

The Low Valued Risk—A Study of the Premium Required for Habitational Risks of Various Policy Amounts by PHILIP G. BUFFINTON.

It has been the practice in the United States to charge the same premium per \$100 of insurance for fire insurance on all dwellings in a state or territory meeting a particular construction and fire protection standard. For a long time it has been realized that the premiums charged for the smaller policies are inadequate both on account of the poor loss experience and the high expenses in relation to the premiums charged. As a result, in a number of states a new rating plan has been developed under which a dollar "loss constant" is charged in addition to a premium proportional to the amount of insurance. This has the effect of increasing the premium for small amounts of insurance quite considerably and reducing the premium for the larger risks. Philip Buffinton's study gives important statistical support for this rate making change.

The Latest Reported Stock Insurance Company Expenses for 1961 by FRANK HARWAYNE.

This paper contains an extensive tabulation of expenses by line of business and premium volume for the year 1961, and is a continuation of a paper published in the previous volume of the Proceedings.

Negative Binominal Rationale by THOMAS O. CARLSON.

This paper is a review of recent work on the negative binominal distribution and presents an interesting link between the distribution of individual claims and the distribution of accidents (wherein a multiple claim accident receives only one count).

In an invitational address, Henry S. Beers speculates on "Tomorrow's actuary" and in a presidential address your reviewer discusses "Actuarial Aspects of Industry Problems". The seminar reports include two rate making problems (excess coverages and package policies), the analysis of the financial reports of Unites States Companies and the control of average claim costs. The remarks of three of the speakers at a panel discussion on the future of rate making are recorded. The Proceedings also includes a *Report on Credibility* which is reviewed on page 308 of Volume II of the Astin Bulletin.

SOCIETY OF ACTUARIES

The 1962 Transactions of the Society of Actuaries (Volume 14) contains two papers of especial interest to ASTIN members.

Actuarial Application of Monte Carlo Technique by RUSSELL M. COLLINS, Jr.

Many ASTIN members are interested in the use of modern mathematical and statistical techniques in actuarial studies. There has been much written about the theoretical use of the mathematical tools now available but examples of their practical application to actual data are comparatively rare. This paper which applies the Monte Carlo method to a problem in Group Life

insurance is therefore of interest since the method is equally applicable in the non-life field.

An Introduction to Collective Risk Theory and Its Application to Stop-Loss Reinsurance by Dr. PAUL M. KAHN.

The purpose of this paper has been to present to the American actuary some of the methods and results of risk theory and to stimulate consideration of it on this side of the Atlantic. Dr. Paul Kahn provides a discussion of the distribution problem inherent in the collective theory of risk, a brief outline of the ruin problem and an application of the distribution theory to stop-loss reinsurance which, by its very nature, invites the application of collective risk theory. He concludes with some discussion of the usefulness of this work and of more useful tools which may be developed.

L. H. Longley-Cook

Austauschbare stochastische Variablen und ihre Grenzwertsätze by HANS BÜHLMANN. University of California Press, Berkeley 1960.

In non-life insurance, the mathematical models frequently proceed from the simplifying assumption that the variables investigated are stochastically independent. This hypothesis generally does lead to a lucid presentation, however, practical experience has shown that under the assumption of independence, it often becomes difficult to reproduce the actual conditions satisfactorily. The investigation of dependent variables is therefore not merely of theoretical interest. The author of the present thesis deals with a special type of dependence, viz. exchangeability. This concept was introduced by de Finetti some time ago (1931, in a work in the "Mem. Reale Academia Naz. Lincei"), but has received little attention so far. A series of stochastic variables X_t is called exchangeable, if the distribution function for each finite selection $X_{i_1}, X_{i_2}, \dots, X_{i_n}$ is identical to that of X_1, X_2, \dots, X_n , i.e.

$$F_{X_{i_1}, X_{i_2}, X_{i_n}}(x_1, x_2, \dots, x_n) = F_{X_1, X_2, \dots, X_n}(x_1, x_2, \dots, x_n)$$

The problems, which arise through the introduction of this new concept, are dealt with by the author in three chapters.

The basis of the theory is a proposition by de Finetti, which—as formulated by Loève—proves that every infinite series of exchangeable random variables can—in a certain well-defined sense—be regarded as conditionally independent and identically distributed. The analysis of the concepts 'exchangeable' and 'conditionally independent' and the proof of their equivalence form the contents of the first part.

In the second section, the author investigates the solution of the central limit theorem for exchangeable variables. Assuming finite variance of the variables X_t , it appears that the class of the possible limit distributions of

standardized sums $S_n = \sum_{i=1}^n \frac{X_i}{B_n}$ coincides with the class of weighted normal

distributions. Degenerate distributions occur in special cases. The question as to the necessary and sufficient conditions for the convergence permits a precise answer. In particular, the proposition holds good that for $B_n = \sqrt{n}$ the standardized partial sums of a sequence with mean 0 and variance σ_0^2 tend to the normal limit distribution if, and only if,