PROCEEDINGS

OF THE

Casualty Actuarial Society

ORGANIZED 1914

CONTENTS OF VOLUME L

CONTENTS OF VOLUME L (Cont.)

NOTICE

The Society is not responsible for statements or opinions expressed in the articles, criticisms, and discussions published in these *Proceedings*.

PROCEEDINGS

MAY 20, 21 and 22, 1963

ACTUARIAL NOTE: FIXED AND VARIABLE EXPENSES

LEWIS H. ROBERTS

A variety of meanings appear to have been attached to the expression "fixed expenses," with the result that we sometimes find ourselves talking at cross-purposes. The intent of this note is to see if any clarification is possible.

A cost which does not depend upon a particular variable is by definition constant, or fixed, with respect to that variable. For example, administrative costs do not depend upon premium rates although both may depend upon the value of money. A rate increase or a rate decrease does not affect the cost of underwriting, bookkeeping, etc. Administrative costs can therefore be logically regarded as fixed with respect to premium rates. Such costs, however, are obviously not fixed with respect to time since they depend upon the value of money and other factors, such as technology, which change with time.

It might be observed that administrative costs, although fixed with respect to premium rates, are not fixed with respect to premiums since policies with larger premiums often involve more underwriting expense than policies with smaller premiums.

The dependence, however, is indirect. Where the larger premium is a consequence only of higher rates there is no necessary dependence. The controlling factor is the amount of work entailed which, although correlated to some degree with premiums, actually depends on such factors as the complexity of the risk, the need for inspection, expected costs of loss adjustment, etc. The degree of correlation between administrative costs and size of premium will therefore be negligible when variations in premium size are due only to variations in rate for a given kind of business. Where, however, variations in premium are associated with variations in exposure there will often be corresponding, but smaller, variations in administrative costs. Hence administrative costs are in some cases unrelated to premium and in other cases weakly related. Care is necessary to avoid error.

Another sense in which costs can properly be regarded as fixed is as a minimum. If, for example, it is known that a cost of at least $4 is incurred for every policy of a certain kind put on the books, then the fixed cost of this policy is $4 in the sense that $4 is the constant term in a mathematical equation. As such it will contain some elements of administrative cost but not necessarily all. Inspection, for example, could hardly be included.

A third sense in which costs can properly be regarded as fixed is reflected in the "out-of-pocket" cost principle, to which reference is frequently made in ratemaking for public utilities. Here, if a given increment to a carrier's total business will produce more revenue than the resulting increment to expenses, the new business is said to cover out-of-pocket costs. Any excess is a contribution toward overhead and profit. Fixed expenses here are all those which are not increased. The problem of defining fixed expenses in such cases is complicated by the fact that, whereas an increment of one size may not affect certain costs, a larger increment will do so. Each case must be analyzed from its own facts. It is apropos to remark here that where competition leads to widespread use of rates sufficient only to cover out-of-pocket costs, financial failures can be expected.

Contrasting with fixed costs, certain costs such as commissions, premium taxes, and assessments are clearly variable with respect to premiums. The correlation here is complete within a kind of business subject to the same tax rates. Another kind of variable cost is allocated overhead. This paradoxical definition arises from the fact that important "fixed" expenses must be covered one way or another. One way is to allocate them arbitrarily as a function of premium, say as a constant percentage. If the allocation at every instant is in proportion to "standardized premium in force,"* then the fixed expenses so allocated are made a function of earned premium by fiat.

It is no wonder, considering the foregoing, that different meanings have been attached to the expression "fixed expenses." Different things are meant in different contexts. The Author suggests that when we refer to "fixed" expenses we take pains to be sure that the sense in which the word is used is clear. The use of such expressions as "costs independent of premium," "minimum costs per policy," "costs independent of exposure," etc., would make for better understanding in many cases.

DISCUSSION BY PAUL S. LISCORD

As one who is constantly being tripped up by terminology I find Mr. Roberts' paper on Fixed and Variable Expenses extremely helpful. It should be required reading for those of us who are faced with the forthcoming study of expenses by size of risk for Workmen's Compensation on Liability lines.

Such a study after all concerns itself with an analysis of "fixed expenses" which include those defined by Mr. Roberts as " '. . . costs independent of premium,' 'minimum costs per policy', 'costs independent of exposure,' etc." The fact that these expenses are subsequently related to premiums (by size) only makes it of increasing importance to recognize differences not only in terminology, but also in measurability and controllability.

We are indebted to Mr. Roberts for what I hope is an introduction to many more contributions to our *Proceedings* on this subject.

---

* An expression coined by the author to denote the value obtained by dividing each premium in force by the term which it covers and adding the quotients. Integration of this sum with respect to time yields earned premium.

DISCUSSION BY JOHN H. MUETTERTIES

This actuarial note under discussion "Fixed and Variable Expenses" has as its closing remark a little philosophy which we are all aware of, but many times it is forgotten. Mr. Lewis Roberts suggests that ". . . we take pains to be sure that the sense in which the word is used is clear. . . ." Also, that more descriptive terms be used instead of a general word ". . . would make for better understanding in many cases."

This reviewer is sure that all of us can recall when we have used general undescriptive terms (knowing full well what we meant) but have not been understood by others.

The author's closing remarks are so very true especially when referring to general undescriptive terms as fixed and variable expense. Fixed and variable to what? Something like the over used term of "off-balance"; off-balance to what? We, in this actuarial profession, should advocate a course in completed terminology, with Mr. Roberts' paper as a start in this one area.

This brief actuarial note moves right along and it is easy to agree with the presentation as you read it. But then, on the other hand, when applied to a specific problem it may not be easy to follow a general pattern. For example, to consider allocated overhead as a variable expense item may only work when pricing additions to a portfolio. But it generally remains a fixed expense item when pricing a deviation or a rate change. Of course, the normal effects of inflation must be included.

In getting down to specifics and possibly this is where the paper left off, we must apply our definitions of what kind of expenses we are dealing with and how do they react to different situations to be priced out or evaluated. We could be pricing out or evaluating a rate revision, a deviation, a discount, a risk's profit potential or the outside effects on our business. What we are really after is this — holding some things constant and varying others — what effect does a certain change have on our business. We are in a way forecasting what the different elements of a profit and loss statement will become after some kind of a change.

In pricing out or evaluating a situation, the effect on expenses is of importance. Are certain expenses affected by certain changes or are they constant? If constant, are they constant as to dollars or percentages? So, possibly instead of using the terms fixed and variable, we could in a general way have expenses constant either as to dollars or percentage.

Therefore, we would like to propose the use of the words "dollar" expenses and "percentage" expenses as being only slightly more descriptive as to their values under certain conditions. Dollar expenses — wherein the dollars do not necessarily change as the premiums may change. Percentage expenses — wherein the percentage does not necessarily change as the premiums may change. We should, also, consider this in the terms of fixed and variable "dollar" expenses and fixed and variable "percentage" expenses.

Mr. Roberts has started our course in terminology and has warned us to be careful. May this review add to the course and warning.

INSURANCE RATES WITH MINIMUM BIAS

ROBERT A. BAILEY

INTRODUCTION

The paper presents specific methods for obtaining insurance rates that are as accurate as possible for each class and territory and so on. Many of the techniques presented in the paper are already in use by the various bureaus and other ratemakers in one form or another. With the increasing use of electronic computers, there is the opportunity to use them in new ways to improve the accuracy of our ratemaking methods and to reduce the vast mass of statistical detail down to a meaningful set of answers. The methods in this paper are methods that we have used to analyse some of the data in our company.

THE RATEMAKING PROBLEM

In making rates for insurance we are faced with the problem that there are many different classes of risks with a different rate for each class, and that no one class by itself has a sufficient volume of premiums and losses to give a reliable basis for the rate for that class. A simple and practical solution to this problem is to make a rate for each class on the basis of judgment, then to adjust all the class rates up or down by a uniform percentage in order to produce the proper total amount of premium for all classes within one general category. This is a sound procedure under certain conditions and is used in many areas.

It often happens that the classes within one general category can be grouped in such a manner that each group has a sufficient volume of premiums and losses to provide a reliable indication of how much all the rates within each group should be adjusted. An example of this is found in property insurance on dwellings and in Homeowners insurance where the classes are sometimes grouped by type of construction: frame, brick, and fire resistive. Instead of adjusting all dwelling insurance rates by the same percentage, a different adjustment is made for each type of construction. Sometimes the classes in dwelling insurance are grouped by amount of insurance and a different adjustment is made for each amount of insurance. This procedure is better than applying the same adjustment to all classes, but it can only be used when the volume of data is sufficient to provide a reliable indication for each group.

It often happens that the classes within one general category can be grouped in more than one manner. (It should be noted here that we are concerned more with what can be analysed than with what is analysed in every case.) For example, the data for dwelling insurance might be grouped by type of construction and the same data might also be regrouped by amount of insurance. One set of adjustments would be determined for the types of construction and another set for various amounts of insurance. Then each class would receive two adjustments. For example, all the rates for small

brick dwellings would receive the adjustment for brick construction and also the adjustment for small amount of insurance. If the same data had also been regrouped into geographical territories and again regrouped by type of fire protection, then each rate would receive four adjustments.

When the same data is successively regrouped in several ways we obtain larger groups with correspondingly greater reliability of the indications, than if we made all the subdivisions simultaneously. For example, the data for all brick dwellings and also for all small dwellings may be sufficient to be reliable whereas the data for small brick dwellings might not be sufficient to be reliable. We naturally would prefer to adjust the rates for small brick dwellings entirely on the basis of the data for small brick dwellings, but if that data is not sufficient to be reliable, we usually find it better to combine the small brick dwelling classes with other groups of classes, as in our example, to produce one adjustment for brick dwellings and another for small dwellings.

Although we may get a more reliable indicated adjustment for brick dwellings by combining all brick classes, and a more reliable indicated adjustment for small dwellings by combining all small dwelling classes, we cannot be so confident that the adjustment for brick dwellings and the adjustment for small dwellings will combine to produce the proper net adjustment for small brick dwellings. The data for small brick dwellings may be insufficient to be fully reliable but it will always provide some information. So we should look at it and take it into consideration. We should try to use a ratemaking system which, instead of producing each set of adjustments successively one after another, produces all sets of adjustments simultaneously. In this way the adjustments for brick dwellings and for small dwellings will both reflect the indication of small brick dwellings as well as the total for brick dwellings and the total for small dwellings. Such a system will produce a better result than a system which ignores the data in each subdivision. Such a system will be set forth in more detail later.

Such a system might possibly be used for fire insurance rates for all commercial risks rated according to the same fire rating schedule, where the data might be subdivided by construction, protection, occupancy, territory, and any other characteristics that are considered important. Such a system could very easily be used in various lines of casualty insurance such as private passenger automobile insurance where the data might be subdivided by territory, class of driver, value of car, age of car, size of deductible, limit of liability, merit rating, whether collision coverage is included or not and so on.

CENTS OR PERCENTS

If the premiums and losses for all classes are combined to produce one adjustment for all classes, it often makes little difference whether we use an adjustment which adds the same number of cents to each rate or an adjustment which increases each rate by the same percent. The relationships among

the class rates are not seriously disturbed either way. We can select the type of adjustment which, in our judgment, is more proper for the kind of insurance involved. But when the data is to be divided four different ways with four different adjustments to be applied to each rate, the difference between cents and percents becomes greater. The product of four percents can be materially different than the sum of four amounts of cents. If we produce each set of adjustments successively one after another, we will have to rely entirely on judgment to decide whether each set of adjustments should be cents or percents. But if we produce two or more sets of adjustments simultaneously, we can use the indications of each minor subdivision of the data to tell us which type of adjustment will fit the data better. So an added advantage of computing more than one set of adjustments simultaneously is that we can at the same time determine which type of adjustment is better: cents, percents, a combination of the two, or some other formula relationship among classes.

The Analytic System for the Measurement of Relative Fire Hazard, developed by Mr. A. F. Dean, which is used to establish the rates for commercial buildings in many areas of the United States uses a combination of cents and percents. It is based on fire protection engineering judgment. A system of analysing the premiums and losses developed under such a rating schedule might enable us to test whether cents or percents should be used for several of the more important characteristics recognized by such a schedule.

AN UNBIASED ESTIMATOR WITH MINIMUM VARIANCE

In mathematical statistics the best estimator is defined as the unbiased estimator which has the least variance. For any one mathematical frequency distribution, such as the normal distribution or the Poisson distribution or the negative binomial distribution, there are many unbiased estimators of the mean, sometimes an unlimited number, and the classical problem is to determine which unbiased estimator has the least variance. "Least variance" is equivalent to "most reliable." This problem has been solved for most mathematical distributions.

But in insurance statistics we don't have the luxury of many unbiased estimators to choose from. In fact, we have not yet found even one unbiased estimator. To be sure, when we combine all classes to produce a single adjustment for all classes, the sample mean is unbiased and the resulting adjustment is unbiased in the aggregate, but none of us believe that the resulting rates are unbiased for each class. That is why we subdivide the data when we can. The more we can subdivide the data, the less biased are the resulting rates for each class. But even though we subdivide the data several different ways we are not confident that, for example, the adjustment for young drivers and the adjustment for merit rating combine to produce an unbiased adjustment for young merit rated drivers. So in insurance statistics our big problem is to find the estimator with the least bias.

AN ESTIMATOR WITH MINIMUM BIAS

Suppose that a body of insurance data can be subdivided four different ways into i occupancies, j territories, k constructions and l protections. Suppose further that the total data for each occupancy is considered to be reliable, and similarly for the totals for each territory, each construction and each protection. It is axiomatic, then, that an estimator with minimum bias must produce a total premium for each occupancy exactly equal to the total premium indicated by the total losses for that occupancy, and similarly for each territory, construction and protection. In other words, the estimator with minimum bias must be unbiased in the aggregate for each occupancy, and for each territory, and so on.

If the body of data is only subdivided one way into i occupancies, each of which is considered large enough to be reliable, we simply base the rate for each occupancy on the total for that occupancy. There is only one set of estimators with minimum bias in such a case. But when the data is subdivided in more than one way, such as in the example above with four different ways, there is more than one set of estimators that will be unbiased in the totals. It is possible to devise more than one different set of rates which will produce the same premium totals for each occupancy, each territory, each construction, and each protection. Which set has the minimum bias?

In other words, we seek an estimator that is unbiased for the totals for each occupancy, and so on, and has minimium bias for the multiple subdivisions of the data, where the data is subdivided in all four ways simultaneously. Because the data for each multiple subdivision is not considered fully reliable, we know that the data in each such subdivision will differ from the net adjustment produced for that subdivision. So any set of adjustments will not fit the data in each multiple subdivision at least to the extent of chance variations. Different sets of estimators will differ in different degrees which means that some of them at least will differ more than purely chance variation would account for. So we seek the set of estimators with minimum bias, that is, the set that fits all the data most closely.

Given a certain amount of expected losses for each risk and a certain distribution of actual losses about the mean for each risk, the distribution of actual losses for each class or group of classes will depend on how many risks are included in that class or group of classes. We can see then that the composite distribution of the actual losses about the true population values for the whole body of data and all its subdivisions will be different for every ratemaking study we make and very difficult to calculate. Seeking for an estimator with minimum bias when we are dealing with an unknown distribution which will be different for each set of data we encounter is a problem which will have to be solved in an empirical manner.

A body of data that is subdivided four different ways may have a thousand different sets of estimators that are unbiased for the totals for each occupancy, territory, and so on. For practical reasons we will not compute all possible

sets. We will probably be satisfied if we compute three or four different sets and test each one for its degree of bias.

RATES THAT ARE UNBIASED IN THE AGGREGATE

As mentioned above, there are usually more than one set of estimated rates that are unbiased in the aggregate. If we can calculate several such sets we can then test them to see which one has the least bias for the multiple subdivisions of the data. An efficient way to calculate a set of estimated rates that are unbiased in the aggregate for each occupancy, each territory, and so on is to set up a formula for the average deviation of the estimated rates from the data for each occupancy, set the average deviation equal to zero, and derive a formula for the estimator for each occupancy. Using a predetermined set of estimators for each territory, construction, and protection, we can solve the formula for the estimator for each occupancy. We can then use these calculated estimators for each occupancy to calculate a revised set of estimators for each territory using a similar formula, and continue this process until the estimators stabilize. Examples of the formulas that might be used are shown in the appendix. Needless to say, if there are many subdivisions of the data, this problem is better done on electronic computers than by hand.

MEASURES OF BIAS

In order to compare several sets of estimators to find which one fits the data better, we cannot use the average bias because we used the average bias to compute the estimators. All sets of estimators should have an average bias of zero.

A very practical and easily understood measure is the average absolute difference between the estimated rates and the data for each multiple subdivision of the data. The differences, without regard to sign, are weighted by the number of risks or amount of premium in each subdivision. The usual disadvantage of the average absolute difference is that the derivation of its mathematical distribution is more difficult than for other measures. This is not a disadvantage in our problem here because we are only comparing one estimator with another. We are not trying to derive any mathematical distributions.

A measure of bias which uses the squares of the differences is a good supplement to the average absolute difference, especially if each subdivision has a large volume of data in it so that the distribution of sample values about the true population value is not too different from a normal distribution. The chi-square test is probably the most appropriate such measure. Since the distribution of losses is not normal, the value computed for chi-square will be much larger than for a normal distribution. But this will not be a problem as long as we are simply comparing one set of estimates with another.

If the data is subdivided too finely for the amount of data available, chance variations will overshadow true variations to such an extent that it will be

difficult to tell, from any measure of bias, which relationship is better – cents, percents, or anything else. In such cases the sets of adjustments will have to be analysed two or three sets at a time to determine how the adjustments should be interrelated so as to produce minimum bias. Once the measures of bias have been used in this way to determine how the various sets of adjustments should be interrelated, the actual adjustments can then all be calculated simultaneously.

INCREASING THE RELIABILITY OF THE DATA

We have seen that the more we can subdivide the data, the less biased the resulting rates will be. However, we are limited in our subdivisions by the requirement that the total data in any one subdivision must be sufficient to be reliable. For some kinds of insurance it is possible to increase the reliability of the data by making rates in layers. For example, if the total data for one class of Workmen's Compensation insurance is not fully reliable, perhaps the first $1,000 of each loss would be fully reliable. In Workmen's Compensation insurance in the U.S.A., about half of the rate is for the first $1,000 of each loss. It would be better to base half of a rate on a fully reliable indication of the experience for the first layer for the class, and base the remainder of the rate on some overall indication, than to base the entire rate on an average of the overall indication and an unreliable indication of the total experience for the class.For a thorough discussion of the advantages of using layers rather than percentages of the total experience, see "An Attempt to Determine the Optimum Amount of Stop Loss Reinsurance" by K. Borch, *XVI International Congress of Actuaries,* 1960, Vol. I, p. 597. The principles developed by Mr. Borch are applicable here as well as in reinsurance.

Suppose we divide the losses into three or four layers, for example, the first $1,000 of each loss, the next $2,000, and all losses in excess of $3,000. Then we can subdivide the data in the first layer into much finer detail than we can subdivide the total data and still get fully reliable estimators. This technique of making rates in layers is especially effective when a large proportion of the total losses are small losses.

The combination of the layer technique and the technique outlined above for obtaining rates with minimum bias is a very powerful tool for squeezing every last drop of information out of the data available.

APPENDIX

Let us define x_i as the estimated rate factor for the ith occupancy and y_j, z_k and w_l as the estimated factors for the jth territory, the kth construction and the lth protection, respectively. Let r_{ijkl} be the combined factor indicated by the actual losses and exposures for the n_{ijkl} risk in the ith occupancy, jth territory, kth construction and lth protection.

If all the factors are percents and the estimated rate corresponding to r_{ijkl} is $x_i y_j z_k w_l$:

The average difference for the ith occupancy equals

$$\frac{\sum_{jkl} n_{ijkl}\,(r_{ijkl} - x_i y_j z_k w_l)}{\sum_{jkl} n_{ijkl}\,r_{ijkl}}$$

and similarly for each territory, construction and protection.

The average difference for all classes equals

$$\frac{\sum_{ijkl} n_{ijkl}\,(r_{ijkl} - x_i y_j z_k w_l)}{\sum_{ijkl} n_{ijkl}\,r_{ijkl}}$$

The average absolute difference equals

$$\frac{\sum_{ijkl} n_{ijkl}\,\left|\,r_{ijkl} - x_i y_j z_k w_l\,\right|}{\sum_{ijkl} n_{ijkl}\,r_{ijkl}}$$

The chi-square is proportional to

$$\sum_{ijkl} \frac{n_{ijkl}\,(r_{ijkl} - x_i y_j z_k w_l)^2}{w_i y_j z_k w_l}$$

(See the 1960 *PCAS*, page 17 for the derivation of this chi-square formula.)

Setting the average difference for the ith occupancy equal to zero and solving for x_i we obtain

$$x_i = \frac{\sum_{jkl} n_{ijkl}\,r_{ijkl}}{\sum_{jkl} n_{ijkl}\,y_j z_k w_l}$$

and similarly for y_j, z_k, *and* w_l.

If all the factors are cents and the estimated rate corresponding to r_{ijkl} is $x_i + y_j + z_k + w_l$:

The average difference for the ith occupancy equals

$$\frac{\sum_{jkl} n_{ijkl}\,(r_{ijkl} - x_i - y_j - z_k - w_l)}{\sum_{jkl} n_{ijkl}\,r_{ijkl}}$$

and similarly for each territory, construction and protection.

The average difference for all classes equals

$$\frac{\sum_{ijkl} (r_{ijkl} - x_i - y_j - z_k - w_l)}{\sum_{ijkl} n_{ijkl}\,r_{ijkl}}$$

The average absolute difference equals

$$\frac{\sum\limits_{ijkl} n_{ijkl} \left| r_{ijkl} - x_i - y_j - z_k - w_l \right|}{\sum\limits_{ijkl} n_{ijkl} r_{ijkl}}$$

The chi-square is proportional to

$$\sum\limits_{ijkl} \frac{n_{ijkl} (r_{ijkl} - x_i - y_j - z_k - w_l)^2}{x_i + y_j + z_k + w_l}$$

Setting the average difference for the ith occupancy equal to zero and solving for x_i we obtain

$$x_i = \frac{\sum\limits_{jkl} n_{ijkl} (r_{ijkl} - y_j - z_k - w_l)}{\sum\limits_{jkl} n_{ijkl}}$$

and similarly for y_j, z_k and w_l.

If the factors are some combination of cents and percents, or are based on some other relationship, appropriate formulas can be set up.

DISCUSSION BY JAMES R. BERQUIST

Mr. Bailey's latest paper is, indeed, a timely contribution to the proceedings of our Society. Timely, not only because it provides a method of calculating rates with minimum bias, but also because it provides ideal computer application. Without the aid of a computer the method is, in fact, impractical.

The technique presented in the paper bears careful study by every ratemaker who has the task of calculating territorial or class differentials, and what ratemaker doesn't? Mr. Bailey's technique is designed to calculate the differentials which provide the best "fit" of the data. He solves for each of the various differentials by setting what he defines as the average difference equal to zero, then, by successive approximation he arrives at the set which provides the best fit.

Mr. Bailey goes on to provide an outline of a method of testing the resultant differentials, or "estimators" for minimum bias. The advantage of this system over the systems presently in use is that the differentials so calculated will yield rates which are most nearly correct for, say, "small brick buildings" as well as small buildings in total and brick buildings in total.

It is interesting to note the similarity between this method and "Method 2" advanced by Bailey and Simon in "Two Studies in Automobile Insurance Ratemaking," *PCAS,* Vol. XLVII, which, I believe, should be read in conjunction with this paper.

