insurance company pension plans, Reserve strengthening, Mortality studies, Gross premiums and dividends, and Group insurance. There are also digests of a 'smaller company' forum and of a forum on individual health and accident insurance.