One of our impressions about Table 16 might be that differences between successive distributions are trivial. Suppose we find the one year probability distributions associated with groups of 100 motorists where each individual within a group has the same λ and μ. In Table 17 we evaluate $S_{100}(1)$ for various combinations of λ and μ, remembering that the evaluation is the same as that for $X(100)$, the total accident costs acquired by an individual over a period of 100 years (assuming unchanging parameters). No longer do the differences between distributions appear inconsequential, but rather distinct differences in performance between groups of like individuals are apparent. The casualty insurance industry has recognized this, of course, through use of classification plans.

In Table 17 we observe that the standard deviation of mean accident costs, $\sqrt{Var(S/100)}$, is quite large relative to average costs, $E(S/100)$. To show how our predictions about average costs become more reliable as k is increased, in Table 18 we find distribution functions of $S_{1000}(1)$, i.e., for $k = 1000$ and $t = 1$. We also see how the distributions are approaching "normality" as indicated by the asymtotic distribution of the standardized $S_k(t)/k$ random variable displayed as (23).

13. RELEVANCY

At a time when proposals for no-fault automobile accident insurance plans have been introduced in the legislatures of New York and other states, perhaps it is time for the Casualty Actuarial Society to consider new techniques in the event of a universal change in state insurance laws. This writer has described a model which he believes is applicable in a no-fault insurance system.

DISCUSSION BY LESTER B. DROPKIN

Don Weber's paper, "A Stochastic Approach to Automobile Compensation," provides us with a most interesting approach to a subject of considerable current concern. If there were those who thought that the problem of pricing a "no-fault" automobile insurance system was still somewhat academic when the paper was presented last May, more recent events will have quickly brought the realization that the problem is now squarely in the forefront.

Whatever the case may have been at one time, today the unmodified term "no-fault" does not uniquely describe a single system. Rather, the various events which might initiate a claim, and the amounts of such claims, will vary substantially according to the particular specifications of particular systems. However, because the paper is basically presenting an approach — that is, a theoretical model — it is possible to consider the general aspects, which should have a fairly wide range of useful application, separately from the specific numerical facts and results, which may have more limited areas of pertinency.

Indeed, to this reviewer, one of the prime virtues of the model is that it may serve not only in connection with no-fault systems, but also in connection with the traditional third party liability system. Consider, for example, the claim frequency component. If it may be assumed that associated with each insured is a claim event parameter, λ; that λ is constant over the time period of interest; that claims occur according to a Poisson process; and that λ is a linear function of certain criteria variables — then the model is as equally useful in the one system as the other. Whether one is dealing with claim occurrences arising out of an involvement irrespective of fault or a liability claim, or whether he may be using a particular set of criteria variables in one case and another set in the other, in both instances the abstract structure — the model — is the same.

Although the objective of the author is the determination of the distribution of total costs, in fact the paper may be viewed as being composed of three distinct parts. The first part considers the claim frequency component; the second, the claim cost; the third combines the two components to arrive at total cost.

The concept of an insured having an inherent accident rate potential which should be an estimable function of some set of criterion variables, is not, of course, new. However, what the author does do in the present paper is to present, in a very neat blend of theoretical and practical work, a concrete example of a method which results in the setting out of an explicit functional relationship.

Since the reader may not be wholly familiar with the author's least squares procedure which is an extension of the classical least squares situation, it may be of help to the reader to point out two basic points. In classical least squares, a situation of equal variances is assumed. That is, $Var\ (N_j)$ would be equal to $Var\ (N_k)$ for the j^{th} and k^{th} individuals. This assumption no longer holds in the situation of interest here, and it is this absence of equal variances which results in the introduction of the diagonal matrix, V.

The second point is that, since we are dealing with a Poisson process, we know something about these variances along the diagonal of V; viz., that $Var\ (N_j)$ equals $\epsilon(N_j)$, which is, itself, being taken as a linear combination of the criteria variables.

There is one aspect of the treatment of the claim frequency component which this reviewer would have very much liked to have seen in the paper. The paper starts out with the observation that claim involvements follow a negative binomial distribution. This implies a particular distribution of λ in the population. Having subsequently worked out the functional relationship for determining λ, it should be relatively straightforward to compare the distribution of the λ's so determined with the Pearson type III distribution of the λ's underlying the negative binomial.

Many readers will find themselves on somewhat more familiar ground when the subject turns to the question of the distribution of the amount of a claim once the claim initiating event has occurred. Familiar, and yet not quite so. The concept that an observed size of claim distribution for a population may be the result of a mixing of individual exponential distributions is quite intriguing and deserves to be followed up; again, even outside of the immediate concern with "no-fault" systems.

Having separately determined the individual accident rate potential and claim cost distribution, the author proceeds to establish total costs along a well known path. In connection with this last part of the paper, we can note one of the advantages of a paper that combines its theoretical considerations with numeric data, viz., that the reader can get a real feel for what is going on and a real sense of how certain quantities change with changes in the values of the parameters.

This review would not be complete without the following comment: A paper of not inconsiderable size, utilizing mathematics, can be something of a chore to get through. We are therefore all the more appreciative of the fact that Don Weber's paper is well-written and most readable.

This is a paper which undoubtedly will be referred to often. It represents a most welcome addition to the *Proceedings*.