The equation for x_i, for example, using "Method 2" is

$$x_i = \left[\sum_j \frac{n_{ij} r_{ij}^2}{y_j} \Big/ \sum_j n_{ij} y_j \right]^{\frac{1}{2}}$$

while the comparable equation advanced in this paper would be

$$x_i = \frac{\sum_j n_{ij} r_{ij}}{\sum_j n_{ij} y_j}$$

The following tables show the results of applying the "Minimum Bias Method" to the data presented in that earlier paper.

Table 1 shows the rate relativities produced by this method. Table 2, which compares to Table D on page 16 of "Two Studies in Automobile Insurance Ratemaking," shows how close the combination of the Minimum Bias relativities are to the combination of Method 2 relativities.

TABLE 1

COMPARISON OF RELATIVITIES*

		Customary Method	"Method 2"	Minimum Bias Method		
				First Calculation	Second Calculation	Third Calculation
	x_1	.863	.881	.872	.868	.868
	x_5	1.154	1.161	1.143	1.144	1.143
CLASS	x_3	1.313	1.309	1.288	1.290	1.290
	x_2	1.372	1.367	1.341	1.345	1.345
	x_4	2.269	2.125	2.050	2.089	2.090
	y_1	.895	.906	.918	.919	.919
MERIT	y_2	1.174	1.113	1.129	1.128	1.127
RATING	y_3	1.277	1.215	1.232	1.232	1.232
CLASS	y_4	1.610	1.462	1.486	1.481	1.481

*Source: Tables A, B and C "Two Studies in Automobile Insurance Ratemaking," *PCAS*, Vol. XLVII.

TABLE 2

RELATIVE LOSS RATIOS
Minimum Bias Method — Third Calculation*

i/j	1	2	3	4
1	.798	.979	1.069	1.286
5	1.050	1.288	1.408	1.693
3	1.186	1.454	1.589	1.910
2	1.236	1.516	1.657	1.992
4	1.921	2.355	2.575	3.095

*Compares to Table D.

A fresh numerical example would have aided considerably in understanding the paper, however, after calculating the above "simple" tables, this reviewer now realizes why the author decided against it.

Mr. Bailey is to be congratulated for his generous contributions to our *Proceedings*.

DISCUSSION BY STEPHEN S. MAKGILL

Mr. Bailey has again contributed significantly to our *Proceedings* with the ideas presented in this paper. The ratemaking technique suggested is designed to utilize to the fullest the predictability inherent in the data of each subdivision created by a multiple classification system. Mr. Bailey accomplishes this maximum utilization by producing all sets of adjustments, or relativities, simultaneously. These adjustments may be either cents or percents or a mixture of both, whichever is indicated by tests for minimum bias. Such a technique represents a significant improvement over the common practice of determining percentage relativities for the divisions of each classification, the appropriate relativity from each class then being applied one on top of another to arrive at the final adjustment for a subdivision.

The requirement of complete reliability of the data for each division of each category imposes a certain limit on the applicability of the method as presented, for it sets a substantial minimum to the volume of experience necessary. This points to the necessity of ensuring that all the rating criteria used are contributing significantly to predictability. By eliminating those that do not so contribute, the volume of experience required may be decreased appreciably. The field of meteorology particularly has made great strides in developing screening methods that might well be adapted to our needs in this area.

Mr. Bailey's iterative method of calculating a set of estimated rates that are unbiased in the aggregate seems rather unwieldy, even for computer operations. Improving these techniques offers a highly worthwhile field for further investigation.

The tests for minimum bias described appear most appropriate, and Mr.

Bailey makes an excellent point in regard to the necessity for combining sets where the data is subdivided too finely for the amount of data available.

Still another highly worthwhile technique is suggested when Mr. Bailey touches on the possibility of making rates in layers. As is pointed out, the layer ratemaking technique is especially effective when a large portion of the total losses are small losses. Accordingly, this method may go a long way to solving the problem of the non-reviewed classification in workmen's compensation ratemaking.

While the mathematics of the formulas presented in the Appendix is sound, this reviewer had some difficulty with the definition of terms included. When we are dealing with all factors as percentages, it is not clear what the combined factors are percentages of. Furthermore the product of four factors, all defined as percentages is referred to as an estimated rate at one point. This apparently should have been referred to as an estimated combined factor.

The Society should be most grateful to Mr. Bailey for presenting these interesting ratemaking methods.

RATING BY LAYER OF INSURANCE

RUTH E. SALZMANN

One of the peculiarities of property and casualty insurance is that losses vary by size depending upon the severity of the accident, occurrence, or illness. The insured amount, or limit of liability, is a maximum benefit and is paid only in the event of a very serious or total loss. For the most part, losses are settled for less than the maximum benefit. Because of this "partial loss" feature, an increase or decrease in the insured amount for any one risk does not necessitate a proportional change in the premium charge. This nonproportional or non-linear relationship gives rise to many rating complications, especially when it is coupled with a limitation on the amount of coverage afforded.

Limitations on amounts insured can take many forms. Deductibles, franchises, excess coverage, retentions, coinsurance, and maximums are all ways of limiting coverage. To properly evaluate the cost of the limited insurance protection, it becomes necessary to measure either the proportion of losses eliminated or the proportion of losses remaining. If the forms of limited coverage were standardized, rates could be determined by class rating, simply by adding another set of classification codes. Such a solution would suffer the injustices of all class rating methods which by definition are designed to produce the proper rate for the class (the group to which the risk is assigned) rather than a proper rate for the individual risk itself. But more important, such a solution would not produce the desired flexibility. When limited amounts of insurance protection are sold, it is usually for the purpose of satisfying the individual insured's needs. Thus it is very important that the rating system afford maximum flexibility.

Such flexibility can be accomplished by a method which I propose to call "Rating by Layer of Insurance." This method requires that we measure or evaluate the proportion of losses which fall in each layer of insurance protection. These proportions can be established by analyzing losses by size of loss from which accumulated loss cost distributions can be developed.

The mechanics of developing such distributions are relatively simple, and will be discussed later in the paper. The difficulty in this method of rating is getting the right distribution for the rating problem at hand. In other words, a size of loss distribution developed from one population of risks may not be appropriate for another population of risks. Each size of loss distribution is dependent upon the characteristics inherent in the collection of risks generating the losses. Thus it is necessary to be acquainted with the spread of exposures producing the size of loss distribution before any application of the results can be made. For instance, in major medical insurance we do not expect that the first $200 of benefits will cost the same for a man as for a woman, for an old person as for a young, for a high income person as for a low, for a New York City resident as for a resident of Highland, Wisconsin, nor do we expect that the first $200 will be the same proportion of the total

cost for these respective individuals. In fire insurance, we do not expect that the first $1,000 of protection will cost the same for a $50,000 house as for a $10,000 house, for a frame house as for a brick, for a protected house as for an unprotected one, nor do we expect that the first $1,000 will be the same proportion of the total cost for these respective houses.

Because of these complications it is easy to understand why most size of loss distributions are of limited value and are only appropriate for the collection of risks which generated the losses. Perhaps this explains why so little size-of-loss data has been published. (The one major exception to this general situation is the continuation tables used in A & H insurance.) In any event, there are many complications and dangers inherent in this rating approach. No doubt the rating by layer of insurance from accumulated loss cost distributions is a long way off, but the challenge in exploring its possibilities is most inviting.

For this reason I undertook a study about two years ago to determine whether size of loss distributions bore any direct relationship to "amounts at risk."

In making this study it was necessary to select data which would be relatively pure; that is, free from the influence of unrelated factors. I therefore selected the Homeowners line of business where the insured value, or policy amount, would be a fair approximation of amount at risk. It was expected that under-insurance, if any, would be relatively consistent by class. Any under-insurance in Homeowners should be rather minimal because of the type of risk insured. The homes are relatively new and probably subject to mortgage. In addition to these risk characteristics, the Homeowner policy has a built-in incentive to fully insure because of the replacement cost clause, which comes into operation when the insured value equals 80% of the replacement cost.

And for the losses, I used fire building losses only, excluding contents. It was expected that these losses would have the most direct relationship with policy amount and thus provide the best basis for the study. Also in Homeowners, there is only one policy and one company per insured which eliminates the problem of apportioned or pro rata direct losses.

The study itself included the direct loss data of the Insurance Company of North America (INA) for 1960 incurred year as of May 31, 1961. This data was summarized by claim number so as to accumulate multiple payments on closed claims and accumulate payments with loss reserves on open claims. The total loss for each claim was then ratioed to the amount of insurance on the policy affording the coverage. (The insured amount was available from the statistical code on the loss cards.) The end result was that there was one card with all pertinent data for each claim.

Individual listings of these loss cards were then tabulated for each insured (policy) amount within each construction-protection class; and accumulated loss cost distributions were developed by "% of insured value." The mechanics of developing these distributions are not difficult especially when the

loss data is in the form already described. (Although the C exhibits will be discussed later, the reader may wish to refer to them now because they illustrate the method used.) First, the individual losses are accumulated upward by "% of insured value." This produces an accumulated size of loss distribution from which we can derive the cost of losses not greater than X%. To get the total cost of losses for the layer of insurance up to X%, it is necessary to add to the size of loss data, the loss dollars up to X% in those losses which exceed X%. This is accomplished by multiplying the sum of the policy amounts for losses exceeding X% by X%. The total of these two sets of data:

1. Those losses not greater than X%, and
2. The first X% included in those losses exceeding X% then gives us an accumulated loss cost distribution from which we can derive the cost of losses by layer of insurance.

When these distributions were calculated for the four most popular policy amounts within each protection-construction class, there was little variation by policy amount, thereby indicating a direct relationship between the loss cost distributions and amounts at risk. This comparison is set forth in Exhibit A.

Because this relationship did exist, all policy amounts were consolidated into one accumulated loss cost distribution for each of the four generally used construction-protection classifications: frame-protected, brick-protected, frame-unprotected, brick-unprotected. Graphs showing these distributions are set forth in Exhibits B and B-1. The actual data was then graduated by the method of adjusting second differences to an orderly downward progression. In addition, the brick-protected distribution was adjusted so that the increments in the upper portion of the distribution were no greater than those in the frame-protected distribution. This adjustment was made entirely on the basis of the author's judgment. Exhibits C-1, C-2, C-3 and C-4 set forth these accumulated loss cost distributions and their respective derivations.

In order to rate by layer of insurance, it is necessary to have accumulated loss cost distributions similar to those included in the C exhibits. Examples of how they can be used are set forth below: (The illustrations will be based on Exhibit C-1, thus confining the examples to the building fire peril in the frame-protected classification.)

a. A deductible of 2% of total value — Coverage in this instance would be limited to the proportion of all losses in excess of 2% of the total value of the building. From the accumulated loss cost distribution in column 8, the cost for the layer of insurance eliminated is 29.5% of the cost for full coverage. Thus the credit for a 2% deductible would be 29.5% of the pure premium for full coverage.

b. A maximum benefit equal to 70% of the total value — This coverage eliminates the proportion of losses in excess of 70% of the

total value. The cost for the layer of insurance eliminated is equivalent to 4.6% of the cost for full coverage. (100.0 — 95.4 in column 8.) Thus the credit for this limited coverage would be 4.6% of the pure premium for full coverage. These percentages could also be used for a building with a market value equal to 70% of its replacement cost.

These examples illustrate the promulgation of pure premiums for various layers of insurance via accumulated loss cost distributions. Another example of limited coverage is the franchise clause in property coverages. Although this is not a direct application of the "rating by layer of insurance" method, rates can be derived as a by-product from the data collected. Therefore the following illustration is also included:

   c. A franchise of 5% of total value—Coverage in this instance eliminates all losses which are 5% or less of the total value of the building; the full amount of all losses in excess of 5% is paid. From the accumulated size of loss distribution in column 3, the proportion of losses equal to or less than 5% is 28.2% ($559,257 ÷ $1,981,703). Thus the credit for a 5% franchise would be 28% of the pure premium for full coverage.

This completes the explanation of the study itself.

The benefits of the study are two-fold. First, the results showed that there was a direct relationship between loss cost distributions and amounts at risk. Although this conclusion is what we might have expected, it is interesting to learn that such a premise can be substantiated. The other advantage of the study is in the value of the loss cost distributions themselves. There may be few direct applications of the loss cost data, but such statistics could well serve as a useful yardstick in evaluating other fragmentary size of loss data. At INA, these distributions have been helpful in determining excess of loss quotas, CML experience rating plan credibilities, and credits for deductibles in yacht insurance.

The door is open for many other studies on this general subject. It would be of interest, for instance, if someone could show via this technique that the loss constant method of rating dwellings in the fire field was the equivalent of a fixed charge for the first $X of loss and a variable charge (varying by amount of insurance) for the coverage in excess of $X.

In the reinsurance area, the potential for further exploration in rating by layer of insurance is tremendous. Here a significant contribution could be made if we could isolate sufficient characteristics in the primary carrier's book of business to establish a size of loss distribution that would be appropriate for the collection of risks involved. As reinsurance problems embrace only the upper limits of accumulated loss cost distributions, it may be possible to study such distributions in reverse, from the top down so to speak. In Mr. Longley-Cook's paper, "A Statistical Study of Large Fire Losses with

Application to a Problem in Catastrophe Insurance" (1952 *PCAS*, p. 77), the study was limited to large losses from which a graduated distribution of excess loss costs was developed.

Additional large loss studies may well disclose the existence of a relatively uniform slope in the upper portion of the loss cost curve, thus making it possible to do some reasonably accurate curve fitting for a particular collection of risks after one or two points on the curve can somehow be determined. At the Reinsurance Seminar for our November 1961 meeting (1961 *PCAS*, p. 211), I suggested that the Xth largest loss might serve as such a rating tool. Such a plan is now being tested, where X equals the 3rd largest loss per million dollars of the primary carrier's base premiums subject to the reinsurance cover. This plan incorporates formulas which, when the value of the 3rd largest loss is introduced, will produce expected loss costs (applicable to the experience period involved) for various retentions.

The material presented in this paper should make it abundantly clear that there are many challenges in the rating of nonproportional insurance when limited coverage is made available to the insured. It is hoped that this paper will encourage others to make further studies in this mostly unexplored area.
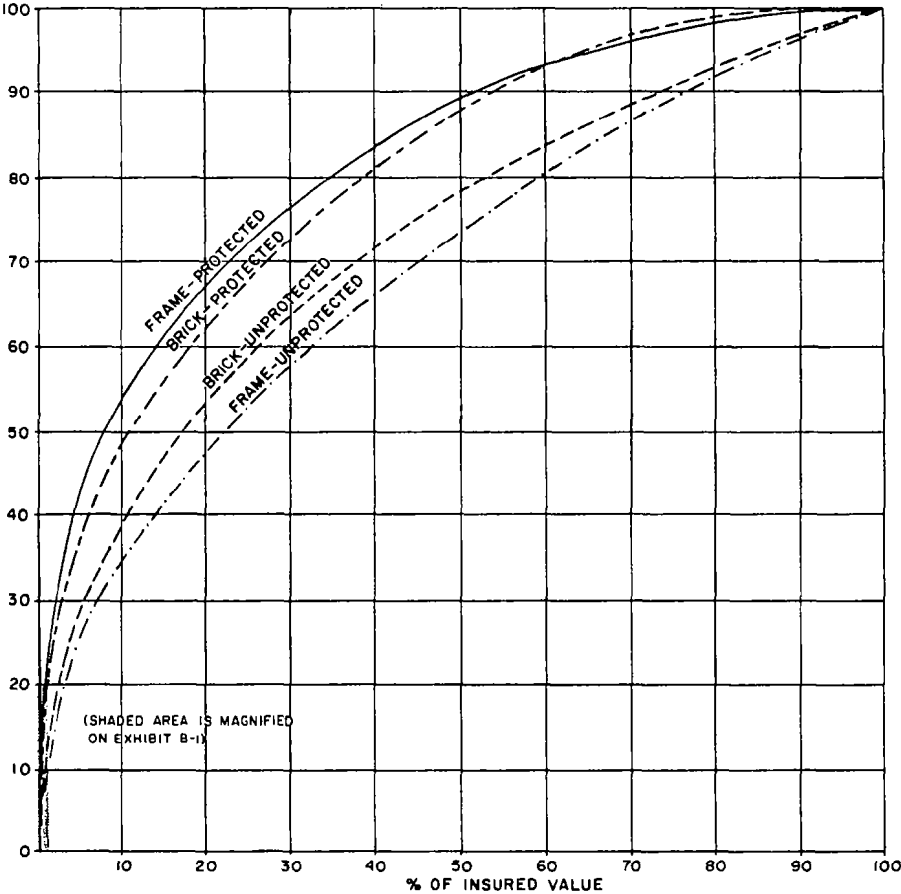
HOMEOWNERS BUILDING FIRE LOSSES
ACCUMULATED LOSS COST DISTRIBUTIONS BY % OF INSURED VALUE
PROTECTED CLASSES

% Of Insured Value	Frame Construction Policy Amount (in thous.)				Brick Construction Policy Amount (in thous.)			
	10	15	20	25	10	15	20	25
0.0 — 1.0	21.0	20.7	25.5	19.3	16.8	19.3	31.7	15.7
0.0 — 2.0	30.3	28.8	35.9	25.8	24.4	26.0	43.7	20.1
0.0 — 3.0	35.9	34.0	42.2	29.6	28.3	29.7	51.7	23.2
0.0 — 4.0	40.3	37.7	46.8	32.7	31.3	32.6	57.2	25.8
0.0 — 5.0	44.0	40.6	50.5	35.3	34.1	35.3	61.9	28.2
0.0 — 6.0	47.1	43.0	53.7	37.7	36.9	37.5	66.3	30.3
0.0 — 7.0	49.8	45.2	56.4	39.9	39.3	39.5	70.0	32.1
0.0 — 8.0	52.1	47.2	58.7	42.1	41.2	41.5	72.9	33.6
0.0 — 9.0	53.7	49.0	60.8	44.0	43.0	43.6	75.8	35.0
0.0 — 10.0	53.1	50.6	62.7	45.7	44.5	45.3	78.4	36.4
0.0 — 12.5	61.0	54.5	66.5	49.5	47.0	49.1	82.1	40.0
0.0 — 15.0	64.8	57.6	69.5	53.2	49.1	52.1	84.3	43.6
0.0 — 20.0	70.9	62.9	73.5	60.1	53.4	57.9	87.3	49.4
0.0 — 25.0	76.3	67.3	76.7	65.7	57.5	63.6	89.1	55.1
0.0 — 30.0	81.0	71.0	79.7	69.8	60.3	69.1	90.8	60.7
0.0 — 40.0	86.8	77.6	85.6	76.3	66.0	78.1	94.4	68.1
0.0 — 50.0	90.1	83.0	89.8	81.5	71.6	86.8	97.9	73.9
0.0 — 60.0	92.7	87.9	93.8	86.6	77.3	94.2	100.0	79.6
0.0 — 70.0	95.3	92.2	96.5	91.8	83.0	98.0	100.0	85.3
0.0 — 80.0	97.0	95.8	98.4	96.0	88.7	99.8	100.0	91.1
0.0 — 90.0	98.6	98.3	99.8	98.4	94.3	100.0	100.0	96.8
0.0 — 100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
# of losses	674	763	478	226	103	252	176	125

Source: INA experience for 1960 incurred year developed as of 5/31/61

HOMEOWNERS BUILDING FIRE LOSSES
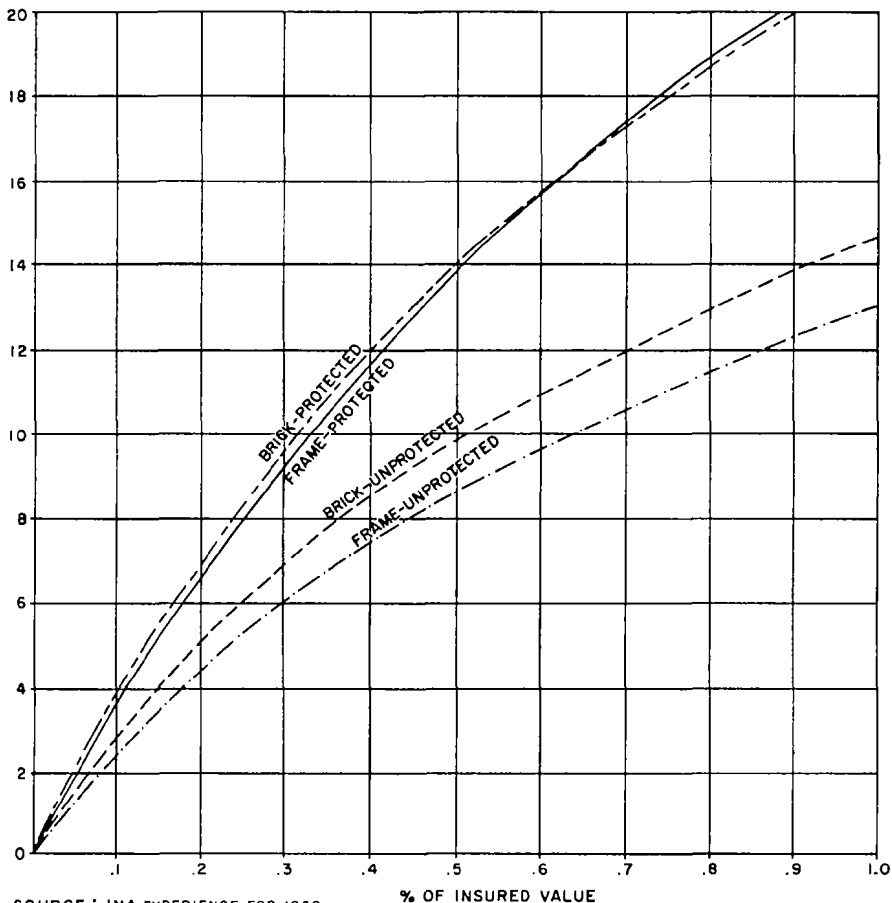## ACCUMULATED LOSS COSTS BY % OF INSURED VALUE

SOURCE : INA EXPERIENCE FOR 1960
INCURRED YEAR DEVELOPED AS OF 5/31/61

HOMEOWNERS BUILDING FIRE LOSSES —
ACCUMULATED LOSS COSTS BY % OF INSURED VALUE
ENLARGEMENT OF SHADED AREA IN EXHIBIT B

% ACCUM.
LOSS COST

% OF INSURED VALUE

SOURCE : INA EXPERIENCE FOR 1960
INCURRED YEAR DEVELOPED AS OF 5/31/61

Exhibit C-1

HOMEOWNERS BUILDING FIRE LOSSES
ACCUMULATED LOSS COST DISTRIBUTION BY % OF INSURED VALUE
FRAME-PROTECTED CLASSIFICATION

1 X% of Insured Value	2 Losses ≦ X% #	3 $	4 Losses > X% $	5 1st X% in Losses > X%	6 Total Cost 1st X% (3) + (5)	7 % Distribution of Column 6 Actual	8 Graduated
.1	546	$ 6,670	$1,975,033	69,011	75,681	3.82	3.9
.2	1,157	21,949	1,959,754	111,120*	133,069	6.71	7.0
.3	1,659	41,658	1,940,045	145,432*	187,090	9.44	9.6
.4	2,041	63,304	1,918,399	170,625*	233,929	11.80	11.9
.5	2,338	84,543	1,897,160	190,620*	275,163	13.89	13.9
.6	2,610	109,067	1,872,636	202,594*	311,661	15.73	15.7
.7	2,833	130,681	1,851,022	213,452*	344,133	17.37	17.4
.8	3,003	150,684	1,831,019	222,922*	373,606	18.85	19.0
.9	3,151	170,273	1,811,430	230,288*	400,561	20.21	20.5
1.0	3,310	194,386	1,787,317	233,380	427,766	21.59	21.9
1.5							26.0
2.0	3,981	340,500	1,641,203	257,980	598,480	30.20	29.5
2.5							32.6
3.0	4,256	438,598	1,543,105	266,910	705,508	35.60	35.4
4.0	4,388	504,344	1,477,359	280,520	784,864	39.61	40.1
5.0	4,474	559,257	1,422,446	289,450	848,707	42.83	43.8
6.0	4,520	594,585	1,387,118	308,580	903,165	45.58	46.7
7.0	4,554	626,163	1,355,540	325,500	951,663	48.02	49.0
8.0	4,585	657,956	1,323,747	337,920	995,876	50.25	50.9
9.0	4,605	688,148	1,293,555	348,390	1,036,538	52.31	52.6
10.0	4,636	735,442	1,246,261	338,400	1,073,842	54.19	54.2
15.0							61.5
20.0	4,730	903,986	1,077,717	431,000	1,334,986	67.37	67.4
30.0	4,767	1,039,020	942,683	483,000	1,522,020	76.80	76.9
40.0	4,794	1,195,005	786,698	468,400	1,663,405	83.94	83.9
50.0	4,810	1,363,855	617,848	400,000	1,763,855	89.01	89.0
60.0	4,818	1,436,391	545,312	400,800	1,837,191	92.71	92.7
70.0	4,828	1,559,165	422,538	333,200	1,892,365	95.49	95.4
80.0	4,837	1,664,088	317,615	269,600	1,933,688	97.58	97.4
90.0	4,843	1,742,466	239,237	220,500	1,962,966	99.05	98.9
100.0	4,862	1,981,703	0	0	1,981,703	100.00	100.0

