are practically the same for methods three and four, while for the other two methods the results diverge with increasing retention limits.

In part III the author gives a wider set of transformations than the set considered by Borch. He asserts the theorem of Borch that stop-loss reinsurance minimizes the variance if a fixed amount is available for reinsurance premiums. In part IV Jackson's and Ammeter's methods for group experience rating are mentioned. It is shown that this process is intimately connected with stop-loss reinsurance and that there exist interrelationships between the different methods, the formulae of Jackson being special cases of Ammeter's formulae.

A valuable feature of this thesis lies in the fact that it not only deals with the theoretical aspects but also enumerates practical applications.

An Introduction to Credibility Theory, by L. H. LONGLEY-COOK, *published by the Casualty Actuarial Society*, 200 E. 42nd Street, New York 17, N.Y. (price $ 1.50).

Liability and property insurers are often faced with problems for which the data are incomplete or usable only in a very indirect way. The determination of the statistical reliability of rates derived from such incomplete data and the relative weight to be given to indications of such experience are therefore matters of considerable importance.

In 1914 Professor Mowbray presented one of the first discussions of the reliability of exposure and his theory has been followed by almost every subsequent writer. Today, although a rather extensive literature exists on reliability of experience or "credibility", there is no elementary introduction available. Without a good background knowledge of the subject it is sometimes very difficult to fully comprehend some of the numerous papers.

This gap has been filled by an excellent paper by Mr. L. H. Longley-Cook. At the request of the Educational Committee of the Casualty Actuarial Society the author has prepared this introduction to provide actuaries and others interested in credibility theory with a framework into which they can fit these papers.

The purpose of the paper was to give an introduction to the subject and to avoid complicated mathematics. The author has therefore concentrated on principles rather than details and referred in an appendix to the extensive literature existing in this theory. The meaning of credibility and the need for a mathematical model are clearly explained, and, with a minimum of mathematics, the reader is acquainted with the formula first derived by Mowbray:

$$P = 2\left[\frac{1}{\sqrt{2\pi}}\int_0^{k\sqrt{nq}} e^{\frac{-t^2}{2}}\,dt\right]$$

n = number of exposures in one year

q = average number of accidents

k = maximum departure from expected

A few examples of the use of this formula are demonstrated, e.g. an accepted standard of credibility is 1082 claims corresponding to P equal 90 % and k equal 5 %.

In a second model the distribution of the losses by size is discussed introducing the Log-normal distribution, while in a third model the Poisson distribution in model one is replaced by the Negative Binomial distribution by assuming that the distribution of probabilities of accident within the classification follows a Pearson-Type III curve. The problems of partial credibility, stability in rate revision, rate relativities, credibility and experience rating plans, merit rating, reinsurance and profit-sharing are treated and complete this most interesting paper.

This outline on the different problems involved in credibility helps to enrich the literature. It may be recommended to all actuaries.

The Classification of Accident Risks, by J. VAN KLINKEN (*Internationale Zeitschrift für versicherungsmathematische und statistische Probleme der sozialen Sicherheit*, Nr. 5-6, 1960).

This paper deals with certain problems of classifying risks. Under the provisions of the Dutch Accident Act all enterprises pay premiums according to a risk number previously allotted to them and based on earlier experience. The problem of determining new risk numbers arises when a new enterprise has to be insured.

In section 1 the author shows that the classification is reduced to a regression problem if the total number of accidents only is considered, thus neglecting subdivision into certain types of accident. A modified minimum χ^2 method is mostly used in cases when a Poisson distribution is justified.

Section 2 deals with the so-called discriminant function technique. Detailed information of the number of accidents according to definite types requires multi-variate methods. Again the application of multiple Poisson distributions leads to particularly simple solutions.

Finally, in section 3, some tests in connection with discriminant analysis are described. These tests permit objective standards to be obtained for classification purposes and are based mainly on the scheme of multiple Poisson distributions.

M.D.