7. With slight accidents excluded, data are also available for comparing the accident rates of motor scooters with other motor cycles of the same cylinder capacity. There is no evidence of any difference in the accident rates.
8. Few riders change from one category of two-wheeled machine to another. Among riders under 21 the commonest change is from moped to motor cycle, but this accounts for only 10 per cent of those riding motor cycles. Very few motor cyclists gained their first experience on a motor scooter.
9. All findings involving *mileage* are subject to the motor cycle owner's accuracy in reporting his mileage over the "last four weeks". Independent evidence suggests that moped owners considerably overstated their mileage but other motor cyclists were, as a group, reasonably accurate.

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Some significance tests for identifying deviating accident risks of large industrial enterprises, by J. VAN KLINKEN. *Actuariële Studiën*, January 1961.

In the paper "Ein theoretischer Beitrag zur statistischen Erfassung der Gesamtbetriebsunfallkosten" ("Mitteilungen der Vereinigung schweizerischer Versicherungsmathematiker", Band 58, Heft 1) the author, H. Bühlmann, gives a model for the representation of the net liabilities in the form of a product-distribution. This model forms the basis of the report in question, but, instead of only one type of accident, the author considers a few types in such a way that the distribution used is representative for each of these types. The method offers some advantages, especially if the frequency distribution of the benefits is not unimodal. The numbers N_i of accidents of type i are assumed to be Poisson-variables with parameters λ_i (not specified by Bühlmann); thus $n_i = N_i/w$ (w = number of man-years) has a normal distribution $N(\lambda_i, \lambda_i/w)$. For the second class of stochastic variables the costs of one observed accident of type i related to the wage level l, a transformated Γ-distribution with parameters α_i, β_i, γ_i is assumed (Bühlmann takes an ordinary Γ-distribution, defined in $[0, \infty]$). If there are k types of accidents the sum of the net liabilities related to the amount of wages is simply $\sum_{i=1}^{k} n_i x_i$, where $x_i = X_i/(N_i l)$ (X_i = sum of the accident compensations of type i), and its distribution can be derived by means of the assumptions mentioned.

The determination of the parameters λ_i, α_i, β_i, γ_i is done by usual estimation procedures. For λ_i the MLH-estimator is given; the α_i, β_i, γ_i ($\alpha_i \neq 0$) are estimated by the method of moments, whilst in the special case $\alpha = 0$, two other possibilities are indicated with the solution of the MLH-equations and the rather simple use of expectation and mode.

The main object of the paper is to find some methods for deciding whether accident-risk differences between a certain enterprise and the assumed risk level of the industrial group into which the enterprise is classified, are significant or not. This problem is solved by the use of significance tests. Starting from the described probability model the author proposes for the general case and for special assumptions several statistics which are appro-

ximately χ^2- or normal-distributed and which can serve as a basis for the desired investigation. J. K.

Versicherung und Risiko, by PAUL BRAESS, Köln. Betriebswissenschaftlicher Verlag Dr. Th. Gabler, Wiesbaden 1960 *).

This publication gives an introduction to the so-called individual theory of risk and subsequent problems. By means of the relative standard deviation of the total sum to be paid in one year which, in the simpliest case with equal sums at risk, is given by the well known expression

$$S = \sqrt{\frac{1 - q}{n\,q}}$$

q = claim rate
n = number of independent risks

the influence of

the extent of the portfolio,
heterogeneous sums at risk,
variations in the claim rates,
partial claims,
repeated claims, etc.

is discussed. Well chosen examples illustrate the results obtained. The mathematical analyses by Dr. Gertrud Jäger and Dipl. Math. Hermann Fangmeyer are separated from the main part and collected in two special appendices.

The purpose of this publication is to provide an elementary approach of risk theory to the mathematically untrained insurance employee. Therefore only a limited mathematical knowledge is presupposed and the results of modern literature, especially of the collective risk theory, are not taken into account. The author's objective is largely justified since, apart from a rather restricted group of actuaries especially interested in these problems, the main results of risk theory are scarcely known in the insurance world.

On the other hand the question arises whether the goal aspired by the author may, in fact, be realized by using his methods. Readers not familiar with mathematical statistics and the theory of probability might already be troubled by the abstract nature of the risk standard S. The difficulty would probably be somewhat reduced if the distribution concept were to be chosen as the starting point. The risk standard S as a measure of dispersion of the various distributions according to the essential risk properties of the portfolio in question, might then be more easily understood.

The book represents a valuable contribution to actuarial literature. The desired propagation—in particular in not especially actuarial circles—would be facilitated however if the book could be available independently of the whole compendium. H. A.

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*) This book is a part of the compendium "Die Wirtschaftswissenschaften" (Economic science) published by Prof. E. Gutenberg. Complete edition 8000 pages, 48 issues (appearing monthly at DM 8.70; 25th issue).—No purchase of single issues permitted.