* Slight error in programming set X to be .19, .29, ... and .89 rather than .2, .3, ... and .9

Source: INA experience for 1960 incurred year developed as of 5/31/61

Exhibit C-2

HOMEOWNERS BUILDING FIRE LOSSES
ACCUMULATED LOSS COST DISTRIBUTION BY % OF INSURED VALUE
BRICK-PROTECTED CLASSIFICATION

1 X% of Insured Value	2 Losses ≦ X% #	3 Losses ≦ X% $	4 Losses > X% $	5 1st X% in Losses > X%	6 Total Cost 1st X% (3) + (5)	7 % Distribution of Column 6 Actual	8 % Distribution of Column 6 Graduated**
.1	210	$ 3,079	$692,043	24,953	28,032	4.03	4.1
.2	398	8,822	686,300	39,723*	48,545	6.98	7.2
.3	561	17,327	677,795	50,205*	67,532	9.72	9.7
.4	670	25,039	670,083	58,590*	83,629	12.03	12.0
.5	762	34,059	661,063	63,519*	97,578	14.04	14.1
.6	840	42,048	653,074	67,744*	109,792	15.79	16.0
.7	916	52,280	642,842	68,117*	120,397	17.32	17.7
.8	964	59,077	636,045	70,729*	129,806	18.67	19.2
.9	998	63,561	631,561	74,885*	138,446	19.92	20.6
1.0	1,047	73,182	621,940	74,010	147,192	21.17	21.9
1.5							26.0
2.0	1,243	122,800	572,322	75,900	198,700	28.58	29.5
2.5							32.6
3.0	1,307	151,770	543,352	78,330	230,100	33.10	35.4
4.0	1,330	169,337	525,785	84,000	253,337	36.44	40.1
5.0	1,344	185,830	509,292	87,450	273,280	39.31	43.8
6.0	1,353	193,237	501,885	96,720	289,957	41.71	46.7
7.0	1,361	202,907	492,215	102,410	305,317	43.92	49.0
8.0	1,370	217,817	477,305	101,360	319,177	45.92	50.9
9.0	1,373	220,260	474,862	111,420	331,680	47.72	52.6
10.0	1,381	232,633	462,489	110,900	343,533	49.42	54.2
15.0							61.5
20.0	1,400	286,567	408,555	143,400	429,967	61.85	67.4
30.0	1,406	324,880	370,242	173,700	498,580	71.73	76.9
40.0	1,411	353,253	341,869	200,400	553,653	79.65	83.9
50.0	1,415	392,934	302,188	208,000	600,934	86.45	89.0
60.0	1,421	459,427	235,695	179,400	638,827	91.90	92.7
70.0	1,424	485,723	209,399	181,300	667,023	95.96	95.4
80.0	1,427	615,100	80,022	68,000	683,100	98.27	97.4
90.0	1,428	627,322	67,800	63,000	690,322	99.31	98.9
100.0	1,432	695,122	0	0	695,122	100.00	100.0

*Slight error in programming set X to be .19, .29, ... and .89 rather than .2, .3, ... and .9

**This distribution is the same as the graduated distribution for the frame-protected classification from 1.0% on. Such an adjustment was made to avoid higher burning costs for the brick-protected classification in the upper layers of insurance.

Source: INA Experience for 1960 incurred year developed as of 5/31/61.

Exhibit C-3

HOMEOWNERS BUILDING FIRE LOSSES
ACCUMULATED LOSS COST DISTRIBUTION BY % OF INSURED VALUE
FRAME-UNPROTECTED CLASSIFICATION

1	2	3	4	5	6	7	8
X% of	Losses		Losses	1st X%	Total Cost	% Distribution	
Insured	$\leq$ X%		> X%	in Losses	1st X%	of Column 6	
Value	#	$	$	> X%	(3) + (5)	Actual	Graduated
.1	169	$ 1,981	$724,838	16,609	18,590	2.56	2.7
.2	383	6,508	720,311	25,591*	32,099	4.42	4.6
.3	547	12,181	714,638	32,155*	44,336	6.10	6.1
.4	662	17,921	708,898	36,516*	54,437	7.49	7.4
.5	733	22,407	704,412	40,837*	63,244	8.70	8.6
.6	811	28,561	698,258	42,386*	70,947	9.76	9.7
.7	867	33,662	693,157	44,036*	77,698	10.69	10.7
.8	902	36,884	689,935	46,966*	83,850	11.54	11.6
.9	937	40,538	686,281	49,039*	89,577	12.32	12.4
1.0	968	45,095	681,724	50,290	95,385	13.12	13.1
1.5							16.1
2.0	1,095	71,776	655,043	62,640	134,416	18.49	18.5
2.5							20.5
3.0	1,170	97,626	629,193	62,700	160,326	22.06	22.1
4.0	1,203	111,014	615,805	68,160	179,174	24.65	24.7
5.0	1,217	118,496	608,323	77,050	195,546	26.90	26.9
6.0	1,224	123,584	603,235	86,760	210,344	28.94	28.9
7.0	1,237	134,806	592,013	89,180	223,986	30.82	30.8
8.0	1,239	136,021	590,798	100,640	236,661	32.56	32.6
9.0	1,240	137,093	589,726	112,140	249,233	34.29	34.3
10.0	1,254	157,020	569,799	104,100	261,120	35.93	35.9
15.0							42.9
20.0	1,272	199,581	527,238	148,000	347,581	47.82	48.7
30.0	1,280	222,237	504,582	195,300	417,537	57.45	58.4
40.0	1,287	250,895	475,924	226,800	477,695	65.72	67.0
50.0	1,294	287,097	439,722	245,000	532,097	73.21	73.6
60.0	1,298	306,751	420,068	271,800	578,551	79.60	80.3
70.0	1,300	318,378	408,441	304,500	622,878	85.70	86.2
80.0	1,305	371,421	355,398	292,000	663,421	91.28	91.4
90.0	1,308	419,090	307,729	276,300	695,390	95.68	96.0
100.0	1,333	726,819	0	0	726,819	100.00	100.0

*Slight error in programming set X to be .19, .29, ... and .89 rather than .2, .3, ... and .9

Source: INA experience for 1960 incurred year developed as of 5/31/61

Exhibit C-4

HOMEOWNERS BUILDING FIRE LOSSES
ACCUMULATED LOSS COST DISTRIBUTION BY % OF INSURED VALUE
BRICK-UNPROTECTED CLASSIFICATION

1	2	3	4	5	6	7	8
X% of	Losses		Losses	1st X%	Total Cost	% Distribution	
Insured	≦ X%		> X%	in Losses	1st X%	of Column 6	
Value	#	$	$	> X%	(3) + (5)	Actual	Graduated
.1	54	$ 815	$220,576	5,698	6,513	2.94	2.9
.2	120	2,656	218,735	8,436*	11,092	5.01	5.1
.3	155	4,257	217,134	10,968*	15,225	6.88	6.9
.4	191	6,025	215,366	12,695*	18,720	8.46	8.4
.5	218	8,131	213,260	13,563*	21,694	9.80	9.7
.6	237	10,013	211,378	14,308*	24,321	10.99	10.9
.7	248	11,171	210,220	15,449*	26,620	12.02	12.0
.8	257	12,431	208,960	16,361*	28,792	13.01	13.0
.9	272	15,013	206,378	15,646*	30,659	13.85	13.9
1.0	280	15,937	205,454	16,600	32,537	14.70	14.7
1.5							17.9
2.0	323	27,084	194,307	18,140	45,224	20.43	20.4
2.5							22.3
3.0	344	34,309	187,082	18,120	52,429	23.68	23.7
4.0	349	36,438	184,953	21,800	58,238	26.31	26.4
5.0	351	37,544	183,847	26,100	63,644	28.75	28.8
6.0	353	38,645	183,746	30,180	68,825	31.09	31.1
7.0	356	41,780	179,611	31,990	73,770	33.32	33.3
8.0	356	41,780	179,611	36,560	78,340	35.39	35.4
9.0	358	45,229	176,162	37,530	82,759	37.38	37.4
10.0	362	52,429	168,962	34,400	86,829	39.22	39.3
15.0							46.5
20.0	366	63,147	158,244	52,400	115,547	52.19	52.6
30.0	370	82,703	138,688	57,000	139,703	63.10	62.9
40.0	372	94,317	127,074	62,000	156,317	70.61	71.0
50.0	373	98,971	122,420	72,500	171,471	77.45	77.5
60.0	374	123,227	98,164	60,000	183,227	82.76	82.9
70.0	374	123,227	98,164	70,000	193,227	87.28	87.6
80.0	374	123,227	98,164	80,000	203,227	91.80	91.9
90.0	375	131,391	90,000	81,000	212,391	95.93	96.0
100.0	378	221,391	0	0	221,391	100.00	100.0

* Slight error in programming set X to be .19, .29, ... and .89 rather than .2, .3, ... and .9

Source: INA experience for 1960 incurred year developed as of 5/31/61

DISCUSSION BY ROBERT L. HURLEY

The author exercises singular care to specify precisely the scope and purpose of the paper, "Rating by Layer of Insurance." The study is limited to the losses under the Homeowners policy, specifically, direct physical damage losses incurred on the dwelling building occasioned solely by the fire hazard. The author would not have the reader imagine that the conclusions pertain to the Homeowners policy overall. Nor should the reader, in disregard of the author's purpose, impute the findings to any classification of fire risk beyond the relatively narrow prescription, dwelling building physical damage risks, most probably not subject to abnormal underinsurance.

The mathematical analysis is carefully developed and the pertinent calculations should impose no undue hardships on the reader familiar with graduation methods. While the graphical presentation may initially appear somewhat awesome for one whose responsibilities no longer encompass statistical methodology, the author supplies cues and actual instructions by which all becomes relatively easy.

The paper gives the portion of total dollar losses for each percent of the total policy amount. In effect, the data show the expected distribution of losses by percent deductible. While a familiar technique for writing earthquake insurance, the percentage deductible is thought to be less common than the straight dollar deductible in most property insurance situations.

At this point maybe we should offer a caution. The title of the paper, "Rating by Layer of Insurance," must not be interpreted directly as pure premiums by layers of insurance. Rather we have here the relative distribution of losses by size correlated to the policy amount only on those buildings having suffered a loss. The study, by design, does not treat directly with those policies not having suffered losses during the experience review period.

The absence of the zero loss class, which would introduce the frequency element, can be of somewhat more than speculative interest to a person attempting to develop relative pure premiums by layer of insurance. It is conceivable that analysis of two different batches of insurance losses might tend to have a similar distribution of losses by size but an entirely different distribution of pure premiums, solely because of the relative differences in the zero loss class.

To develop pure premiums by layer of insurance, the author suggests that the savings in loss cost (or if one prefers, the loss elimination ratios) as developed in the study might be applied to the total classification pure premiums to fraction off the cost for the relative layers of insurance. This approach is viewed as not inconsistent with Bertil Almer's paper published in the *Transactions of the XVth International Congress of Actuaries* wherein the probability of a loss within a specific range of values is represented as a joint function of the inherent probability of any loss occurring and a mathematical expression for the expected distribution of losses by size. Similar theory has also been at least touched upon by previous Casualty Actuarial Society authors if not developed with the mathematical subtlety of a Dr. Almer.

The author concludes on the basis of the findings presented in Exhibit A that the savings in loss cost (or, again, the loss elimination ratios) as a percent of the amount of insurance at risk is identical for all policy sizes. This reviewer also suspects that whatever differences may exist by policy amounts, they might not be turned into easily defensible rating differentials for such a narrow range of coverage as Homeowners fire dwelling building property damage insurance.

For example, it was noted that at the 5% value to insurance level the $10,000 policy (Frame) had suffered 44% of its dollar losses. At the same percentage level, the $25,000 policy (Frame) had suffered only 35% of its losses. This 20% differential (i.e. 1 — .35/.44) might conceivably be used by some hypothetical disputant wanting to argue that the value of the identical percentage deductible decreases as the policy size increases.

On the other hand the same entry point in Exhibit A might also be used by an equally keen but no less unreal adversary who would contend just the opposite, that the value of the identical percentage deductible increases right along with increases in the policy size. For we note that at the same 5% insurance to value level, the $20,000 policy has suffered 51% of its total dollar losses, or about a 15% differential, in just the opposite direction. The following abstract of table A may help to point up the respective arguments.

Percent of Total Dollar Losses Suffered With a 5% Deductible

	$10,000 Policy	$20,000 Policy	$25,000 Policy
% total dollar loss	44%	51%	35%
Relativity to $10,000 policy	1.00	1.16	0.80

It is thought possible to find other such points at which an honest uncertainty might not be able to withstand a determined adversary whichever way the latter may choose to argue. The reviewer seriously doubts that these vexatious points escaped the author. Rather it is not unlikely that the author dismissed all such unexplainable inconsistencies as non-significant. There is at least the suspicion in the reviewers conscience that he might easily have done so too.

And yet, in retrospect it seems that there has been on occasion, an undue willingness to belabor either implicitly with verbal argumentation or formally with statistical methodology the Null Hypothesis. This technique developed early in the present century has certainly become, over the intervening years, an indispensable dogma in the statistician's portmanteau of learning.

Almost inescapable is the parallel of the Null Hypothesis with such popular ratiocinations as, "If you can't see it, it isn't there,"— or probably better "if you can't prove it, it probably can't be true." While it may be somewhat rash to question the wisdom of such popular maxims, the value of the Null

Hypothesis can most effectively be realized with a due regard for what have been characterized as "Type 2 errors," wherein real differences appear as non-significant according to the statistical test.

Yet, it should not be difficult to accept the author's representation that the relative loss costs are solely a function of the percentage of loss to amount at risk, and are relatively independent of the policy value. In other words, we might expect the same savings in loss cost on, say, a 1% deductible whether the fire property damage coverage was written for $10,000, $15,000, or $20,000 insurance on the dwelling building.

Actually, the 1% deductible means only the difference between the first $100 on a $10,000 policy and the first $150 of loss on a $15,000 policy. This may not be enough of a difference to fuss about mathematically. It should not likely outrage even the most scrupulous integrity to assume that for all practical purposes one need not differentiate between these two situations, as far as Homeowners dwelling fire property damage losses are concerned.

However, it could be dangerous to assume that this argument holds for fire coverage generally. The author certainly makes no such mistake in logic, and there is no reason why we should be trapped into such a non-sequitur. There are statistics to indicate that the fire loss cost (excl. dwellings) on a per cent deductible basis is not a constant overall magnitude of insurable value. However, it is thought the potential fallacy is most easily shown by examining where such a theory would lead if followed to its logical conclusion, again, in the case of fire, non-dwelling coverage.

Let the 1% deductible again be our base. On a $2,500 mercantile contents fire policy (and there are many such) the 1% deductible means that the company would escape paying anything on any loss under $25 (as well as the first $25 on any larger loss). However, it is difficult to imagine that there are many fire losses in a retail store which would cost less than $25.

On the other hand, the 1% deductible of a $50 million dollar office building represents $500,000. Even in this era of adverse fire loss ratios, such an occurrence is thought sufficiently unusual that an underwriter would not easily forget the full particulars of any event on which his company was called upon to make a payment in excess of $500,000. Thus, logic would seem to demand what experience would corroborate, that the loss cost on a percentage deductible basis cannot likely be a constant over the full range of fire insurance value.

Possibly these two positions may initially appear contradictory. Homeowners fire property damage building losses can, with seeming impunity, be handled as a constant on a percentage deductible basis, but other fire classifications cannot.

Actually, the dilemma is more apparent than real. It is most probable that comparable influences are working in both situations. However, the operating range of insurable values is sufficiently narrow on dwelling properties that the variation in loss cost per segment of insurable value tends to be imperceptible

in terms of which arithmetical differences are indentifiable by established statistical tests. On the other hand the value spectrum for other than dwelling properties is sufficiently wide that it may be quite unsatisfactory to treat the loss cost per segment of insurable value as if it were a constant.

The author (unjustifiably in the reviewer's opinion) seems to slight her paper as solely an introduction into an area of prime concern for the property-casualty insurance industry. It is much more than that. At the same time there is a need to continue the research into the expected distribution of losses by size, particularly in conjunction with the probability of loss occurrences by hazard, by classification of risk, and by area. Certainly such findings should be of value for establishing credibility criteria, although there may be actuaries who would prefer not to consider these standards as exclusively an exercise in mathematical statistics.

Miss Salzmann is to be commended for her valuable and thought-provoking research. It should be an incentive for other actuaries to contribute to the problem of determining the expected distribution of losses by size and its possible nexus with the industry's rating needs.

DISCUSSION BY ROBERT POLLACK

One of the truly important phenomena of our business in recent years has been the desire and ability of the industry to experiment successfully with new methods of providing coverage. Basically, we have been insuring most of the major property and casualty hazards for many years. However, the scope of coverage of these hazards has been changing markedly and, I am certain, will be subject to more change in the future.

Miss Salzmann's paper suggests a method for dealing with this changing pattern. By arranging losses in an accumulated loss cost distribution, she has offered a means of coping with coverages other than complete first to last dollar protection for lines of insurance in which "an increase or decrease in the insured amount for any one risk does not necessitate a proportionate change in the premium charge." The need for this type of study is obvious, and yet practically no research had been made in this area heretofore.

The method used is not completely new. In the casualty field, Table M is based on a similar approach in that the insurance charges and savings derive from arranging the spectrum of risk loss ratios. The Society of Actuaries has been working for years on similar studies, notably in the field of health insurance. In these latter studies, continuation tables have been developed which can be used in measuring the non-proportional effects of changing the maximum duration of benefits, the waiting period before benefits are payable, etc.

Miss Salzmann has chosen INA'S 1960 homeowners fire losses as the experience base for this study. The fact that this represents a relatively small block of exposures opens the question of credibility of the numerical results shown in the exhibits and charts. As an example, the data in Exhibit C-1 show that losses in excess of 10% of insured value represented 5% of the to-

tal number of losses (226 out of 4,862) but 63% of the total dollars of losses ($1,264,261 out of $1,981,703). Exhibit C-2, based on experience of Brick-Protected classifications, is the result of an even smaller block of exposures. If the data does, in fact, lack credibility for purposes of developing a size of loss distribution, they are still of considerable value. In measuring the effect of such coverage adjustments as deductibles and franchise clauses, relatively large distortions at the top end of the distribution would probably have little effect on the rating of these in that the deductible or franchise cut-off point is usually set so as to eliminate only the smaller claims (i.e., small in relation to the value of the property insured). Even if the credibility of the data is subject to question, I believe that, in fairness to the author, this paper was meant to outline an approach for future study rather than to produce a set of tables for use in ratemaking.

The author has mentioned several pitfalls which must be watched by anyone who intends to do research into this type of analysis. First, the obvious question of credibility. As mentioned above, the biggest problem lies in the upper end of the scale. If, for example, such a distribution were used for rating a reinsurance program, important errors could result. If losses up to 90% of value for the Frame Protected classification were 98% instead of the 98.9% shown (Exhibit C-1), the underwriting results of rating the excess of 90% based on the table values would be catastrophic. The use of other methods such as the suggested "X^{th} largest loss" approach is still only as good as the credibility of the data being used. In summary, then, two separate but interrelated criteria of credibility must be used in any curve-fitting attempt. The data must be sufficiently credible so that the overall results are reasonable and, depending on their ultimate usage, the segments of the curve must also stand the test of credibility. The latter is by far the more important of the two.

A second potential pitfall, which the author recognized and carefully avoided, is the temptation to combine data for the sake of building credibility but, in so doing, producing a fruit salad that is of no use at all. In this study, homeowners fire losses were used for a relatively tight range of values for a homogeneous classification. There is enough evidence that: (1) had extended coverage losses been included; (2) had very different property values been combined; and (3) had different classes been put together, the results of the study would have been meaningless. I realize that the problem of limited data makes such combinations tempting. As the author realized, a detailed analysis of data which have no practical application is worse than no analysis at all.

In conclusion, I want to commend the author for opening the door to future study in an extremely important area.

PANEL DISCUSSION — MAY 1963 MEETING

AN ANALYSIS OF THE ADEQUACY OF THE VARIOUS FACTORS AND RATING VALUES USED IN RETROSPECTIVE RATING

CHAIRMAN: STEPHEN S. MAKGILL

A panel comprised of Stephen Makgill, Chairman, James Brannigan, Donald Trudeau, and James Boyle, all of The Travelers, presented for discussion the topic, "An Analysis of the Adequacy of the Various Factors and Rating Values Used in Retrospective Rating."

The Chairman introduced the panel to the Society members and guests present and invited all to participate. He mentioned a résumé, "Origin and Development of Retrospective Rating,"[1] which had been distributed to the members during registration. He presented a brief outline of the retrospective rating formula which involves establishing an expense loading; an insurance charge to provide for the instances when the final indicated premium will fall outside the range between a given maximum and minimum premium; and a charge for limiting individual losses to be included in the rating. The result, known commonly as the basic premium, when increased by means of a tax multiplier to provide for premium taxes, represents the absolute minimum retrospective charge. The rating formula then calls for an addition to the basic of *ratable* incurred losses times a loss conversion factor, the latter to make provision for any claim expense not included in the basic premium, and *ratable* indicating that individual claims are included only up to the called for limits per claim or per accident. This sum, basic premium plus provision for taxes and loss and loss expense, becomes the final premium subject only to the limitations of the agreed upon maximum and minimum.

After outlining the rating formula, Mr. Makgill indicated that the discussion would center around the appropriateness of the elements included in the basic premium, but would also touch upon the area of charges in the liability lines for coverage between the plan limits and policy limits, since this is pertinent.

At this point, the Chairman introduced the panel moderator who explained that the participants would discover as the discussion progressed that the title of the panel was not entirely appropriate — that, rather than being an analysis of the factors involved, it was more properly an exposition of the issues involved and the problems relating thereto.

He said that in their study and discussion the panel found that one company, even of the Travelers' size, can't come up with sufficient data to adequately test the appropriateness of many of the various factors involved in retrospective rating. It followed that the panel did not have many answers, but hoped that through discussion the membership would provide some answers and outline some of the problems which they faced in the retrospective area.

---

[1] This appears immediately following this discussion.

The next panelist, Mr. Brannigan, outlined procedures which might be used to analyze a body of retrospective experience. He mentioned the rating factors to be considered, the type of period which could be used, and the mechanics of the analysis. It was explained that the type and the degree of the analysis would be influenced by the purposes to be achieved — reports to management, underwriting analyses, actuarial studies, etc.

A report to management would include only aggregate results of an analysis and would attempt to explain the sources of profit and loss and should perhaps include the results of interim audits in order to produce a more accurate profit picture for the period being analyzed. An underwriting analysis should consider only first adjustments and subsequent changes and might be delineated by plan type and producing office. It might also involve a study of lose producing elements to determine their adequacy and an analysis by size of risk of the adequacy of the premium discount percentages used for workmen's compensation insurance. A study of liability experience by ratable limits of losses might be useful to show the propriety of the insurance charge factors by industry classification.

Actuarial analyses would be concerned with items mentioned previously, but normally would involve further refinement. A study of Table M adequacy by arrangement of risks by maximum and minimum loss ratios and a determination of ELPF adequacy by a breakdown of losses on the basis of certain serious and non-serious categories can be cited as examples.

An elaboration of the actuarial problems involved in any analysis of the adequacy of retrospective rating values was then presented by Mr. Trudeau. With respect to analyzing insurance charges, he said it was necessary to obtain a distribution of risks by loss ratio by size of risk, and within each size a distribution of risks by the ratio of actual losses to either the mean loss ratio within the premium size, or some expected loss criteria. At this point the membership made comments concerning which of the criteria mentioned would be most proper. It was pointed out that transition from one criterion to another could easily be made, and further, that the selection would depend upon the purpose of the data collection.

The resulting distributions obtained from the body of experience can be compared with the distributions underlying the present Table M which may be obtained by using a second difference method in conjunction with the Whittaker-Henderson graduation formula A. The comparison is perhaps best made empirically as statistical tests for the significance of the difference between means and variances are not defined where the distributions under inspection are not of the normal variety. At this time in the discussion Mr. Carlson explained that the credibility criteria to be used for the body of experience under inspection was available in a paper by Mr. Arthur Bailey titled, "A Generalized Theory of Credibility," *PCAS*, Vol. XXXII.

A question now posed was whether or not Table M is adequate for lines of insurance other than compensation, and it was suggested that an analysis of variance study might be worthwhile in this area. In this connection, sug-

gestion was made by Mr. Bevan to the effect that it might be possible to continue the use of one Table M, adapting it to each line of insurance by applying a factor to that line's permissible loss ratio. A further suggestion, by Mr. Rowell, touched on the possibility of establishing a new concept for Insurance Charge tables. These tables would be based on two separate entries, the first, by expected number of claims, and the second by expected average claim size.

Another problem mentioned concerned the possibility of a redundancy in Table M when there is a loss limitation in effect on a particular risk. It is assumed that a charge is made for this limit. There arises the need to determine the expected values of losses in excess of such a loss limitation and the effect these have on the spread between the standard premium and the maximum and minimum premiums. California admits to such a redundancy and acts to reduce the insurance charge by incorporating into its Tabular formulas the figures arrived at by Mr. Dorweiler in his study, "On Graduating Excess Pure Premium Ratios," *PCAS,* Vol. XXVIII. Different methods were suggested to measure excess pure premium ratios, for example, calculating such ratios across line of insurance by some classification grouping.

The next topic discussed involved the adequacy of excess loss premium factors. Despite the progress which has been made according to Mr. Uhthoff's paper, "Excess Loss Ratios Via Loss Distributions," *PCAS,* Vol. XXXVII; National Council adoption of the New York concept of determining the excess loss premium factors by hazard group; the study involving the Pennsylvania Workmen's Compensation System, it is felt that a need still exists for a method to properly assign a particular classification to the proper hazard group. Also, studies might indicate that somewhat different factors should be used for auto liability, general liability and auto physical damage, all of which now use common factors.

Mr. Berquist at this point read a statement prepared by Mr. Uhthoff concerning the question of adequacy of retrospective rating values and factors:

"If the word adequacy had been qualified with something like 'over-all' or 'average' the question would be relatively limited; as it is, a wide field of discussion is opened and many comments are relevant. Adequacy might be perfect on the average, yet we should have to admit that within that over-all indication there must exist various degrees of inadequacy and of adequacy with respect to various segments of the whole. Charges obtained through Table M cannot be proper for all the variations of risks and lines, nor for all the accident limitation variations, nor for all the variations in compensation classification hazards, in benefit arrangements in the various states.

"Similarly, expense provisions must receive the same kind of error discussion that could be applied to the expense gradation arrangement and in addition, the retrospective rating mechanics may introduce expense error. For example, dependence upon a standard expected loss factor for determination of expense obtainable from the conversion factor and therefore the net basic expense, can be in error in contrast to a true though unknown loss expectation for certain type risks or groups of risks.
"We have been through many years of experience with retrospective arrangements, tabular and Plan D, and it is high time to review this in the light of proportion to our other rating processes.

"To be sure, we have improvised, and you might say this is quite practical. We

'improvised' a Table M for automobile property damage, for automobile bodily injury and the combination thereof, as well as a table for burglary, plate glass and the various segments of general liability. It would be premature now to suggest that the standards of accuracy we apply to Table M are such that very loose practices otherwise are permissible. But I do hope that when we finally are settled upon a practical compromise in the area of Table M, when we deal ourselves what we think are just the right proportions of accuracy and practicality, that we then can thoroughly examine the other steps in retrospective rating with the same kind of proportion between accuracy and practicality. · ·

"And as we examine it in this light, I hope we also can benefit from our long experience and from what must be an accumulation of ingenious ideas as to how mechanics of retrospective quotations can be shortened, simplified, made simple and understandable to the general public, and otherwise tidied up so that this area is not so mysterious and awesome and not so likely to cast doubt upon insurance company motives."

Next, Mr. Bailey outlined a method of retrospective rating which would eliminate the need for Table M:

"Retrospective rating is a combination of a per accident limitation and an aggregate limitation. These two limitations together with the standard premium determine the rating values in retrospective rating. At the present time there is no uniform relationship among these three items—the per accident limitation, the aggregate limitation, and the standard premium. That is why we need such an extensive Table M to cope with all the possible relationships.

"If we devised a retrospective rating plan where the insured was free to choose either the aggregate limitation or the accident limitation and where the other limitation was then automatically determined by the limitation he chose and by the size of the standard premium, we would not need a Table M.

"For example, suppose we set up a table of accident limitations. And instead of showing the charges for the expected losses in excess of the limitation, show credits for the expected losses included below the limitation. Then suppose we specify that the aggregate limitation shall be the greater of twice the accident limitation or twice the credit for the accident limitation. The retrospective premium would then be the standard premium minus the premium discount, minus the credit for the expected losses included below the accident limitation, plus the actual losses included below the accident limitation, where the actual limited losses are subject to the aggregate limitation.

"When the accident limitation, the aggregate limitation and the standard premium are related in this manner, the charge for the aggregate limitation is the same for all sizes of standard premium. Since it does not vary by size of premium, the charge for the aggregate could be combined with the credit for the accident limitation, and we would need only a table of credits for the various accident limitations. We would not need any Table M. The insured could select an accident limitation which would then determine his aggregate limitation and his maximum premium, or he could select a maximum premium which would then determine his accident limitation."

After thanking the audience for their excellent participation, the panel was closed with the comment that current methods of analyzing retrospective results left much to be desired, that there was much work to be done in improving retrospective rating techniques, and that it was hoped that through today's discussion there might result some improvement in this important area of the insurance business.

ORIGIN AND DEVELOPMENT OF RETROSPECTIVE RATING

Retrospective rating in the form that it is generally known today in the Casualty Insurance field is an outgrowth of experimentation on the part of some insurance companies during the bottom of the depression to develop some means for obtaining an adequate premium on sizable Workmen's Compensation risks. In addition to all of the other troublesome factors of the depression, the extremely severe loss ratios on Workmen's Compensation Insurance produced a very serious problem. Generally speaking, the early attempts at retrospective rating were comparatively crude and in many cases simply consisted of determining the premium by dividing the actual losses by a permissible loss ratio. This premium was usually limited to certain minimum and maximum percentages of the standard premium as otherwise developed. As time went on, it was discovered that this type of rating not only produced a more realistic final premium but also served the very desirable purpose of substantially improving the experience of most risks to which it was applied. During this same period, many policyholders were extremely dissatisfied with the results produced by the normal rating procedures for Workmen's Compensation Insurance which was evidenced by many large risks shifting from carrier to carrier in an attempt to obtain more satisfactory results and also in a substantial number of risks leaving the insurance market and becoming self-insureds. The continuing experimentation with retrospective rating by many carriers seemed to go a long way toward meeting this particular problem. Since, generally speaking, retrospective rating produced a final premium far more closely commensurate with the actual risk than the hitherto normal rating procedures, a great deal of the dissatisfaction on the part of the policyholders was removed.

This gradual development finally resulted in what was known as the 1936 Retrospective Rating Plan for Workmen's Compensation Insurance, which was promulgated by the National Council on Compensation Insurance. It was an optional plan which could be applied to Workmen's Compensation risks developing an annual standard premium of $5,000 or more. The plan contained a single table of rating values involving a table of maximum premiums ranging from a high of 175% for the smallest size risk down to 125% for risks of $150,000 or over. The table of minimum premiums ranged from 75% for the smallest size risk down to a minimum of 50%, and the table of basic premiums ranged from 30% on the smaller risks to a minimum of 22.5% on the very large risks. The rating formula was comparatively simple. The final premium consisted of the standard premium multiplied by the basic premium percentage plus the actual incurred losses multiplied by the loss conversion factor. This final premium was, of course, subject to the tabular minimum and maximum percentages. The basic premium performed the function of providing for company administration and acquisition expenses and an insurance charge to take care of losses over the maximum and reflecting any potential savings on the minimum. The loss conversion factor contained the necessary provision for claim expense which was most properly

reflected as a function of the losses. Both the basic premium and the loss conversion factor included the necessary provision for state premium taxes. In the 1936 plan, graded expenses by size of risk had not come into the business as such although a partial gradation was embodied in the plan by the provision that acquisition expense was provided for as a percentage of the minimum premium. This plan was accepted on an interstate basis by the majority of the states, although certain modifications were necessary in some areas. A few states accepted the plan only on an intrastate basis and in the states of New York, Wisconsin, and California the plan was modified to place a limitation upon the amount of any one claim that would be included in the rating. A modification of the plan was also developed to provide an overall basis for the rating of compensation insurance on long-term construction projects. Since the relative hazards in many long-term construction jobs are very different at various stages of the completion of the project, it is desirable both to the company and to the policyholder to have available a procedure whereby the project can be rated in its entirety by a single retrospective plan. This is particularly true where the operations are relatively unique or where an average base rate is applied. The old 1936 plan established the popularity of retrospective rating with a sizable segment of the large risk market but the passage of time showed the need for many improvements. The single table of rating values was too inflexible to meet the legitimate requirements of many policyholders and a more realistic application of expense loadings was called for on the larger risks. As a result, the so-called 1943 Workmen's Compensation rating program was developed.

The 1943 program introduced a formal graded expense program providing for reduced expenses on all risks developing a standard premium in excess of $1,000. This gradation applied whether the risk was written on a guaranteed cost or on a retrospective basis. For guaranteed cost risks the expense reduction was provided for by a system of premium discounts. For retrospective risks the identical expense gradation was built into the retrospective rating plan. As a result, the company received the same expense dollars and the producer the same commission dollars whether the risk was written either on a guaranteed cost or a retrospective basis. A single exception to this was in the allocation of claim expense where on retrospective risks claim expenses were provided for as a function of the actual losses.

The 1943 program offered the policyholder the choice of three retrospective rating plans so that the one most suitable to his individual requirements could be selected. All were tabular plans, but the range of minimum and maximum ratios offered a fairly wide selection. Under Plan A, the standard premium was the maximum, and the minimum premium ratios were comparatively high. Under Plan B, the maximum premium ratios varied from 195% for the smallest size eligible risk, which was $1,000 of standard premium, down to 100% for risks of $500,000 and over. The minimum premiums were substantially lower than Plan A. Plan C contained the same maximum premium ratios as did Plan B but there was no minimum premium as such. Plan

A was devised for the policyholder whose operations were such that he could not afford to subject himself to a substantial penalty in the event of bad experience but for whom retrospective rating was appropriate with a modest swing in potential premium. Plan B was very closely allied to the 1936 plan and was suitable for those risks who had found this plan satisfactory. Plan C was devised for the special risks whose operations were such that an extremely low loss ratio was not at all unlikely and who wished to receive the unlimited benefit of any loss saving which they could achieve. Unlike the 1936 plan, the 1943 program provided that the provision for state premium taxes be contained in a separate tax multiplier to be applied to the indicated retrospective premium as otherwise computed. This had the advantage of avoiding variances in the tables of rating values and loss conversion factors to reflect the individual variations from state to state in tax rates, and also made clear to the policyholder exactly what portion of his premium was payable in the form of state taxes. As in the case of the 1936 Plan there was also a provision whereby the plans could be applied to the rating of long-term construction projects on an overall basis for the entire period of the job. Recently Plans A, B and C have been further amended to provide for the optional application on a three year basis and of limitations on the amount of any one accident to be included in the rating of the risk. These accident limitations range from $10,000 for risks developing a standard premium of $25,000 or more, up to a maximum of $25,000 for risks of $100,000 and over in size. The 1943 program was accepted on an interstate basis in the great majority of the states and its improved flexibility over the 1936 plan resulted in a substantial increase in the number of risks electing retrospective rating. It undoubtedly had the effect of keeping many risks in the insurance market which would otherwise have gone self-insured and kept a large number of risks on the books of producers and companies that would have gone elsewhere had not the plans been available.

Both the 1936 and the 1943 plans were used by stock and mutual companies, although a slight modification was contained in the plans to meet the operating methods of the participating carriers. Under the 1936 plan the most common procedure for the participating companies was to pay dividends on the minimum premium plus the expense loading on the losses in excess of the minimum. Under the 1943 plan, a table of non-stock adjustment factors applied and these factors were applied to the retrospective premium as otherwise determined when the risk was written by a non-stock carrier. The net effect of the non-stock adjustment factor was to provide a loading to enable the participating company to apply its normal dividend procedure.

In chronological order, the next outstanding event in the development of retrospective rating was the promulgation of the Comprehensive Rating Plan for National Defense Projects. This plan was developed in the early part of World War II to provide a uniform plan and market for sizable "cost-plus" defense projects. Many millions of dollars of premium on tremendous risks scattered all over the world were written under this plan with great success

overall, and the plan introduced many new assureds to retrospective rating. The Comprehensive Rating Plan for National Defense Projects was a retrospective plan which combined Workmen's Compensation, General Liability and Automobile Liability Insurance in a single overall rating. With appropriate adjustments in rating values it followed the normal tabular procedure reasonably closely except that there was no provision for acquisition expense as such. The reason for this was that no commissions were payable by the carriers on these risks but the insurance advisor on the individual project was reimbursed directly by the Federal Government under the terms of an insurance advisor's contract.

In general, this covers the period of development of formal retrospective rating plans up to the time of the famous S.E.U.A. decision. To be sure, there were certain differences from one state to the next. A few states had not approved any retrospective rating plans, a few others had approved retrospective rating on an intrastate basis only, and special individual plans on a mandatory rather than an optional basis applied in Pennsylvania and Utah. The Pennsylvania plan followed the basic retrospective procedure except that the maximum premium for all risk sizes was 110% of the standard premium. The State of Utah adopted the so-called premium return plan. This was a plan of the retrospective type but was a non-penalty plan providing for the return to the policyholder of a certain percentage of the difference between the actual and permissible loss ratio. The percentage of the difference to be returned varied by size of risk and the sums available for return were provided for by the expense gradation contained within the plan. Prior to the S.E.U.A. decision, rate regulation applied in a great majority of the states to Workmen's Compensation Insurance but in only a very few states to the other Casualty lines. The result of this decision, of course, resulted in the ultimate enactment of legislation regulating in various ways practically all Casualty Insurance rates in all states. This posed an immediate and serious problem for both insurance companies and policyholders. During the intervening years since the original development of retrospective rating, insurance companies had been free to experiment with various retrospective procedures by taking advantage of the permissible flexibility in the premium rates for lines other than Workmen's Compensation. In the course of time, satisfactory retrospective procedures had been developed for Automobile and General Liability Insurance not only individually but also in combination with Workmen's Compensation Insurance.

This type of rating was extremely popular with many individual risks and was given further impetus by the Comprehensive Rating Plan for National Defense Projects which was essentially this very type of plan. This procedure for a single overall rating plan applicable to all third party liability coverages tied in very closely to the risk concept on the part of both carrier and insured. Although each individual line of insurance is important and must receive consideration on its own merits, to a large extent the major concern to both the policyholder and the insurance company is whether or not the aggregate

premium for all third party liability coverages provides a reasonable measure of the losses and hazards involved.

Very shortly after the enactment of general casualty rate regulation following the S.E.U.A. decision, two new retrospective rating plans were developed for application to the field of third party coverages. The first of these was the Automatic Premium Adjustment Plan which was developed by the National Bureau of Casualty Underwriters for application to Automobile and General Liability Insurance. This was a formula-type plan containing no tabular values. Instead, minimum and maximum premium ratios most appropriate for the individual risks could be selected by the carrier and the insured and under the formula the appropriate basic premium would then be determined. The second and the most outstanding development in retrospective rating was the introduction of Plan D. This is an optional, interstate, formula-type retrospective plan which may be applied to Workmen's Compensation, Automobile and General Liability lines either singly or in combination. The permissible combination of all third party liability coverages was developed to meet the specific demand for this type of plan which had developed out of the years of experimentation and the impact of the National Defense Plan as previously mentioned. The adoption of the formula-type procedure rather than the provision for tabular plans was the logical outgrowth of the reasons behind the adoption of three different plans in the 1943 program. Every sizable third party risk is unique unto itself both in regard to the hazards and underwriting problems involved and also in regard to the operating methods and needs of the policyholder himself. As a result, even a very large number of alternative tabular plans would not provide the most appropriate range of rating values for each individual risk and, in addition, such a large number of tables would be so burdensome and complicated as to fall of their own weight. The formula-type plan provides an infinite variety of minimum and maximum provisions so that the most appropriate values for any individual risks may always be selected. This, of course, calls for a greater amount of know-how on the part of both underwriters and producers but this cannot be avoided if the needs of our policyholders are to be thoroughly and properly served. Although the more technical details of Plan D will be discussed later on under actuarial considerations, some of the high spots may be appropriately outlined at this time. The eligibility requirement is $5,000 of standard annual premium for all of the coverages combined that are to be rated under the plan. The limits of liability for Automobile and General Liability Insurance that may be included in the plan may not exceed $10,000 per accident plus allocated claim expense. However, for very large risks, these limits may be appropriately increased to $15,000 plus allocated expense if the estimated standard premium is $50,000 or more and to a maximum of $25,000 plus allocated expense if the estimated standard premium is $100,000 or more. In the application of the plan, the use of non stock adjustment factors has been eliminated for participating carriers. Instead, the plan itself contains two sets of expense factors to be used depending

upon the type of carrier. For the participating companies, larger expense provisions are contained in the plan to meet their operating methods and to reflect their dividend practices. Generally speaking, this takes the form of a higher loss conversion factor than that used by the non-participating companies and dividends are paid upon the final retrospective premium as determined by the plan. Plan D may be written on either a one-year or a three-year basis and in addition may be applied for the full term of the project for long-term construction risks. In addition, optional accident limitations are available to limit the effect of any one Workmen's Compensation accident to be included within the rating. Furthermore, an additional option is available in which a single accident limitation may be applied to any one accident, including allocated claim expense, for all lines other than Workmen's Compensation which are included in the rating. The development of Plan D represents a tremendous stride forward in providing a realistic and sound program for developing an overall rating plan which provides sufficient flexibility to meet the needs of large individual risks. I believe that there is very little doubt that this plan has not only served to keep many risks in the insurance market which would otherwise be self-insured but has also provided a substantial degree of stability in the business already on the books of many producers and insurance companies. Its flexibility has not only thus retained business but has probably also served to provide a ready market for many risks which would otherwise have difficulty in securing insurance.

The field of retrospective rating in recent years has been developed to a certain extent beyond the third party liability coverages. In the Boiler and Machinery field, the Premium Adjustment Rating plan is available to eligible risks in all states. This is an optional formula-type retrospective rating plan available to risks developing a three-year ungraded manual premium of $25,-000 or more with the exception of Texas where the eligibility requirement is $5,000. Its useful application to eligible risks is somewhat more limited than retrospective rating in the compensation or liability coverages. The reason for this is that a sizable portion of the Boiler and Machinery coverage involves a very low loss frequency and a very high catastrophe potential. There are, however, many Boiler and Machinery risks where retrospective rating is most appropriate. Generally speaking, these are sizable risks where the nature of the objects is such that a comparatively high loss frequency may be expected. It is as true for Boiler and Machinery Insurance as any other Casualty coverage that, by and large, sizable risks may expect, over a period of time, to pay for their normal run-of-the-mill losses plus an adequate charge for catastrophe protection. Retrospective rating serves the advantage of furnishing the policyholder with the complete services of the insurance carrier plus complete catastrophe coverage and, in addition, develops a premium for normal run-of-the-mill losses which is as closely as possible a reflection of these actual loss costs. A unique requirement in retrospective rating of Boiler and Machinery Insurance is the provision that a portion, up to a maximum of 50%, of the provision for engineering expense may be provided for as a

direct function of losses. A certain amount of basic engineering cost is inherent in every risk if proper loss prevention service is to be afforded. However, in the Boiler and Machinery field, the better-than-average risk does not necessarily require as intensive engineering service as the average and under the retrospective procedure this saving may be returned to the policyholder with good loss experience. Conversely, if the risk has comparatively poor experience, more intensive engineering expense and service is required and properly is chargeable to the policyholder.

Another development in the retrospective rating field is the promulgation of the National Defense Projects Rating Plan. This was developed jointly between the Department of Defense and committees representing the National Council on Compensation Insurance, the National Bureau of Casualty Underwriters, and the Mutual Insurance Rating Bureau following the outbreak of the Korean incident. Essentially, it is a development of the plan in effect during World War II and is applicable to eligible risks having "cost-plus" contracts or "price-redetermination" type contracts with the Federal Government under the defense program. It is similar to the World War II plan in that it is a retrospective rating plan, applicable to Workmen's Compensation and other third party liability lines in combination and contains no provisions for acquisition expense. Insurance advisors on defense projects are reimbursed directly by the Federal Government under Advisors Contracts which were developed by direct negotiation between the Department of Defense and committees representing the various national producer organizations. Modifications have been made in the plan to bring it into line with current conditions and it is very close to Retrospective Rating Plan C. The same maximum premium percentages apply with, of course, the appropriate adjustments in the basic premium to reflect the unusual expense requirements.

In 1956, the application of retrospective rating to Automobile Physical Damage insurance was approved. In 1962, Burglary and Glass coverages became eligible for retrospective rating. Each of these lines of insurance may be written under Plan D subject to the same general rules that apply to third party liability coverages. In 1959, a new tabular plan was introduced. This was Plan J. For a one year plan, the table of rating values provides for a maximum of 125% and minimum of 89.5% for the lowest rated risk to a maximum of 105% and no minimum for risks whose one year standard premium is $500,000 or over. The plan is geared to the risk which has had a loss ratio which does not vary appreciably but which is average or above average.

The trends in the development of retrospective rating over the years have been toward its increased availability to policyholders and an increasing flexibility to meet the individual needs and hazards of various types of risks. As mentioned previously, this has taken the form of a gradual increasing of the range of minimum and maximum premiums available, the introduction of optional stop-loss provisions and the broadening of the plans to permit combination of third party liability and some property coverages in a single over-

all rating. For the immediate future, the impelling need to meet the requirements of both local and interstate risks is for the approval of the existing plans in those jurisdictions where their use has not yet been permitted. Fortunately, the number of such states is small and is steadily decreasing but nationwide risks can never be properly serviced until appropriate plans are available in all states. It is difficult at this time to predict what further advances will be forthcoming in the retrospective field but with the increasing acceptance of the retrospective principle it is likely that the trend will continue toward the development of plans which will permit the inclusion of as many casualty and property coverages as are practically feasible under a single overall rating for a sizable risk.

ACTUARIAL CONSIDERATIONS

Since a risk written on a retrospective basis pays its own way within the minimum and maximum range, the primary actuarial consideration involves the determination of an adequate charge to take care of the losses on those risks that go over the maximum premium and to reflect the expected savings on those risks where the earned premium is less than the minimum. All retrospective rating plans contain an element in reflection of this which is usually called the insurance charge. In the development of retrospective rating, a great deal of statistical analysis was involved to determine these charges. What was required was a study of the actual loss ratios of a very large number of sizable risks. As a result of this study, tables were prepared which reflected the dispersion of individual risk loss ratios about the average for various risk sizes. Such a table was initially developed for Workmen's Compensation Insurance and was directly related to Workmen's Compensation premiums. When Retrospective Rating Plan D was developed, as well as the Premium Adjustment Rating Plan for Boiler and Machinery Insurance, tables had to be available to reflect the varying permissible loss ratios for these lines and to measure the dispersion of individual loss ratios. As a result, Table M was compiled and is available for the Workmen's Compensation and General Liability manuals. Although the underlying data of this table was derived from Workmen's Compensation Insurance, an analysis of average claim costs and frequencies for Automobile and General Liability and for Boiler and Machinery Insurance indicated that this table could be properly used for these lines of insurance when adjusted to an expected loss basis rather than a premium basis. For those students who are interested in a study of the mathematical procedures involved, detailed descriptions are contained in a paper by Mr. Sydney D. Pinney entitled, "The Retrospective Rating Plan for Workmen's Compensation Risks," *PCAS*, Vol. XXIV and in a paper by Mr. Paul Dorweiler entitled, "On Graduating Excess Pure Premium Ratios," *PCAS*, Vol. XXVIII.

The propriety of the excess pure premium ratios used in the determination of insurance charges has been quite thoroughly established by the successful results under retrospective rating plans written to date. In addition, a rather

exhaustive analysis was made by one carrier involving almost 1,000 Workmen's Compensation risks written on a retrospective basis, developing a standard premium of slightly under $14,000,000. Results of this individual statistical analysis showed a startlingly high degree of correlation between the indicated insurance charges and those produced by Table M. Considering the limitation of the sample involved, absolute correlation could not be expected, but the high degree which did result could not be due to random chance and offered additional supporting information as to the propriety of the tables.

The mechanical determination of the appropriate insurance charge requires the determination of the expected losses for the risk. For Workmen's Compensation, Automobile, and General Liability Insurance, this is a very simple procedure and merely involves the multiplication of the standard premium by the appropriate permissible loss ratio contained in the rates for the various individual states and lines of insurance. Where Elevator Liability Insurance is involved, the appropriate adjustment is made to reflect the incidence of Elevator inspection charges. For Boiler and Machinery Insurance, the determination of the expected losses is somewhat more complicated due to the nature of the hazards for the various objects which may be insured. Manual rates for Boiler and Machinery Insurance on an ungraded basis contain a 49% provision for losses and inspection expense. However, the relativity between loss and inspection provisions varies very substantially by both type of object and coverage. As a result, to obtain the expected losses it is necessary to segregate the premiums by class of object and coverage and to multiply each such group individually by the appropriate expected loss percentage.

When the risk's expected losses have been determined, the ratio of these losses to the loss provisions in the minimum and maximum premium are used to obtain the insurance charge percentages directly from Table M. These percentages are, of course, in terms of expected losses and must be converted to premium terms for use in the basic premium. In both the automatic Premium Adjustment Rating Plan and the Premium Adjustment Plan for Boiler and Machinery risks the tables for the determination of the insurance charge are not labeled Table M as such but the underlying basic data is the same and the use of separate tables for these plans is merely one of mechanical convenience. In the various tabular retrospective rating plans the calculation of the insurance charge has been made in advance and is built into the tabular basic premium ratios. In the various formula type plans the appropriate insurance charge must be calculated on each individual risk. In view of the wide flexibility in the plans, this calculation is somewhat complicated if a high degree of actuarial soundness is to be maintained and as a general rule these calculations are made in the home office of the various carriers and then are checked as to accuracy by the appropriate rating organization.

The next basic factor which must be determined in the development of a retrospective plan is the proper provision for expenses. For Workmen's Com-

pensation Insurance under both the 1943 program and Plan D, the same expense requirements are maintained whether the risk is written on a guaranteed cost basis or on a retrospective basis. For the 1943 plans, the expense provisions have been previously calculated and are built into the tabular values. The procedure required to do this, however, is the same as for Plan D. This procedure involves the development of weighted expenses by premium intervals in accordance with the premium discount provisions prevailing. For compensation and third party liability lines (in certain states), tables of expense ratios are prepared for stock and non-stock carriers. A portion of the actual expenses may be provided for as a direct function of the incurred losses and is contained in the selected loss conversion factor. Plan D provides that this selected loss conversion factor may not exceed 1.20 for stock carriers and 1.40 for non-stock carriers. A higher loss conversion factor is usually used by participating carriers to reflect the appropriate allowance for their dividend practices. Since some of the expenses are thus provided for as a loss function, the expense provision in the loss conversion factor is subtracted from the total expenses and the balance is contained in the basic premium. This is a comparatively simple calculation and the amount to be subtracted consists of the loss conversion factor minus unity, multiplied by the total expected losses. Since this is based upon the total expected losses for the risk, the insurance charge and any stop-loss charge must be multiplied by the loss conversion factor since only partial losses will in the aggregate be reflected in the rating due to the minimum and maximum limitations as well as the application of the stop-loss feature.

For lines other than Workmen's Compensation Insurance the handling of expenses is somewhat different. In the majority of the states, for the stock companies, rating plans have been approved which provide for a reasonable degree of flexibility in expense provisions so that rating plans can reflect as closely as possible the actual expense requirements of the individual risk. Where such provisions apply the appropriate amount within the limitations of the approved filing is built into the retrospective plan for the individual risk. In those states where such expense flexibility is not available a system of premium discount usually applies. In such cases the actuarial calculation is as follows. The net discounted premium of the risk is divided by the tax multiplier and from this amount the expected losses are subtracted to obtain the expense provisions excluding tax. These expense provisions are then provided for in the plan in the same manner as for Workmen's Compensation Insurance, that is, the basic premium contains the total expense requirement other than tax, less those expenses which are provided for in the loss conversion factor.

Taxes under the current retrospective rating plans are provided for by a tax multiplier applied to the final retrospective premium prior to the application of the minimum and maximum provisions. This not only clearly sets forth those state premium taxes which the carrier must pay but also charges them in the identical manner with which they must be paid by the insurance com-

pany. Before leaving the expense provisions, further reference should be made to the rather unique provision for Boiler and Machinery Insurance whereby a portion of inspection as well as claim expense may be charged as a function of losses. The maximum percentage of inspection and claim which may be provided for in the loss conversion factor is 50% of the total provision for these items. This does not mean that it is appropriate to use the maximum provision on each individual risk. A detailed analysis of the inspection requirements of each individual risk should be made by the underwriter to determine what portion of the inspection provisions will reasonably be required to furnish basic inspection service to the risk and what portion will in all likelihood be expended in direct proportion to the actual losses which may be incurred.

The actuarial considerations involved in the determination of proper charges for stop-loss provisions are not particularly complex. For Workmen's Compensation Insurance, optional stop-loss limitations on the effect of any one accident to be included in the rating are available in practically all states. The determination of these charges involves a certain amount of statistical analysis in regard to the incidence of large claims under the laws of each particular state. These charges were determined partially from an analysis of actual statistical data and partially by the correlation of average death and permanent total costs. These accident limitation charges are contained in the retrospective section of the Workmen's Compensation manual and apply separately by state.

The latest analysis was made in 1961. New York follows the same procedure but has its own table of charges.

There are four hazard groups involved and the appropriate charge for the risk is determined by the hazard group within which the governing classification falls. The governing class is that classification which produces the largest amount of estimated Compensation premium.

For the Automobile and General Liability lines the stop-loss provision is somewhat different than that for Workmen's Compensation Insurance. The compensation stop-loss takes care of the occasional severe and very expensive accident. For the Automobile and General Liability lines the cost of these severe accidents is outside of the plan and is appropriately measured by the excess limits charges which are applied separately for limits of liability in excess of those contained within the plan. However, it must be borne in mind that the limits within the plan apply separately to each individual coverage and also that the basic limits coverage in liability policies has no limitations on allocated claim expense. Thus, although policy limits of $10,000 per accident may be all that is provided within the plan, it is quite possible for a policyholder to have an individual automobile accident costing well in excess of $20,000. This could arise from Bodily Injury loss of $10,000, Property Damage loss of $10,000 in the same accident plus a sizable amount of allocated claim expense. The same situation can, of course, arise under the other liability lines. The stop-loss provision available under Plan D for lines

other than Workmen's Compensation Insurance provides an across-the-board limitation on the effect of any one accident for all such lines combined including allocated claim expense. Thus, the policyholder is assured that no one accident for lines other than Workmen's Compensation Insurance can effect his rating by more than the selected stop-loss limitation. The determination of the charge for this type of stop-loss is rather difficult due to the scarcity of available statistical data and as a result, an appreciable amount of actuarial and underwriting judgment was used. The charges presently in effect are 1.5% of the total Automobile and General Liability standard premium for a limitation of $10,000, 1.2% for a limitation of $15,000 and 1.0% for a limitation of $25,000. These charges are, of course, multiplied by the loss conversion factor.

The various plans with one exception provide rules applicable to the limits of liability for lines other than Workmen's Compensation Insurance which may be contained within the plan. For Plan D, the limitation is $10,000 per accident per line of insurance plus allocated claim expense. This limit may be increased to $15,000 if the total estimated standard premium is $50,000 or more and to $25,000 if the total estimated standard premium is $100,000 or over. The National Defense Projects Rating Plan basically provides for limits of $50,000 per person, $100,000 per accident for liability coverages. The Premium Adjustment Rating Plan for Boiler and Machinery Insurance calls for separate limitations upon the losses to be included for Direct Damage and for Indirect Damage. For Use and Occupancy, Outage and Power Interruption Insurance, there is also a provision for a specified maximum limitation upon the amount of Daily Indemnity to be included in the rating. The combined maximum limits for any one accident cannot exceed 80% of the selected maximum loss ratio applied to the standard premium. However, limits of $5,000 for any one accident for each type of insurance may be used. The Automatic Premium Adjustment Rating Plan does not contain this type of limitation. The actual reason for these limitations is based upon the premise that no single accident should be contained in the rating if the swing of the rating plan is not sufficiently great to absorb the effect of that accident. This must be modified, of course, to provide for the rating of normal standard limits coverage, but other than that it is essential to sound actuarial principle. The reasoning behind this is fairly obvious. If excessively high limits of liability are included within the rating and a severe accident does occur, the carrier receives no benefit from the rating plan since the accident produces an indicated premium greatly in excess of the maximum. If the accident does not occur, the charge for the high limits is dissipated to the carrier since the major portion of the charge is returned to the insured under the terms of his retrospective agreement. It will thus become a one way street and the net effect would be that very high limits protection would be afforded on a basis which provide practically no premium income to the carriers to reimburse them for such losses as might occur.

Somewhat akin to the high limits of liability situation is that which occurs

in a few classifications for Workmen's Compensation Insurance. Notably, these are the aircraft and explosive classes which contain what is known as a non-ratable catastrophe element. This is a portion of the premium to provide for the rare but excessively severe accident which occasionally occurs. Since these losses cannot reasonably be provided for within a retrospective rating plan, this portion of the premium is set aside on a guaranteed cost basis and these catastrophe losses are excluded from the rating.

A brief résumé of the actuarial considerations involved in retrospective rating would not be complete without some reference to the problem of reserves. Insofar as individual case reserves are concerned, sound practice on the part of the insurance company would require that they receive the same consideration and treatment as any other loss in the establishment of proper estimates. It is essential, of course, that efficient handling be given to these reserves so that the proper outstanding estimate will always be available at the time of the evaluation date for the determination of the retrospective adjustment. A unique reserve problem is developed by retrospective rating in that overall experience has shown that retrospective policies result in a substantial premium return to assureds. Sound practice requires that the carrier establish a special unearned premium reserve or retrospective refund reserve so that sufficient funds will be set aside to take care of the aggregate refunds at the time when the retrospective adjustment is made. This is not a particularly difficult problem since the individual carrier's experience is readily available to show the average percentage return made under its retrospective agreements. If this average percentage return shows variations either upward or downward from time to time, appropriate adjustments may be made in the percentage applied to retrospective earned premiums which have not yet been adjusted. If a particular carrier has not had a sufficient volume of retrospective experience to establish its own refund reserve percentage, a reasonable basis may be established by using the all-company indications from data published annually by the National Council on Compensation Insurance.

<div align="center">UNDERWRITING AND SALES CONSIDERATIONS</div>

There are no hard and fast rules that can be laid down in regard to the selection of the appropriate rating plan to use for each individual risk. The individual items which must be considered are numerous and the wide variation in the operating methods and business needs of individual policyholders requires a very flexible approach to the question. There are many risks whose business operations are such that retrospective rating is not appropriate. These are risks whose operating costs must be known to a high degree of accuracy for immediate future short-term operations. The size of the risk if retrospective rating is to be used must be sufficiently great so that the application of retrospective rating will produce a fair measure of the hazards involved rather than wide fluctuations in premium rate due to pure happenstance. In the Boiler and Machinery field, the coverages and type of object insured

should for the application of retrospective rating be those which may be expected to produce a comparatively high frequency of normal losses.

As a very rough rule of thumb for the Compensation, Automobile, and Liability lines, retrospective rating is not overly attractive to the normal or average risk producing a premium much below $25,000. However, many risks are not either normal or average and there is a wide field of application for retrospective rating on risks under this size where for various reasons the standard rating procedures develop a premium that may fairly be considered as too high or too low for the hazards involved.

In consideration of retrospective rating the basic ratemaking procedures must be kept in mind. In the development of manual rates the experience for all risks within a given classification is compiled to develop an average rate. Individaul risks making up the classification are of all shades—good, bad and indifferent—and the resulting rate although perfectly proper for the average risk of modest size is not necessarily appropriate for the larger risks varying from the average in accordance with their own individual characteristics. In the normal rating application experience rating plans are used not only as incentive to loss prevention but also as an extension of the normal classification system to reflect appropriate premium differentials between those risks that are better or worse than the average for the classification as a whole. In certain instances, the effect of the experience rating plans does not completely meet the full requirements that may be involved in the rating of the individual risk. A few examples of this may be briefly discussed. Many individual business establishments are not static from year to year in their operations and are not only expanding and contracting in size but in many instances are branching out rapidly and substantially into new and varied fields of operations. In many cases manufacturing processes undergo rapid changes in individual classifications as new machinery and manufacturing developments are introduced. In these cases, the past experience of the risk is not necessarily indicative of the future hazards involved and stopping with experience rating will not in all cases produce a rate for the forthcoming year which is completely satisfactory to either the policyholder or to the carrier.

Most of this boils down to the problem of the propriety of the standard premium and the use of retrospective rating as an extension of the normal rating methods to iron out deficiencies in this respect. It must be emphasized, however, that retrospective rating is not a cure-all by any means for underwriting or rating problems. For the more modest size risks in the aggregate, and individually for the very large risks, the sound underwriting of business on a retrospective basis requires the use of proper standard premiums. Since, to a large extent, the underwriting hazard involved depends upon the propriety of the insurance charges contained in the retrospective plan, and since these insurance charges are based upon the normal dispersion of individual risk loss ratios about the average, any overall sizable inadequacy or redundancy in the standard premiums to which retrospective premium applies will produce either an underwriting loss to the carrier or unsatisfactory results to the policyholder.

INVITATIONAL ADDRESS — MAY 21, 1963

MEDICAL CARE INSURANCE —
COMPULSORY OR FREEDOM OF CHOICE?

GILBERT W. FITZHUGH

Within the last few years, I have lived and worked in both the United States and Canada. As a consequence, I have had an excellent opportunity to see, at first hand, developments in the tremendous field of health care as they have taken place on both sides of the border. I have also had the opportunity, over a period of many years, to study the background and operation of voluntary and compulsory health insurance plans in England, Australia, and other countries.

Although the basic question of the proper method for financing health care and the appropriate role of the individual and the government has arisen under a different set of circumstances and has evolved in different directions in the United States and Canada, the fundamental principles involved are equally applicable in either country.

UNITED STATES

In the United States, the focus at the present time is on the question of financing health care for people over 65. The administration's program, embodied in the King-Anderson bill, is limited essentially to hospital and related services for people over age 65. While it does not include provisions for doctors' or surgeons' bills, it is clear that if the government once starts down the road of providing service-type benefits through Social Security, as distinguished from the strictly cash benefits presently provided, it would only be a question of time before strong efforts were made to expand the coverage to include all medical expenses – and to provide coverage for the entire population, not just those over age 65.

Basically, I am an optimist, and perhaps this is the reason I have so much difficulty understanding the philosophy behind the King-Anderson bill. I believe in our free enterprise system which has produced for the American people the highest standard of living in the world. I am confident that if left alone, it has within it the creative ability and the capacity to solve the problem of financing medical care for the great majority of the elderly without adding further burdens to the taxpayer. I recognize that this system does not work perfectly for every individual. For this reason, I support the principle of the Kerr-Mills law, which is based on the assumption that most of the people are able to take care of themselves, and directs taxpayer assistance to those who need help.

The King-Anderson bill, however, is based on a pessimistic view of our socio-economic system. It rests on the assumption that our system simply does not work for whole classes of people – the 17 million persons over 65. The King-Anderson bill further assumes not only that people over 65 are in

desperate straits now, but that no improvement is in sight. In fact, things are only going to get worse.

By any objective test, however, the evidence favors my more hopeful and optimistic view. Ten million persons age 65 and over – approximately 60 percent of the people in that age bracket – were covered at the end of 1962 by some form of voluntary health insurance. In 1952, only three million persons age 65 or over – or 26 percent of that age group were insured. Thus, in about 10 years the proportion of the aged population with health insurance has more than doubled and the number covered has more than tripled.

Another important factor, frequently overlooked, is the striking improvement in the financial picture of people retiring today as contrasted with those who retired some years ago. Those now in their 80's suffered from the effects of the depression years late in their working life and had little opportunity to share in the economic growth of the country which followed the end of World War II. The newcomers to the ranks of the retired, however, spent their peak earnings years during a period of prosperity and were in a much better position to accumulate savings.

Data published by the Social Security Administration provides a good illustration of the improving financial picture of the elderly. The average primary Social Security benefit, for example, paid to a man retiring today at age 65 is $92 a month. This compares with $63 a month paid to the average retired male age 80 and over.

Moreover, those now becoming 65 are the beneficiaries of the great postwar growth in private pension plans which supplement their Social Security benefits. Clearly, people now entering into retirement are in much better financial shape than were their predecessors some years ago. There is every reason to believe that this improvement will continue into the future.

Any justification for governmental action in this area has been further reduced by the passage in Congress in 1960 of the previously mentioned Kerr-Mills law. Under this program the Federal taxpayers provide funds, on a matching basis, to the States to assist them in providing hospital and other medical care for those aged individuals unable to pay for it themselves but who are self-supporting otherwise. This new program has already been placed in effect in 28 jurisdictions.

With these rapid developments in mind, it is hard to see why anyone would feel that the adoption of a compulsory uniform government hospital or other health insurance plan is necessary or even desirable.

Actually, over the years there has been a clear drop-off in public support for the Administration's program. Three Gallup Polls taken last year indicated that as the American people became better acquainted with what the King-Anderson bill proposed, there was less and less enthusiasm for it. Among persons over 65, the percentage favoring the Social Security approach declined from 58 percent in March 1962, to 51 percent in July and 45 percent in August.

CANADA

In Canada, the situation is somewhat different.

There the threat of governmental action has manifested itself principally at the provincial level. A governmental hospital plan has already been adopted in every Province. The present issue in Canada, therefore, is not one of hospitalization benefits for the elderly, as in the United States, but rather one of medical care benefits, such as surgical and physician's attendance fees for all ages.

The Province of Saskatchewan has gone beyond the discussion stage and last year enacted and placed into operation a compulsory medical care law. This is the law, incidentally, which sparked the widely-publicized protests by the doctors in Saskatchewan last summer.

At the Federal level in Canada, a Royal Commission has been established to examine and study all aspects of Canadian health care and services. Despite the very broad terms of the area of the Commission's study, the popular view has narrowed the terms to a consideration of whether or not Canada should have a universal medical care plan operated and financed – in whole or in part – directly or under the aegis of the government.

In its appearance before this Royal Commission, the Canadian Health Insurance Association, representing 117 insurance companies operating in Canada, set forth the advantages of maintaining the voluntary approach, but conceded that there are some gaps in existing voluntary plans – principally the unavailability of coverage at reasonable cost to the presently aged, and for the substandard and uninsurable lives. The Canadian Health Insurance Association proposed a specific, illustrative plan for the extension of voluntary medical care insurance to close these gaps.

Under this plan, the insurance companies and prepaid service plans, similar to Blue Shield in this country, would be required by law to make available a specified level of medical care coverage to everyone regardless of age, condition of health, occupation, or geographic location. Each person would have complete freedom of choice as to the insurance carrier to which he wished to apply. Maximum premiums would be established so that no one would have to pay more than those amounts, regardless of his age, occupation, or condition of health.

Competition among the carriers, and this is a key point, would be encouraged and maintained by permitting each to set its own premiums below the maximum, as well as to provide more extensive benefits. A central reinsurance agency would be formed so that any loss would be pooled for this high-risk group. In order to provide a broad base for the sharing of these excess costs, the plan requires that all providers of medical care coverage share in this allocation. This includes service-type plans, programs self-administered by an employer for his employees, union welfare plans, or any similar programs.

An interesting, practical effect of this pooling arrangement is that each carrier, rather than avoiding the high-risk cases, would be encouraged to write as many as it could, since the risk would be shared among all the providers of the medical care coverage. Each company would be charged its share of the extra cost whether it writes the policy itself or it is written by another company.

The C.H.I.A., in making its submission to the Royal Commission, recognized that there are some segments of the population that are just simply not in a financial position to pay even a reasonable premium for voluntary medical insurance. Clearly, the insurance carriers cannot create dollars. Such persons will continue to require financial assistance from the taxpayers, operating through some level of government.

At the request of the Commission, the C.H.I.A. undertook to study this problem and, in a supplementary submission on October 16, 1962, outlined a suggested approach. The persons to be covered would be the lower income or "marginal income" group and the so-called "medically indigent" group, that is, people who are capable of providing for their own normal needs of daily living, but who do need outside financial help in the event of accident or illness. The truly indigent would be cared for by private welfare agencies and the taxpayers.

The amount of subsidy would vary inversely with the amount of the income of the individual, and would be to the individual himself and not to the insurance carriers. An individual would submit his regular income tax return to the government, or a similar form if his income were below the minimum requiring the filing of a return and, in turn, receive a voucher. This voucher could be used to pay part or all of the required premium for a health insurance policy purchased from the company of his choice. The insurance carrier, in turn, would redeem the voucher from the government.

You will note that the operation of this plan would not require the entrance of the government or any of its departments – existing or new – into the provision of health insurance benefits, nor the application of any new means test. It is really an extension of the existing income tax mechanism, which no one has ever called a means test.

This Canadian approach suggests the possibility of considering a plan in the United States under which taxpayer assistance would be provided to help the marginal income and medically indigent groups pay for voluntary insurance protection. This would help keep them from ever needing Kerr-Mills or other public assistance.

It is significant to note that in the speech from the Throne at the opening of the 1963 session of the Ontario Legislature, the Provincial Government declared its intention of introducing legislation substantially along the lines of the C.H.I.A. proposals. Such legislation was introduced for discussion purposes April 23, 1963, looking toward enactment in 1964. There has already been some legislation in Alberta to make medical care insurance avail-

able on a voluntary basis. This program will include taxpayer assistance to those residents who are not able to pay for this insurance on their own.

With this background of recent and current developments, let us consider for a moment the philosophy underlying the choice between a voluntary and a compulsory health care plan. This is not too different from a similar choice between methods for providing any other needed goods or services, but it has been overlaid with emotional and political arguments.

The burden of these arguments seems to be that everyone is entitled to personal health care as a matter of right, that is, without having first been subjected to a "degrading means test." Granted that personal health care is a necessity of life, is it any more of a necessity than food, clothing, or housing? If the government should provide medical care for all as a matter of right, why should it not provide food, clothing, and housing for all – regardless of income or need – at the expense of the taxpayer? Isn't it true that by providing benefits for those who do *not* need help, we inevitably reduce the benefits that could be afforded for those who really *do* need help?

The point has been neatly highlighted in a footnote in the excellent booklet appraising the British Health Service entitled, "Health Through Choice," by Dr. D. S. Lees, where Dr. Lees inquires whether it is simple-minded to ask why one refers to a "financial barrier" for personal medical care, whereas we simply refer to "prices" for food, housing, clothing, etc.

ADVANTAGES OF A VOLUNTARY SYSTEM

There are many advantages in a voluntary system as opposed to a uniform, compulsory, governmental plan.

First, in any compulsory, governmental plan the needs of a specific individual cannot be considered. Political decisions replace personal choice. A governmental plan, of necessity, must be essentially a uniform, standardized plan applicable to all. But in a field as personal as health care, not everyone wants or needs the uniform plan. The desire of the people for a choice of health coverage is dramatically demonstrated every day in the marketplace. Some prefer first-dollar coverage; some prefer major medical with deductible and coinsurance features; some prefer the indemnity plans offered by the insurance companies; still others prefer the Blue Cross-Blue Shield-type service plans.

Second, voluntary plans are flexible and can readily be adapted and modified to meet changing conditions. Government plans, being based on statutory enactment, are difficult to change. In a field like the science of medicine, where new techniques and new drugs are being introduced with almost bewildering rapidity, only the voluntary plans have the ability to keep pace.

Dr. Lees' paper, referred to earlier, reaches this conclusion:

"... that a monolithic structure financed by taxation is ill-suited to a service in which the personal element is so strong, in which rapid advances in knowledge require flexibility and freedom to experiment."

Dr. Lees further stressed the danger to both the patient and the doctor of political control ". . . based on short period electoral calculations."

Third, inherent in the voluntary system of financing health care are all the economies and advantages produced by full and open competition among hundreds of insurance companies and service-type plans, each one striving to do a better job and to attract a greater share of the public's patronage. A compulsory plan gives the government a virtual monopoly. The absence of any alternative means that there are no strong, external forces working for improvements in quality and efficiency.

Fourth, in a complex area like personal health care, I believe that our resources will be allocated more efficiently if we rely on the millions of individual decisions inherent in the voluntary, free-choice system than if we rely on the few decisions made by a handful of central planners.

Fifth, the voluntary insurers have already made tremendous strides in extending the benefits of health insurance coverage and can be expected to expand and broaden their services in the future. A compulsory, governmental plan would inevitably bring to a halt the voluntary efforts which are progressing so well.

Congressman William E. Miller, of New York, in speaking against the King-Anderson bill said this:

> "We can find an anology — which is not far-fetched — in plans for slum clearance in our major cities. We all want to see slums eradicated . . . but who in his right mind would suggest that, in order to rid this city of slum areas, we ought to tear down the Empire State Building, the U. N. Headquarters, the apartments and hotels along Central Park, and hundreds of thousands of comfortable homes already standing — and then rebuild from scratch?"

It has been said that providing a basic floor of benefits through a compulsory plan would stimulate further expansion of supplementary, voluntary coverage. The growth of private pension plans to supplement Social Security is cited as an analogy. But the analogy is false. A low cash pension can be supplemented by an additional pension. But how do you supplement an inferior quality of medical care?

Any monopolistic government plan that I have heard proposed involved a tremendous expense to the taxpayers. This question of cost to the taxpayer has been an important factor in the defeat, thus far, of the King-Anderson bill and other proposals for compulsory governmental health insurance.

The expenses of administration of a voluntary plan may appear, on the surface, to be higher than those for a uniform government system. There are many expenses inherent in a government plan, however, which are not readily visible, such as the hidden cost of collecting the taxes necessary to support the program. Furthermore, human nature being what it is, claim costs under government programs inevitably rise, reflecting the public's attitude that, since they are entitled to the benefits as a matter of right, they are going to "get their share." The history of government plans confirms this. With the removal of competitive incentives for economy and improvement, further increased costs

under a governmental plan would be inevitable. Beyond doubt, the total cost of the government program would be higher than under voluntary plans.

Indeed, the rising cost of the hospital care program in Ontario has been so marked, although the program has been in effect just over four years, that the former Prime Minister of that province, who was Prime Minister when the program was inaugurated and a strong sponsor thereof, said in a remarkably frank statement:

> "The minute the government starts to operate one of these plans, the costs rise. It is inevitable and it is inescapable, and it might just as well be faced as a fact. There is no use fooling ourselves."

On another occasion he said, in connection with the rising costs:

> "Perhaps I may be permitted at this stage in my political life to remind you as taxpayers that money does not grow on trees."

Sixth, and most important of all, I believe that the voluntary system preserves and strengthens the quality of health care, and I am very much concerned that the adoption of a monopolistic, uniform, governmental plan will lead ultimately to a deterioration in the quality of personal health care.

DANGERS OF GOVERNMENT CONTROL

Any governmental plan, no matter how palatable-looking on the surface, must inevitably result in the providers of the services becoming subject to governmental control. When the government undertakes, in effect, to supply health services, it must also accept the responsibility for regulating, allocating, and paying the individuals and institutions who and which alone can provide the services.

Thus a monopsony results, i.e., a condition under which there is only one buyer – the government. This can be worse than a monopoly – where there is only one seller. In the case of health care it can result in the effective conscription of an entire profession. How would we like it if a law were passed saying that lawyers, economists, actuaries, engineers, bricklayers, businessmen, bankers, and salesmen could work only for the government and on terms set by it? Why pick on the doctors? Or the druggists? Or the hospitals?

If you think this is overdrawn, consider the following extract from the original Saskatchewan Medical Care Insurance Act:

The Commission was empowered to make regulations

(a) establishing, maintaining, and altering lists of doctors entitled to receive payments for providing services,

(b) prescribing the rates of payments to be made to physicians and other persons rendering services, and

(c) prescribing the terms and conditions on which physicians and other persons may provide insured services.

No wonder the doctors of Saskatchewan rebelled; wouldn't you? And as a consumer of doctors' services, would you like them controlled in this manner?

As one person said when asked why he was opposed to compulsory government insurance: "I want the doctor who operates on me to be happy!"

Of course, the proponents of these plans say they will not interfere with the doctor-patient relationship or control the medical profession. But he who pays the piper calls the tune.

No government, any more than any insurance company should have such control over a profession. The market-place is the best arbiter here as elsewhere.

A loss of freedom to use individual judgment, as well as increased regimentation, will both stifle and frustrate many of our most talented doctors. Such frustration will result in deterring young men from entering the medical profession, with an impact on the quality of medical care in the future which is beyond calculation.

In this connection, the debate as to whether or not the British system is a success seems to me to be largely irrelevent. Putting aside material differences between the situation in Britain and the United States, the important question is not whether the system is working well now, but how will it work in the future? There has not yet been sufficient time to know what effect the British National Health Insurance scheme will have on the supply of new doctors coming into the profession. In large part, the doctors serving the people of Britain now are the same doctors that were serving before the Act was passed. They selected the medical profession, and were trained and motivated under the old system. They are still the same people and would be likely to approach their medical relationships in the same manner as they always did. Any change due to the new system would be relatively minor as compared with the change that might be effected on doctors yet unborn.

For all these reasons and many more, I think we should all do everything in our power to protect the voluntary system of health care. In doing so, we in the insurance business may be accused of trying to protect our own interests, but we will still be in business whether the King-Anderson bill, or one like it, is passed or not. The truth is that we are fighting to protect the health of our children and our grandchildren. If government takes over medical care, most of us here will continue to be served by doctors attracted to the medical profession and trained under the voluntary system. They will still be good doctors. But will doctors electing to enter the profession under government control be as dedicated? Maybe so – but I for one don't want to take the chance – particularly when the desired purposes can be accomplished so much better without this grave risk.

It is incomprehensible to me to argue that in order to provide health care for a relatively small percentage of the population that has not, can not, or will not provide for itself, we must adopt a monolithic, compulsory, tax-supported program to cover the entire population. To avoid this, voluntary insurers and employers must do everything possible to take the plausibility out of the case for further government action. What is needed now is not relaxation or rejoicing over the defeat of the King-Anderson bill last year, but a real cam-

paign – a crusade if you will – to solve the problems of financing health care by means which do not involve a compulsory governmental program.

RECOMMENDATIONS

To close with a few specific recommendations for action along these lines:

1. It is important to have as many people as possible over age 65 covered by voluntary insurance. Employers can help by making sure their own group insurance programs provide for continuance of coverage on employees when they retire.

2. The extension of the "65 Plans" would further narrow the gap. Several companies have pioneered in mass-enrollment plans of their own, offering coverage without the usual evidence of good health. And in New York, Massachusetts and Connecticut, special legislation has permitted insurance companies to operate such programs jointly. Many thousands of over-age-65 citizens in those States have voluntarily elected to purchase such coverage – or their children have bought it for them. Other plans are on the drawing boards.

3. Further extension and implementation of the Kerr-Mills law, whereever needed, is most important. Criticisms should be examined honestly and, if valid, changes should be made.

4. The possibility of establishing a new plan should be studied, whereby low income groups could receive financial help with premiums for voluntary health insurance coverage. The amount of taxpayer assistance would vary inversely with income, and be determined simply by an extension of the income tax reporting system.

I believe the health insurance industry in both the United States and Canada is alert to its responsibilities, and with the dedicated work of those providing health care, and the help of employers interested in the welfare of their retiring employees, will stave off this grave threat to the health of our children and our grandchildren.

DISCUSSIONS OF PAPERS PUBLISHED IN VOLUME XLIX

AN INTRODUCTION TO CREDIBILITY THEORY

L. H. LONGLEY-COOK

Volume XLIX, Page 194

DISCUSSION BY ARTHUR L. BAILEY

Mr. Carlson has given you a rather complete picture of statistical developments in casualty insurance. His picture was a general overall view of the business and its statistical problems. It would appear that it can be discussed only by describing, in somewhat more detail, one or more aspects of that picture.

Active statisticians in other fields, teachers of insurance in general, or teachers of statistical techniques, whether of insurance or not, should be especially interested in those philosophies of casualty insurance which serve to make its statistical procedures different from those of other fields. For those of us who are active in the statistics of casualty insurance, it is good to pause occasionally and to meditate on the reasons why we do things differently in our business. For these reasons I have chosen to enlarge on Mr. Carlson's presentation by dwelling on differences, particularly the differences in the philosophies or beliefs of casualty insurance statisticians and those in other fields. I will mention specifically three beliefs held by casualty people which have produced procedures, either peculiar to that field, or found only occasionally in other fields.

First, there is the belief of casualty underwriters that they are not devoid of knowledge before they have acquired any statistics. This belief is probably held by operating personnel in all businesses. When a new form of insurance is initiated or a new classification or territory established, there may be a considerable variety in the opinions of individual underwriters as to what the rate should be; but the consensus of opinion invariably produces a rate. This rate soon becomes embedded in the minds of the underwriters as the "right" rate. Later, when statistics as to the actual losses under the new coverage, classification, or territory, finally are acquired, the problem is not "what should the rate have been?" but "How much should the existing rate be changed as a result of the facts observed?" In revisions of rates for regular coverages, classes, and territories, this is always the question.

The statistical methods, developed by the mathematicians and available in the standard textbooks on statistical procedures, deal with the evaluation of the indications of a group of observations, but under the tacit or implicit assumption that no knowledge existed prior to the making of those particular observations. The credibility procedures, which Mr. Carlson has mentioned as used in the revisions of casualty rates, have been developed by casualty

actuaries to give consistent weightings to additional knowledge in its combination with already existing knowledge.

A second belief of casualty actuaries is that they are in a continuing business. Also that a more or less wide spread of risk is being taken at any one time. The ratemaker in such an organization as the National Bureau of Casualty Underwriters, which Mr. Carlson represents, literally has thousands and thousands of rates to be revised at relatively frequent intervals. Being called upon to make a large number of estimates, the casualty statisticians can relinquish the condition, usually imposed by other statisticians, that each estimate be unbiased. In its place they may impose the less restrictive condition that a particular group of estimates be unbiased in the aggregate. This permits them to make a material reduction in the error variances below what could be obtained by applying the usually taught and presented methods of statistical estimation. It produces another type of credibility formula which appears to be unique to casualty insurance.

The third peculiarity that I want to mention is that casualty underwriters consider each insured to differ from all other insureds. For example, each automobile driver is assumed to have habits and eccentricities unlike any other; each fleet of trucks is assumed to travel routes and engage in operations which make its hazards different from all others, even those engaged in the same industry in the same territory. The propriety of this assumption has been verified in so many instances that the differences between risks has become a basic concept or axiom. Experience rating plans are used in almost all lines of casualty insurance to measure the peculiarities of individual risks.

Despite this uniqueness of the "inherent hazard" of different insureds, each and all of them are subject to the vagaries of chance and the random errors of classification and measurement common to all statistics. Statistical methods generally taught and published in textbooks deal with populations for which the entire variation is produced by the vagaries of chance or the random errors of measurement. Populations in casualty insurance, however, consist of individuals having a variation of expectations other than that due to these two items. Their inherent hazards must be assumed to differ even if it is impossible to postulate or to precisely measure the differences.

This dealing with heterogenous populations produces some very interesting results which most statisticians would sneer at as "impossible," but which are, nevertheless, wholly sound and justifiable. One of these is the "split" of losses in the experience rating plans of casualty insurance. The first N dollars of each loss is given a greater weight (that is, more credibility) than the amounts of any loss in excess of N dollars. The result of this separation and weighting is to produce a better estimate of the average loss than would be obtained by the use of the observed average. Although it is axiomatic to most statisticians that the observed mean of the sample is the best estimate of the mean of the parent population, this is only true in the case of homogenous populations and can be materially improved if the populations are heterogenous.

I personally entered the casualty insurance field from the completely un-associated field of statistical research in the banana business. The first year or so I spent proving to myself that all of the fancy actuarial procedures of the casualty business were mathematically unsound. They are unsound, if one is bound to accept the restrictions implied or specifically placed on the development of the classical statistical methods. Later on I realized that the hard-shelled underwriters were recognizing certain facts of life neglected by the statistical theorists. Now I am convinced that casualty insurance statisticians are a step ahead of those in most fields. This is because there has been a truly epistemological review of the basic conditions of which their statistics are measurements. I can only urge a similar review be made by statisticians in other fields.

NEGATIVE BINOMIAL RATIONALE

THOMAS O. CARLSON

Volume XLIX, Page 177

DISCUSSION BY JOHN W. CARLETON

Mr. Carlson sets forth one of the reasons for writing his paper in these words: ". . . We are all interested in finding tools that work. But we should not be satisfied as actuaries without probing into any unfamiliar mathematical model until we know why it works, because thus only do we learn whether it is the best model for the purpose or whether is can be improved upon, and also what extensions of its utility may be available. . . ."

For some of us the utility of a model increases to the extent that it makes possible a visual image of something physical: Gears turning other gears where there is causal linkage, or colored balls being drawn out of an urn where the problem is that of defining the particular degree of absence of causal linkage. Models that make possible visual imagery may be a handicap to the investigator while he is pursuing his investigation, but they will help him communicate his findings to a larger audience after he has found something.

Thus, the concept of a Bernoulli distribution has a comforting tangible aspect when it is built upon a coin-tossing activity that anyone can easily picture, even if he has no intention of actually trying it out. The concepts of "likelihood" and even "equal likelihood," which are difficult to define without some circuity, are communicated painlessly by pointing at a coin. Each item of the distribution is understood to be determined quantitatively as the sum of a fixed number of contributions, additive or essentially additive, all small with respect to the total, and the variation of each contribution being independent of the variations of all others. The physical model gives clues as to what kinds of empirical distributions might be expected to follow the Bernoulli pattern, and perhaps some clues as to why others do not.

If the coins are thought of as being similar, then the information required to describe any Bernoulli distribution is very small and it should not be surprising that the formulas, even in their limiting forms, can be expressed by a very small number of parameters.

The next best thing to models that permit visualizing something physical are those that can be pictured on coordinate paper with one dimension of complexity partialed out. I think the recent papers on the negative binomial, at least in some respects, lend themselves to this treatment.

Picture a distribution of events occurring in a large number of exposure items as being the sum of some subdistributions, each generated by a subgroup of the exposure items. Spread the exposure groupings vertically along the Y axis of a piece of graph paper so that each can generate its subdistribution from left to right at some distance up from the bottom of the page. If

the exposures are grouped and distributed by inherent hazards, and if each inherent hazard is assumed to generate a Poisson distribution of events or accidents, then you will be looking at a frequency contour analogous to the one prepared by Mr. A. L. Bailey and shown on Page 71 of the 1942 *PCAS*. I have trouble staying in touch with imaginary three-dimensional contours, so I'd prefer to think of the exposure items for each inherent hazard generating its Poisson distribution of events separately, after which all of the sub-distributions can be added up and recorded as a total distribution across the bottom of the page.

If the distribution of inherent hazards, running up and down the Y axis, follows a Pearson Type III curve, then according to the authors of a number of recent papers, the distribution of accidents across the bottom of the page will follow a negative binomial or depart from it only by chance.

In Mr. Carlson's paper there is developed a distribution of the number of claims which I think can be set up and looked at in a similar way. Instead of using the Y axis to sort out the different inherent hazards into a frequency distribution of its own, it can be used to show on separate lines the separate distributions of accidents producing different numbers of claims per accident. The total line will be a claim count distribution. If the parameters of the Poisson formula for each of the subdistributions are connected in a particular way, then the claim count distribution will also follow the negative binomial pattern.

To the extent that I understand what Mr. Carlson has done, the Y axis would represent only the formula with which he connects the variables generating the distributions for each of the different numbers of claims per accident. It would not represent anything tangible that can be pictured in the imagination, like different numbers of exposure items (insured cars) grouped and arrayed by inherent hazards (the bad drivers at one end of the street, the good drivers at the other). I feel more comfortable with the latter and want to go back to it.

In the real world that brings forth empirical data on accidents, the inherent hazards that are arrayed up and down the Y axis will have certain quantitative characteristics that, whatever they are, can be described in a manner intelligible to statisticians by specifying the moments of their distribution. The more moments that can be measured, the more nearly the general characteristics of the frequency for curve can be bounded. Thus, I assume all frequency curves having the same first five moments look pretty much alike on graph paper, although I know of no reason why there should not be a very large number of curves, including freehand curves, that would satisfy the same five values.

It is believed the moments of the inherent hazard distribution can be determined from empirical data by comparing the empirical distribution of numbers of accidents with those that would be predicted by a Poisson distribution for the same average hazard. The greater the number of differences that can be taken with confidence, the greater the number of inherent hazard

moments that can be estimated with a little algebra. These are the moments of an inherent hazard distribution that one infers must exist, if one is satisfied that the accidents generated by any single magnitude of inherent hazard should follow a Poisson distribution, and if one finds, as people have, that the empirical data don't quite do that.

> (Parenthetically, I don't believe any of the recent contributors to the *PCAS* have commented on the correspondence between the model that underlies the Poisson distribution and the actual behavior of what Mr. Simon would call "isohazardous" exposure groups. One writer suggested, perhaps for a special development, that the hazard of each member of such a group must be assumed to be constant for the period of time over which the exposure unit is being accumulated. If so, the model is contra-indicated by the obvious changes in hazard as an insured car moves from a freeway to a garage. I don't believe the requirement is necessary. It is thought sufficient if (a) the members of the isohazardous group each have the same average hazard, and (b) fluctuations in the hazard of an individual member from hour to hour and day to day are unrelated to the accidents that fortuity occasionally brings forth. However, even these easy requirements suggest a possible difficulty: Would cyclical fluctuations in hazard intensity impair the criterion (b)? There is a feeling that they might.)

Is there any reason to believe that these moments of the inherent hazard distribution should lend themselves to being reproduced by a formula that has only a few parameters? I know of none. Aside from a few platitudes about continuity in natural phenomena, I know of no reasons why the inherent hazard distribution should not be multimodal, or at best the sum of a few subdistributions each of which has its own pattern.

The Pearson Type III is found to fit the inherent hazard distribution in the sense that when it (implicit in the negative binomial) is used along the Y axis, the total line fits the empirical data better than a Poisson distribution (zero variance along the Y axis) would. Since common sense suggests that some exposures have more inherent hazard than others, it seems possible that any inherent hazard distribution that can contribute a suitable amount of variance would be apt to permit a better fit than a single value distribution, which can contribute none. Is it known if the negative binomial (with its implied Pearson Type III distribution of inherent hazards) permits a better fit than could be accomplished if the Pearson Type III were replaced along the Y axis by some other distributions having the same mean and the same second moment, particularly by some freehand distributions?

"Freehand distribution" suggests a fuction that is obtained that way. I an using it to mean one that requires a very large number of parameters for its sufficient expression. Investigators, trying to find useful and meaningful descriptions of nature, usually grope for formulas with small numbers of parameters. In spite of this tendency a good deal of the world's work is done with smoothed tables of empirical data (mortality tables, seasonal corrections, magnetic compass adjustments, even Table M). Empirical data may have been smoothed by one device or another, but the smoothing devices seldom have any derivation from the structure of the multiple parameter formula that might have been there if there had only been enough data or enough insight

to permit its discovery. Also, much of the world's work is done with tables prepared from simple functions like that of the normal curve. Thus, it's difficult to say that practical applications prefer formulas and accept tables only when formulas can't be found. What then is the fascination of the search for simple formulas to fit empirical data?

One motive might be to find or test an explanation of why the empirical data are as they are. The distinction between "to explain" and "to describe" may have become blurred at some levels of epistemology, but for immediate purposes I want to use the word "explanation" to cover something that helps me visualize a model within which I can see what produces the result.

Does the Type III Pearson curve purport to be the frequency distribution that can be expected when some definable factors are working on the individual items? In other words, is there a model that underlies it? I do not know whether there is or is not such a model. Has an analysis of the sources of hazard differences among exposure items suggested that they should be subject to analogous factors? In other words, does the Type III model, if it exists, look promising? With affirmative answers to both questions, a good fit would tend to support the inferences drawn from the analysis. Absent affirmative answers to either or both questions, the fit would seem to be coincidental. Moreover, searches for such fits, prior to dealing with such questions, would seem to be searches for such coincidences.

Such searches may be well worthwhile and yield many useful results, including those turned up through serendipity. However, some questions suggest themselves to which answers would be interesting: Do the conventional tests of Goodness of Fit apply to an undirected or trial and error search for a formula to fit some empirical data? Does testing a single hypothesis against some data call for different testing mathematics than starting with the data and then drawing at random from an infinite (or very large) available supply of formulas until one is found that seems suitable? Was the chi-square test built on the latter model? There is the intuitive notion that the random search should be shorter if the data are too thin to carry much information about the higher moments. Probably the notion is unfounded.

I hope these comments have some bearing on Mr. Carlson's concern with the rationale and the utility of models. Certainly his paper will stimulate others on claim count distributions.

DISCUSSION BY KENNETH L. McINTOSH

In this paper, deceptively simple in concept though perhaps not simple in mathematical detail, Mr. Carlson has accomplished three things, one of which possibly exceeds the limits of his own original objectives. First, the paper constitutes an excellent historical summary of various approaches to the negative binomial distribution in general, including presentation of one such approach in some detail. Secondly, the use of the factorial moment generating function is demonstrated. This extremely powerful mathematical tool is ignored by

many authors,[1] yet, as this paper shows, with remarkably little effort the function yields results obtainable by other means only at the cost of considerable difficulty.

Thirdly and finally, in pursuing the rationale of the negative binomial, Mr. Carlson has gone far beyond that distribution to open for actuarial exploration the entire area of the general compound Poisson, of which the negative binomial is but a specific example. He then notes casually that the area is "fertile." It might be noted casually that The Bomb is "noisy."

This paper complements rather than supplements the negative binomial derivations presented earlier by Mr. Dropkin[2] and (independently) by Dr. Bichsel.[3] As it is only when Mr. Carlson's derivation is brought together with these earlier presentations that we approach critical mass, it seems necessary to bring Mr. Dropkin's derivation again under discussion despite the scrutiny to which it already has been subjected. This will serve to include Dr. Bichsel also, since his derivation parallels Mr. Dropkin's so closely that, for all present purposes, the latter may be considered representative of both.

To compare and contrast the two developments, Mr. Carlson's and Mr. Dropkin's, it first must be noted that the general compound Poisson distribution assumes either of two equivalent forms represented respectively by the left and right members of the identity:

$$\left[Q_1(r;\lambda) = e^{-\lambda} \sum_r \frac{\Pi \lambda_j{}^{k_j}}{\Pi k_j!} \right] \equiv \left[e^{-\lambda} \sum_k \frac{\lambda^k}{k!} \left\{ \frac{\lambda_j}{\lambda} \right\}^{k*} = Q_2(r;\lambda) \right] \quad (1)^4$$
$$(\Pi = \Pi_j)$$

In present specific context:

$j =$ the number of claims arising from a single accident; briefly: "claims-per-accident."

$k_j =$ the number of accidents each producing exactly j claims; briefly: "j-claim accidents."

---

[1] *E.g.*, Cramér, in his *Mathematical Methods of Statistics* (Princeton, 1946) recognizes this function only by means of a single problem buried in fine print on p. 257. But see Feller, W. *(An Introduction to Probability Theory and Its Applications.* Vol. I (2nd Ed.) Wiley (1957) Chs. XI & XII), who concentrates on it to the exclusion of the more–commonly–encountered characteristic function and moment generating function. To be honest, before beginning this review I knew almost nothing of the function beyond the fact of its existence.

[2] Dropkin, Lester B., *Some Considerations on Automobile Rating Systems Utilizing Individual Driving Records.* PCAS XLVI (1959), p. 165.

[3] Bichsel, Dr. F., Une Méthode pour Calculer une Ristourne Adéquate pour Années sans Sinistres. *The ASTIN Bulletin.* I (1960), p. 107.

[4] Mr. Carlson's notation is not compatible with that of Mr. Dropkin, and neither system is entirely adequate for what follows here. Hence, it has been expedient to introduce notation as shown. However, notational equivalents will be obvious in cross-reference to original equations of either author except possibly in certain specific cases explained as they occur.

$k = \sum k_j =$ the total number of accidents; briefly: the "total-of-accidents."

$r = \sum jk_j =$ the total number of claims; briefly: the "total-of-claims."

$\lambda_j =$ the parameter of a Poisson distribution of k_j.

$\dfrac{\lambda_j}{\lambda} =$ the probability that exactly j claims arise from any single accident.

$\left\{\dfrac{\lambda_j}{\lambda}\right\} =$ the distribution of claims-per-accident. (This is *not* the cumulative distribution function, but is the distribution itself, *i.e.* the sequence of the several probabilities $\dfrac{\lambda_j}{\lambda}$).

$\left\{\dfrac{\lambda_j}{\lambda}\right\}^{k*} =$ the k-fold convolution of $\left\{\dfrac{\lambda_j}{\lambda}\right\}$ with itself.

It will be convenient to have:

$$g_j = \frac{\lambda_j}{\lambda} \tag{2.a}$$

$$\left.\begin{array}{l} p(k; \lambda) = \dfrac{e^{-\lambda}\lambda^k}{k!} \\[2ex] P(k; \lambda) = e^{-\lambda} \sum_k \dfrac{\lambda^k}{k!} \end{array}\right\} \tag{2.b}$$

The validity of Identity (1) which shows the so-called "multiple Poisson" to be the equivalent of a "compound Poisson," is demonstrated in Appendix C.

In present context, $Q_1(r;\lambda)$ and $Q_2(r;\lambda)$ are alternative expressions of the cumulative distribution function of the total-of-claims distribution. But for change of notation, the left member of Identity (1) is exactly Mr. Carlson's Eq. (4).[5] On the assumption that the relationship:

$$\lambda_j = \frac{\lambda_1}{j} \beta^{j-1} \qquad (\beta = \text{constant}) \tag{3}[6]$$

holds among the parameters λ_j, the development presented by Mr. Carlson leads to a negative binomial total-of-claims distribution:

$$b(r; n_r, \pi_r) = \binom{-n_r}{r} \pi_r^{n_r} \; (-p_r)^r \tag{4}[7]$$

---

[5] Let: $Q_1(r; \lambda) = P(r);\ \lambda = a_1 + a_2 + \ldots;\ \Pi\lambda_j{}^{k_j} = a_1{}^{x_1} \cdot a_2{}^{x_2} \ldots;\ \Pi k_j! = x_1! \, x_2! \ldots$ Mr. Carlson's Eq. (4) then follows.

[6] Let: $j = k;\ \lambda_j = a_k;\ \beta = b$. Eq. (3) then becomes Mr. Carlson's Eq. (2).

[7] Let: $\pi_r = (1 - b);\ p_r = b;\ n_r = \dfrac{a}{b};\ r = r$. Mr. Carlson's Eq. (8a) then follows.

On the other hand, Mr. Dropkin has concerned himself entirely with accident frequency, and has not become involved with the claim distributions with which Mr. Carlson deals. On the assumption that inhomogeneity of the automobile driver population may be reflected by variation of the Poisson parameter, Mr. Dropkin's basic equation is (with notational changes):

$$f(k) = \int_1^\infty \frac{e^{-\lambda}\lambda^k}{k!} \cdot \phi_\lambda d\lambda \tag{5}$$

where ϕ_λ is the probability density function of the distribution of λ among individuals of the population. Assuming the p.d.f. ϕ_λ to be specifically the Pearson Type III, Eq. (5) leads to the negative binomial total-of-accidents distribution:

$$b(k; n_k, \pi_k) = \binom{-n_k}{k} \pi_k^{n_k}(-\rho_k)^k \tag{6}[8]$$

as Mr. Dropkin demonstrates.

Though exhibiting identical mathematical properties, it can be shown that Mr. Carlson's negative binomial *claim* distribution, $b(r; n_r, \pi_r)$, and Mr. Dropkin's negative binomial *accident* distribution, $b(k; n_k, \pi_k)$, are actuarially incompatible. They cannot ever both be applicable simultaneously to data arising from the same population.

The negative binomial is a form of the compound Poisson[9], therefore, Identity (1) holds for that distribution.[10] Assuming the relations:

$$\lambda = log \frac{1}{\pi_r}$$

$$\frac{\lambda_j}{\lambda} = \frac{\rho_r{}^j}{\lambda j}$$

Identity (1) becomes:

$$\left[B_1(r; n_r, \pi_r) = \sum_r \binom{-n_r}{r} \pi_r^{n_r} (-\rho_r)^r \right] \equiv$$

$$\left[e^{-\lambda} \sum_k \frac{\lambda^k}{k!} \left\{ \frac{\rho_r{}^j}{\lambda j} \right\}^{k*} = B_2(r; n_r, \pi_r) \right] \tag{7}[11]$$

---

[8] Let: $\pi_k = \dfrac{a}{1+a}$; $\rho_k = \dfrac{1}{1+a}$; $n_k = r$; $k = x$. Mr. Dropkin's form then follows.

[9] This is demonstrated by Mr. Carlson's derivation of the total-of-claims distribution $b(r; n_r, \pi_r)$. In general, see, for example, Feller, op. cit. (1) p. 271, Example (c).

[10] *Cf.* Feller, op. cit. (1) Ch. XII, Sects. 1 & 2. Specifically see Eqs. (1.2), (2.1) and (2.4).

[11] Identity (7) is by no means obvious, but see Feller, op. cit. (1), Ch. XII, Sect. 2. The distribution $\{ \rho_r{}^j/\lambda j \}$ is the logarithmic distribution here assumed applicable to the claims-per-accident. Letting: $\lambda_j = a_k$; $\rho_r = a_1 = b$; $j = k$; Mr. Carlson's power series Eq. (2) follows immediately.

The Poisson components in the right members of Identity (1) and of Identity (7) represent the total-of-accident distributions underlying respectively both the general claim distribution $Q_1(r;\lambda) \equiv Q_2(r;\lambda)$ and the specific claim distribution $B_1(r;n_r,\pi_r) \equiv B_2(r;n_r,\pi_r)$. It can be shown that the substitution of Mr. Dropkin's negative binomial accident distribution, or in general of any other distribution whatever for the Poisson accident frequency distribution, destroys Identities (1) and (7)[12]. And since the validity of Identity (1) is a necessary (and sufficient) condition that the total-of-claims distribution be a compound Poisson, it follows that specifically Mr. Carlson's and Mr. Dropkin's respective negative binomials are mutually incompatible, as stated above. More generally, *no compound Poisson (or "multiple Poisson") total-of-claims distribution is compatible with any but a simple Poisson total-of-accidents distribution.*

In other words, if the total-of-claims distribution follows any form whatever of the compound Poisson (saving the trivial case of always exactly one claim per accident), the population is homogeneous with respect to the accident-expectancy which Mr. Dropkin's entire development assumes to be variable within the population. This is true regardless of any assumptions whatever concerning inter-parameter relationships among the several λ_j of the left member of Identity (1).

If the logic of Mr. Dropkin's assumption of an inhomogeneous driver population is self-evident, the logic of assuming Mr. Carlson's population of potential victims of railway accidents to be homogeneous as regards accident-expectancy can be demonstrated. The idiosyncracies of individual passengers can have no influence upon accident frequency. Moreover, variation among railroad operating personnel will have been reduced to a minimum by selection, training, and experience, and whatever variation remains will be masked into virtual insignificance by safety rules and safety equipment (*e.g.* automatic block signals). Homogeneity with respect to accident-expectancy (demanded by Mr. Carlson's fatality distribution) logically follows.

No purely actuarial analysis of actual loss data ever can *rationalize* either Mr. Dropkin's Pearson Type III or Mr. Carlson's equally arbitrary inter-parameter power series, though either or both of these assumptions can be *validated* (or, alternatively, *invalidated*) by actuarial analysis in a given case. Mr. Carlson's power series can be rationalized only if it can be shown that the distribution not of total-of-claims but of claims-per-accident logically should be the logarithmic distribution.[13] Obviously, this leads away from

---

[12] See Appendix A.

[13] *Cf.* Feller, op. cit. (1), p. 271, Eq. (2.4) and see *Note 11*, above. Mr. Carlson notes as "interesting" that a compound Poisson with three "unrelated" parameters fits certain railway fatality data better than does the negative binomial. These parameters *cannot* be "unrelated," since λ_j is directly proportional to the probability of exactly *j* deaths in a single accident, hence a relationship among the parameters must follow from the fatalities-per-accident distribution. I have not had opportunity to refer to the original studies of Lüders which Mr. Carlson cites. It may be that Lüders' data was too thin to reveal the claims-per-accident distribution, thus giving the appearance of "unrelated" parameters.

purely actuarial considerations into safety engineering analysis of railway accidents and the circumstances attendant upon them. It is possible that the Pearson Type III assumption someday may be rationalized by the psychologist, whose attempts to correlate driving record with the psychological pattern of the individual already have been partially successful. The most that any purely actuarial analysis can accomplish, however, is to validate this assumption empirically, as Mr. Dropkin and Dr. Bichsel have done.

Mr. Carlson notes that his "observations on rationale by no means exhaust the subject." If the negative binomial specifically did not offer a broad enough field of inquiry, the field of the general compound Poisson in actuarial application appears inexhaustible. And it is into exactly that unbounded area that Mr. Carlson has led.

APPENDIX A

From the right member of Identity (1):

$$Q_2(r;\lambda) = P(k;\lambda)\left\{ g_j \right\}^{k*} \tag{1.R}$$

where:

$$g_j = \frac{\lambda_j}{\lambda} \tag{2.a}$$

$$\left. \begin{array}{l} p(k;\lambda) = \dfrac{e^{-\lambda}\lambda^k}{k!} \\[2mm] P(k;\lambda) = e^{-\lambda}\displaystyle\sum_k \dfrac{\lambda^k}{k!} \end{array} \right\} \tag{2.b}$$

Let λ vary in accordance with a distribution function $\Phi(\lambda)$ with corresponding probability density function ϕ_λ.[1] Let:

$$f(k) = \int_0^\infty p(k;\lambda) \cdot \phi_\lambda d\lambda \tag{5}$$

$$F(k) = \sum_k \left(\int_0^\infty p(k;\lambda) \cdot \phi_\lambda d\lambda \right) \tag{8}$$

Transform the distribution $Q_2(r;\lambda)$ into a distribution $Q_2(r;\lambda)$ by substitution of $F(k)$ for $P(k, \lambda)$ in Eq. (1.R):

$$Q_2(r;\lambda) = F(k)\left\{ g_j \right\}^{k*} \tag{9}$$

If $Q_2(r;\lambda)$ is any compound Poisson whatever, we must have by Identity (1) a distribution $Q_1(r;\mu)$ such that:

$$Q_2(r;\lambda) \equiv Q_1(r;\mu) \equiv Q_2(r;\mu) \tag{1.A}$$

---

[1] Obviously, if $\Phi(\lambda)$ is discrete, ϕ_λ is the frequency function rather than the p.d.f., and the integral of Eqs. (5) and (8) becomes a summation.

where:

$$\left[Q_1(r;\mu) = e^{-\mu} \sum_r \frac{\Pi\mu_j^{k_j}}{\Pi k_j!} \right] \equiv \left[e^{-\mu} \sum_k \frac{\mu^k}{k!} \left\{ \frac{\mu_j}{\mu} \right\}^{k*} = Q_2(r;\mu) \right] \qquad (1.B)$$

$$(\Pi = \Pi_j) \qquad\qquad (\mu = \Sigma\mu_j) \qquad\qquad (k = \Sigma k_j)$$

and, since stochastic independence between j and k is assumed:

$$\left\{ \frac{\mu_j}{\mu} \right\} = \left\{ \frac{\lambda_j}{\lambda} \right\} = \left\{ g_j \right\} \qquad (2.c)$$

From the right member of Identity (1.B), the total-of-accidents distribution underlying the distribution $Q_2(r;\mu)$ is:

$$p(k;\mu) = \frac{e^{-\mu}\mu^k}{k!} \\ P(k;\mu) = e^{-\mu} \sum_k \frac{\mu^k}{k!} \quad \Bigg\} \qquad (2.d)$$

whence by Identity (1.A) and Eq. (9):

$$F(k) \equiv P(k;\mu) \qquad (10)$$

Let:

$\rho(z;\zeta) =$ the generating function of $P(k;\zeta)$ ($\zeta = \lambda$ or $\zeta = \mu$)

$f(z) = $ " " " " $F(k)$

$\phi(z) = $ " " " " $\Phi(\lambda)$

then:

$$p(z;\mu) = e^{-\mu+\mu z} \qquad (11.a)$$

$$f(z) = \phi[p(z;\lambda)] = \phi[e^{-\lambda+\lambda z}] \qquad (11.b)[2]$$

where the brackets of the right member of Eq. (11.b) indicate the compound function obtained by substitution of $p(z;\lambda) = e^{-\lambda+\lambda z}$ for z in $\phi(z)$. It then follows from Identity (10) that:

$$\phi[e^{-\lambda+\lambda z}] \equiv e^{-\mu+\mu z} \qquad (12)$$

whence, immediately:

$$f(z) = \phi[e^{-\lambda+\lambda z}] = (e^{-\lambda+\lambda z})^c = e^{-c\lambda+c\lambda z} \qquad (13)$$

$$\left(c = \frac{\mu}{\lambda} \right)$$

whence:

$$F(k) = e^{-c\lambda} \sum_k \frac{(c\lambda)^k}{k!} \qquad (14)$$

---

[2] See Appendix B, following, and *cf* Feller, *op. cit.* p. 269, *Theorem.*

whence ϕ_λ must be:

$$\phi_\lambda = \varphi_\lambda = \begin{cases} 1; \text{ for } \lambda = \dfrac{\mu}{c} \\[2em] 0; \text{ for } \lambda \neq \dfrac{\mu}{c} \end{cases} \tag{15.a}$$

and it further follows from Eq. (2.c) that:

$$c\lambda_j = \mu_j \quad \text{for all } j. \tag{15.b}$$

The rabbit is now nicely out of the hat. It follows from Eqs. (14), (15.a), and (15.b) that although the level of hazard exhibited by a given population *in toto* may vary with time, any form of compound Poisson total-of-claims distribution (*e.g.* Mr. Carlson's negative binomial) implies homogeneity of the population as regards accident-expectancy and, therefore, is incompatible with any total-of-accidents distribution derived on assumption of inhomogeneity (*e.g.* Mr. Dropkin's negative binomial), save in the trivial case where each accident produces exactly one claim.[3]

APPENDIX B

There is an alternative derivation of the negative binomial accident frequency. In the particular instance, the following offers no advantage whatever over Mr. Dropkin's original derivation, however not only has it some theoretical interest, but the method in general may save calculation where all necessary generating functions are known in advance and need not themselves be calculated individually in the course of deriving a given distribution.

The Pearson Type III assumption is retained. Then:

$$\phi_\lambda = \frac{a^{n_k} \lambda^{n_k - 1} e^{-a\lambda}}{\Gamma(n_k)}$$

and by Eq. (5):

$$f(k) = \int_0^\infty \frac{e^{-\lambda} \lambda^k}{k!} \cdot \frac{a^{n_k} \lambda^{n_k - 1} e^{-a\lambda}}{\Gamma(n_k)} \, d\lambda \tag{16}$$

(Eq. (16) is, but for notation, identical to Eq. (5) of Mr. Dropkin's Appendix A.)

Now the factorial moment generating function of the Pearson Type III is:

$$h(z) = \int_0^\infty \frac{z^\lambda a^{n_k} \lambda^{n_k - 1} e^{-a\lambda}}{\Gamma(n_k)} \, d\lambda = \frac{a^{n_k}}{\Gamma(n_k)} \int_0^\infty \lambda^{n_k - 1} e^{-(a - \log z)\lambda} d\lambda \tag{17}$$

---

[3] It should be emphasized that homogeneity as regards accident-expectancy does *not* necessarily imply homogeneity of the population with regard to expected severity, *i.e.* individual claims-per-accident expectancy.

Repeated integration by parts[4] gives:

$$\int_0^\infty \lambda^{n_k-1} e^{-(a-\log z)\lambda} d\lambda = \frac{\Gamma(n_k)}{(a-\log z)^{n_k}}$$

whence:

$$h(z) = \left[\frac{a}{a-\log z}\right]^{n_k} \tag{18}$$

Substitute $p(z;\lambda)$ or z in Eq. (18):

$$f(z) = h\left[p(z;\lambda)\right] = \left[\frac{a}{a-\log\left(e^{-\lambda+\lambda z}\right)}\right]^{n_k} = \left[\frac{a}{a+\lambda-\lambda z}\right]^{n_k} \tag{19}$$

Let:

$$\lambda = \rho_k$$
$$a = \pi_k = 1 - \rho_k = 1 - \lambda \tag{20}$$

Substitute in Eq. (19):

$$f(z) = \left[\frac{\pi_k}{1 - \rho_k z}\right]^{n_k} \tag{21}$$

But the right member of Eq. (21) is the generating function of the negative binomial:[5]

$$b(k; n_k, \pi_k) = \binom{-n_k}{k} \pi_k^{n_k} (-\rho_k)^k \tag{6}$$

Hence it follows immediately that:

$$F(k) = B(k; n_k, \pi_k) = \pi^{n_k} \sum_k \binom{-n_k}{k}(-\rho_k)^k \tag{22}$$

APPENDIX C

Let:

$$a_1 + a_2 + \ldots = \lambda$$
$$a_1^{x_1} \cdot a_2^{x_2} \ldots = \Pi\lambda_j^{k_j}$$
$$x_1! \, x_2! \ldots = \Pi k_j!$$
$$P(r) = Q_1(r;\lambda)$$

---

[4] Or see any standard table of definite integrals, *e.g.* Korn & Korn, *Mathematical Handbook for Scientists and Engineers.* McGraw-Hill (1961), p. 820, Integral #380.

[5] See, *e.g.*, Feller, *op. cit.* p. 271, Eq. (2.3)

Mr. Carlson's Eq. (4) then becomes the left number of Identity (1):

$$Q_1(r;\lambda) = e^{-\lambda} \sum_r \frac{\Pi \lambda_j^{k_j}}{\Pi k_j!} \qquad (\Pi = \Pi_j) \tag{1.L}$$

Mr. Carlson has developed the generating function associated with his Eq. (4) to be (in his notation):

$$f(z) = e^{-a_1 - a_2 - \cdots + a_1 z + a_2 z^2 + \cdots} \tag{23}$$

(See his Eq. (5)

Let:

$$f(z) = q_1(z;\lambda) = \text{the generating function of } Q_1(r;\lambda)$$
$$a_j = \lambda_j$$

Then Eq. (23) becomes:

$$q_1(z;\lambda) = e^{-\lambda + \Sigma \lambda_j z^j} \tag{24}$$

Turning to the right member of Identity (1):

$$Q_2(r;\lambda) = e^{-\lambda} \sum_k \frac{\lambda^k}{k!} \left\{ \frac{\lambda_j}{\lambda} \right\}^{k*} \tag{1.R}$$

the generating function of the Poisson component is:

$$p(z;\lambda) = e^{-\lambda + \lambda z}$$

and the generating function of $\left\{ \dfrac{\lambda_j}{\lambda} \right\}$ is (by definition of that function):

$$g(z) = \sum \frac{\lambda_j z^j}{\lambda} = \frac{1}{\lambda} \sum \lambda_j z^j$$

By a fundamental theorem[6], if $q_2(z;\lambda)$ is the generating function of $Q_2(r;\lambda)$ then:

$$q_2(z,\lambda) = p[g(z);\lambda] = e^{-\lambda + \lambda g(z)}$$

whence:

$$q_2(z;\lambda) = e^{-\lambda + \lambda \left(\frac{1}{\lambda} \Sigma \lambda_j z^j \right)} = e^{-\lambda + \Sigma \lambda_j z^j} \tag{25}$$

But by Eqs. (24) and (25):

$$q_1(z;\lambda) \equiv q_2(z;\lambda)$$

Therefore:

$$Q_1(r;\lambda) \equiv Q_2(r;\lambda)$$

<div align="right">Q. E. D.</div>

---

[6] Feller, op. cit., p. 269, Theorem. Also see Knopp, Konrad, Elements of the Theory of Functions. Dover #S154 (1952), p. 88.

AUTHOR'S REVIEW OF DISCUSSIONS

After my first reading of the remarks of Mr. McIntosh on my paper, I knew what Pandora experienced emotionally; she didn't realize what she was unleashing, either. I cannot say that my subsequent reading of John Carleton's discussion alleviated this reaction. Both have yielded for me what Mr. Carleton would term serendipitous rewards.

Mr. McIntosh has established rigorously the distinction between the derivation set forth in my paper and that set forth by Mr. Dropkin; I did not highlight the homogeneity vs. inhomogeneity situation because I assumed this distinction to be completely apparent. What has not yet been established is the mathematical synthesis which will reflect Mr. Dropkin's unquestionably valid assumption of inhomogeneity among accident-producing individuals and at the same time will reflect the variability of the number of claims arising from a single accident, so as to produce a more valid approach to the solution of the distribution of the number of claims; as insurance people, it is this latter distribution in which we are most interested, and it is upon this problem that I had hoped to focus attention.

With Mr. McIntosh's mathematics, which though formidable in appearance at first blush throw into remarkably sharp relief the restrictions of the compound Poisson approach to this problem, I do not quarrel. He has made an important contribution in his mathematical demonstration that, while reflection of inhomogeneity among accident-producers can be combined with a variable claims-per-accident distribution for representation within the framework of the compound Poisson, the resolution of this representation is not a compound Poisson expression. He further points out that only a logarithmic relation between the frequencies of accidents with 1, 2, 3, . . . claims per accident will result in the negative binomial distribution when it is assumed that the respective accident distributions are Poisson in form. He does not proceed to demonstrate that only a Pearson Type III variation in the Poisson parameter will result in a negative binomial distribution, but this theorem would appear to be demonstrable by uniqueness considerations; an actuarial note on this point would be welcome.

The ultimate resolution of a claims distribution that reflects inhomogeneity among accident-producers therefore seems to be outside the compound Poisson area.

Mr. Carleton, in his customary pragmatic way, gives a good object lesson in keeping one's feet on the ground, with his attempt to present a graphic visualization of the approaches to derivation, as Mr. Simon did for us with various derivations a year ago. But I think he has too easily rejected recognition of the variation of the number of claims in a single accident with its implications, simply because it does not fit so readily into his visual frame.

When Mr. Carleton asks: "What then is the fascination of the search for simple formulas to fit empirical data?", I do not follow him. Formulas are

primarily for use, and frequent usage customarily dictates simplicity if for no other reason than the economics of time and labor. Suspended over such usage, like the sword of Damocles, is rate regulation which dictates that we must be able to explain to the satisfaction of regulatory authorities, many of whom it must be admitted are not mathematicians at heart, any formula which has a role in the development of rates: manual, experience, (a), or what-have-you. Any degree of simplification helps. As respects the multi-parameter distributions, by reason of data limitations the calculation of moments beyond the second frequently involves a degree of probable error which may make the series based upon the utilization of such moments less accurate than if based on the first and second moments. Mr. Carleton's reference to multi-parameter "free hand distribution" is nostalgic, for we have all had our share in utilizing such, constructed with the aid of ships' curves and French curves when no better was available, and we probably all wish those good old days were still with us; but such graduations are of little avail in an area of constantly changing values, like most of the problems in casualty insurance ratemaking. And in any event there is still the search for a reason, a rationale, an explanatory model.

Mr. Carleton's observations on models at the close are very closely in line with ideas developed in my correspondence with Mr. McIntosh on the paper. The latter has compared the position of the compound Poisson among distributions in general with the position of the polynomial among all functions, in that the polynomial "is theoretically applicable in some cases and empirically applicable in many more." He goes on to ask: "Does it (the compound Poisson) fit because it ought to fit? Or does it fit because it may fit anything within the limit of observational (or stochastic) error?"

My own phraseology, corresponding to Mr. Carleton's reference to the existence or non-existence of an underlying model, is the question whether our rationale is merely rationalization in the most popular usage of the word, i.e., super-imposed or developed ex post facto, or whether it can be organic. I think, for example, that we can look upon the normal process or the Poisson process as essentially organic in development, or in Mr. Carleton's terms, as representing models developed from definable factors; whereas as yet the Pearson Type III distribution is in the category of empirical rationalization by contrast: it just works.

We are by profession practical theorists, and with us never the twain should part.

In closing I would like to make one historical note. Mr. Simon has referred to Mr. A. L. Bailey's use of the negative binomial distribution in 1950 as the earliest in *PCAS*. But a full mathematical presentation of the negative binomial distribution, both in its simple and in its generalized form, and using the Pearson Type III assumption, referred to as a hypergeometric distribution, is to be found in F. E. Satterthwaite's paper, "Notes on Mathematical Statistics" in *PCAS*, Volume XXIX as far back as 1942, antedating

any note on this distribution I can find in actuarial literature, with the exception of Lundberg's 1940 application of the Polya-Eggenberger "contagion" approach to accident and sickness statistics to which Mr. Simon referred in his paper a year ago.

MINUTES OF THE MEETING
MAY 20, 21 and 22, 1963
CONCORD HOTEL, LAKE KIAMESHA, NEW YORK

The following 80 Fellows, 24 Associates, and 19 guests, including 6 subscribers to the Invitational Program, attended the meeting:

FELLOWS

Allen, E. S.
Bailey, R. A.
Balcarek, R. J.
Barber, H. T.
Benbrook, P.
Bennett, N. J.
Berkeley, E. T.
Berquist, J. R.
Bevan, J. R.
Blodget, H. R.
Bondy, M.
Bornhuetter, R. L.
Boyajian, J. H.
Boyle, J. I.
Brannigan, J. F.
Byrne, H. T.
Cahill, J. M.
Carlson, T. O.
Curry, H. E.
Day, E. W.
Dickerson, O. D.
Drobisch, M. R.
Dropkin, L. B.
Espie, R. G.
Fitzgibbon, W. J., Jr.
Fitzhugh, G. W.
Foster, R. B.

Gillam, W. S.
Greene, W. W.
Hart, W. Van Buren, Jr.
Harwayne, F.
Hazam, W. J.
Hewitt, C. C.
Hobbs, E. J.
Hope, F. J.
Hunt, F. J., Jr.
Hurley, R. L.
Johnson, R. A.
Kallop, R. H.
Klaassen, E. J.
Kormes, M.
Leslie, W., Jr.
Linder, J.
Lino, R.
Liscord, P. S.
Longley-Cook, L. H.
Makgill, S. S.
Masterson, N. E.
Maycrink, E. C.
McGuinness, J. S.
McNamara, D. J.
Menzel, H. W.
Miller, J. H.
Mills, R. J.

Morison, G. D.
Munterich, G. C.
Murrin, T. E.
Niles, C. L., Jr.
Otteson, P. M.
Resony, A. V.
Rodermund, M.
Rosenberg, N.
Rowell, J. H.
Ruchlis, E.
Salzmann, R. E.
Schloss, H. W.
Simon, L. J.
Simoneau, P. W.
Skelding, A. Z.
Smith, E. M.
Stankus, L. M.
Tarbell, L. L., Jr.
Trudeau, D. E.
Walsh, A. J.
Wilcken, C. L.
Williams, P. A.
Willsey, L. W.
Wilson, J. C.
Wittick, H. E.
Wolfrum, R. J.

ASSOCIATES

Berkman, J. M.
Curry, A. C.
DeMelio, J. J.
Dorf, S. A.
Gerundo, L. P., Jr.
Gillespie, J. E.
Grossman, E. A.
Jensen, J. P.

Jones, N. F.
MacGinnitie, W. J.
McIntosh, K. L.
McLean, G. E.
Mohnblatt, A. S.
Peel, J. P.
Richards, H. R.
Rood, H. F.

Roth, R. J.
Schneiker, H. C.
Smith, E. R.
Stern, P. K.
Strug, E. J.
Wooddy, J. C.
Woodworth, J. H.
Young, R. G.

GUESTS

Bleiberg, S.	Ladner, G. R.	Rothbart, H.
*Connolly, C. T.	Lemmon, V.	Sabbagh, M. J.
*Donovan, H. G.	Martorana, J. F.	Silletto, C. D.
*Foody, W. M., Jr.	McSherry, H.	Sohmer, H.
Gill, J. F.	*Miller, H. A.	*Strong, H. L.
Hall, J. W.	*Peterzon, R. M.	
Kahn, P. M.	Plast, L. R.	

*Participants in Invitational Program.

On the evening of May 19, early arrivals, prior to the offical convening of the meeting on May 20, joined in an informal get-acquainted session.

On the morning of May 20, from 10:00 A.M. to Noon there was a round of informal discussions:

(a) Loss Reserves — conducted by Martin Bondy.

(b) Private Passenger Ratemaking — conducted by Ronald L. Bornhuetter and Philipp K. Stern.

(c) Problems of Independent Filings, Including Methods of Expense Distribution and Internal Statistics — conducted by Ernest T. Berkeley.

(d) Sampling Techniques — conducted by Norton E. Masterson.

(e) Mathematical Theory of Risk — an open meeting of the Committee conducted by the Chairman, Charles C. Hewitt, Jr.

After recess for lunch the gathering reconvened at 2:15 P.M. Following a brief address of welcome by President Laurence H. Longley-Cook, Vice President Richard J. Wolfrum took over the reins for the rest of the afternoon. The entire session was devoted to a panel discussion on, "An Analysis Of The Adequacy Of The Various Factors And Rating Values Used In Retrospective Rating." The four panel members, all with the Travelers Insurance Company were:

Stephen S. Makgill (Moderator)	James F. Brannigan
James I. Boyle	Donald E. Trudeau

After the presentation by the panel, there was further discussion from the floor including numerous questions directed to the panel members.

The session recessed at 4:30 P.M. and at 6:00 P.M. was followed by a brief social hour arranged for our entertainment by the management of the Concord Hotel.

The meeting reconvened at 9:45 A.M. on May 21 with Vice President Thomas E. Murrin in charge. It was noted that Mr. W. H. Crandall, having completed the necessary requirements, was admitted as an Associate of the Casualty Actuarial Society. The following reports of Committee activity were presented:

(a) *Committee On Distribution Of Losses*: Chairman Matthew Rodermund reported that the Committee expected to get a large volume of automobile data in the not too distant future but additional experience on other phases of the business was needed to expedite the contemplated studies. It would probably be necessary to ask the industry to furnish the desired data.

(b) *Committee On Mathematical Theory Of Risk*: Chairman Charles C. Hewitt, Jr. reported that the principal achievement to date is the stimulation among the members of interest in the subject and the related mathematics. In this connection it was noted that there had been informal discussion with the Society of Actuaries on the project. Reference was also made to a paper by Dr. Paul Kahn in the *Transactions of the Society of Actuaries,* "Introduction To Collective Risk Theory" and to a presentation by Professor O. D. Dickerson, "A General Model For Risk Theory." The Chairman indicated he expects to have a further report at the Annual 1963 Meeting.

(c) *Committee On Annual Statement*: Chairman Joseph Linder reported that the Committee had held three meetings and a fourth was tentatively scheduled for June. It is believed that a formal report can be presented at the May 1964 Meeting.

These reports were followed by remarks by Norton E. Masterson, Treasurer of Astin, on the future meetings of Astin, namely:

(a) Will meet in Trieste the 3rd week of September. It is expected Messrs. Linder and Masterson will represent the Casualty Actuarial Society.

(b) The 1964 meeting will probably be held in New York just prior to the November meeting of the Casualty Actuarial Society.

(c) The International Congress will meet in London and Edinburgh in the latter part of May at which time there will probably be a short session of Astin.

The meeting was then addressed by Mr. Gilbert W. Fitzhugh, a Fellow of the Casualty Actuarial Society and President of the Metropolitan Life Insurance Company. The subject of Mr. Fitzhugh's address was "Medical Care Insurance — Compulsory Or Freedom Of Choice? (Some Recent Developments In The United States and Canada)."

The following three new papers were presented:

1. "Insurance Rates With Minimum Bias" by Robert A. Bailey.
2. "Fixed and Variable Expenses — An Actuarial Note" by Lewis H. Roberts. (In Mr. Roberts' absence his paper was presented by LeRoy J. Simon.)
3. "Rating by Layer of Insurance" by Ruth E. Salzmann.

Reviews of the following previously presented paper were then given:

1. "Negative Binomial Rationale" by Thomas O. Carlson (Vol. XLIX *PCAS.*) Reviewed by John W. Carleton and Kenneth L. McIntosh. (In Mr. Carleton's absence his review was presented by Albert J. Walsh.)

The meeting was then recessed at 12:00 Noon.

The activities for the day were concluded with a Social Hour in the evening followed by an informal banquet.

The May 22nd session convened at 9:45 A.M. with President Longley-Cook presiding.

Joseph Linder, Chairman of the Committee on Professional Status, reported briefly on the activities of the Casualty Actuarial Society in cooperation with other actuarial organizations relating to the possible formation of some form of over-all national actuarial organization or federation and the related problem of accreditation of actuaries in Canada and in this country. In presenting this report Joe stressed that the report was purely for information and no action was required at this time inasmuch as many of the problems had not yet been resolved.

Members of the actuarial staff of the Insurance Company of North America then presented a panel discussion "Commercial Package Policies — Rating and Statistics." The members of the panel were Robert A. Bailey, Edward J. Hobbs (Moderator), Frederic C. Hunt, Jr. and Ruth E. Salzmann.

Following the presentation by the panel members there was a lively discussion and question and answer period from the floor. Unfortunately, because of time limitations it was necessary to close the discussion before all who wanted to be heard had an opportunity to present their views. The Spring 1963 meeting was, therefore, adjourned shortly after 12:00 Noon.

In passing it is noted that, subsequent to the meeting, a digest of the views of the panel members on this subject was distributed to the membership.

PROCEEDINGS

OCTOBER 30, 31 and NOVEMBER 1, 1963

PRESIDENTIAL ADDRESS BY LAURENCE H. LONGLEY-COOK

Following the custom of the Society, I have the honor to address you at this time on completion of my second term as President. I am very much aware of the honor you did me in asking me to assume the position and I have striven to carry out my duties conscientiously.

These two years have been a period of considerable development for the Society.

> The whole problem of accreditation of actuaries has been under review and considerable work has been done on this and on the formation of an association of actuaries.

> A first step has been taken in the use of joint examinations with the Society of Actuaries on subjects of common interest.

> The "paper" route to membership of the Society has been closed.

> The work of the Society in the field of research has increased.

These developments have been of great significance and I feel I should comment on each one of them very briefly.

You have already heard the reports on accreditation and on the proposal for an association of actuaries. In these remarks I do not want to duplicate what has been said but rather ask you to look at the importance of these moves. While actuaries have always carried out professional work, the need to establish themselves legally as a profession had not been strongly felt because such a high proportion of actuaries were employed in insurance companies. It has only been in recent years, with the rapid development of consulting work, particularly in the field of pensions, that it has been apparent that it is no longer practical for us to continue without an established legal status. I am sure that as time goes on we shall find this status equally essential in the work which so many members of our Society perform in the presentation of rates for approval by regulatory authorities. In order to achieve professional status we must clearly establish what an actuary is and it is for this reason that we have been studying the formation of an association of actuaries which can speak for the profession as a whole. You will have observed there is no thought of substituting a single association for the present societies since many of the problems we would want to discuss at our meet-

ings are very different from the problems of interest to life company actuaries or from the problems of interest to pension consultants.

There has been considerable discussion over the years at the meetings of our Council as to the amount of mathematics an actuary needs to know. We have seen papers on credibility and on other subjects in our *Proceedings* involving mathematics of considerable difficulty. On the other hand, actuaries engaged in administrative duties have little use for any mathematics in their day to day work. While all actuaries do not need the ability to carry through the complex mathematical developments required for certain research projects, a thorough grounding in general mathematics seems essential. It is now much easier to obtain such a grounding than it was a few years ago because great strides have been made in the teaching of mathematics in the schools. Since there was little difference in standards between our General Mathematics examination and that of the Society of Actuaries, the Councils of the two Societies authorized the substitution of a single joint examination which was first given in May of this year. This, it may be noted, will give our students the advantage of two opportunities to sit for the examination in a single year. It is my hope that this idea of joint examination can be extended further, not only in such fields as probability and statistics but also, for example, in the area of accident and sickness insurance in which we have almost identical interests. While on the subject of examinations I was very disappointed with the results of the Probability examination this year and reviewed the problem very fully with the chairmen of the Examination and Educational Committees. I was forced to the conclusion that many of the students sitting for this examination were totally unprepared and there could be no possible suggestion that the examination was too difficult. The whole subject of our examinations receives the continued careful supervision of the Council; the Examination chairman is an ex-officio member of the Council and the Educational chairman attends all the Council meetings.

I do not need to say too much about the closing of the "paper" route to membership, since this was discussed fully at our last annual meeting. However, there are two points I should like to make. Casualty actuarial work has always been highly specialized and hence there has sometimes developed an expert in some special area who certainly does important actuarial work but has never received any broad actuarial training. The submission of a technical paper in lieu of taking the examinations has allowed him to enter the Society. If we are to become a properly organized profession we cannot have people calling themselves actuaries, whatever their special expertise, who have not acquired an understanding of basic actuarial principles and this means that for future actuaries the passing of our examinations is a "must." A specialist actuary has to be broadly qualified in the fundamentals of the profession just as a specialist doctor has to have a general medical training. One gain which was to be expected from the "paper" route to membership was that the specialists so introduced would contribute much to our *Proceedings* and discussions. Unfortunately, with a few notable exceptions, this has not

been the case. Comparatively few of those who obtained their membership by the submission of a paper have contributed subsequently at our meetings or otherwise helped the cause of the Society.

Many valuable papers of a research nature have appeared in our *Proceedings* in recent years, and I am delighted to note the number of our members who have found time in these very busy days to carry through research projects which have appreciably increased our knowledge of both actuarial theory and of the workings of the insurance industry. It has seemed desirable, however, to encourage research in certain specific areas. Research is a difficult subject to organize and can hardly be carried on by committees, but if committees are formed of persons particularly interested in a certain line of research, the interchange of ideas is likely to develop some very valuable studies. Four such committees have been set up by the Council during my term of office. I have attended some of the meetings of these committees and have been greatly impressed with the valuable work which is being done.

Having mentioned the research committees, I must say a word of praise for our other committees. The members of these committees rarely receive the praise they deserve for all the hours of personal time they devote to the cause of the Society. The work of the Educational Committee in watching over our examination syllabus and preparing the *Recommendations for Study* is so very important to the Society's well-being as is the work of the Examination Committee in preparing the examinations and grading the papers. I hope you will occasionally find time to look at pages 4 and 5 of our *Year Book* and note who are performing these important duties. Please think, too, of the work done by the Committee on Review of Papers, our Editor in preparing our *Proceedings* with all the problems of mathematical type, our Publicity Committee and the other committees listed. In total membership we are a small Society and each should feel it his duty in some way to contribute his personal help for the good of the profession.

It is customary for at least part of a presidential address to be devoted to industry problems. This portion of the address is not easy to prepare because it must inevitably represent the President's own personal views rather than a consensus of the views of the members of the Society or the views of his employer. Last year I discussed five industry problems to which actuaries might usefully apply their abilities. Today I cannot ignore the adverse experience in fire, homeowners and automobile business which is seriously affecting the profits of insurance companies. No one single cause is responsible for our present difficulties and no single action can solve the problem. Among the causes, certainly the severe weather of the last winter played some part but the unsatisfactory loss experience has continued through the summer. We can only hope that the weather will be kind to us in another way and we shall be free from severe hurricane losses this year. The greatly increased competition in the industry has forced rates for certain lines too low, and the greater lawlessness and carelessness, which seem to be worldwide rather than nationwide, have contributed to our difficulties. Other causes include in-

flation, the transfer of business between classes due to the development of multiple line policies and, I suspect, the greater claim consciousness of the public.

What proposals can we as actuaries offer to the solution of these problems? Since rate levels have proved to be too low, one obvious area for consideration is the ratemaking procedures for fire, extended coverage and homeowners. Owing to the term nature of this business, the response of experience to rate revisions is slow. In order to obtain reasonable rate revisions for fire at the present time it seems to me that development factors should be used to convert past loss experience to a form suitable for future ratemaking. As you know, such factors are an integral feature of most casualty insurance ratemaking procedures. I fear if such a step is not taken and adequate rates established, the loss experience which will continue to develop will force some companies into difficulties and lead to a tightening of underwriting rules which will make the market for non-preferred business very restricted.

It seems to me to be disgraceful that over the last 12 years the results of all stock insurance companies have shown a profit from extended coverage business in only 3 years and the average operating ratio over the period has been 109.6%. The cause of these losses is mainly due to an inadequate provision in the rates for catastrophes. The National Association of Insurance Commissioners agreed to a rating plan in June 1962 which would contain a provision for catastrophes, but I see little evidence of this being put into effect as yet. For Homeowners the chief needs, in addition to the use of a trend factor, are adequate expense provisions in the rates and a provision for catastrophe wind storm losses where this risk is present. In the field of automobile insurance the continued upward trend of claim costs and the increased frequency of loss which is likely to occur as more and more automoblies fill our highways makes one doubt if increased rates can be the full solution. In my last presidential address I advocated the idea of a "knock for knock" law similar to the "knock for knock" agreement used in Great Britain. This would do much to reduce the astronomical legal fees which are provided directly or indirectly out of the insured's premium dollar each year and thus reduce the cost of automobile insurance.

At the present time when companies, acting as individual ratemakers or in concert through rating bureaus, are aware that certain rates are inadequate, they are often afraid to advocate increased rates because of competitive pressures. With many fixed overhead costs and the very free transfer of business by agents from one company to another for lower rates or other reasons, well managed companies may continue to write policies at inadequate rates forced upon them by competitors rather than see their business lost. I believe there is a pressing need to make sure that all companies, both large and small, are made more rapidly aware of the inadequacy of rates when this condition exists. Now that so many companies are making independent filings, it is very difficult for even a large company to be properly informed on the true

experience and competitive positions. As a result, ignorance and fear of loss of business sometimes lead to inadequate rate filings. Here, too, is a need for all companies to be better informed. I am going to make three rather revolutionary proposals which would, I believe, help the industry as a whole by increasing the information available and should not be sufficiently harmful to anyone to offset their overall advantage.

First, I suggest the data developed by rating and statistical bureaus should be made readily available to all. The restriction of such statistics to full members of the bureaus, or even to the rating committees of such bureaus, seems harmful and completely unjustified when the submission of data to such bureaus is mandatory.

Second, I suggest further steps should be taken to speed the rapid development of accurate ratemaking data. In a talk I gave to the Society of Insurance Accountants recently I advocated the adoption of a practice long used by life actuaries in developing mortality statistics. This is to limit the collection of statistics to the data from larger companies. The increased accuracy of such data would more than offset the slight reduction in credibility due to the reduction in volume and the greater speed resulting from all contributing companies having modern electronic data processing equipment would be a real gain. By incorporating in the edit routine of the electronic equipment tests for miscoding, etc., at present carried out by the bureaus, much additional time could be saved in the development of results. Consequently, earlier appraisal of the loss situation would be available and more prompt rate revisions could be made.

Third, I believe an information interchange agreement should be set up to which any company could subscribe. Subscribers would provide other subscribers with information as to filings made on their behalf (whether developed by themselves or by bureaus) including the justification for such filings. This information is already on public file in Insurance Departments but it is not easy or cheap for a single company to collect it. The idea of interchanging information between companies, so long as it is limited to past experience and rates filed, does not, I understand, involve any anti-trust implications. The practice might be extended to items other than rate filings. Examples which come to mind are loss frequency and average claim costs for private passenger automobile insurance, and expense experience in greater detail than that provided by the Expense Exhibit. The industry needs to be protected from ill informed competition and this plan would be, I believe, of considerable assistance in this respect.

Whether any of these proposals will bear fruit I cannot guess, but I hope they may lead to better and generally acceptable proposals which will help to solve the problems with which we are presently faced.

COMMERCIAL PACKAGE POLICIES — RATING AND STATISTICS

ROBERT A. BAILEY · EDWARD J. HOBBS
FREDERIC J. HUNT, JR. · RUTH E. SALZMANN

INTRODUCTION

Commercial multiple peril package policies have been in existence since 1958 and at this time are still new enough so that they have not yet really passed beyond the evolutionary or seasoning stage. As a result, they should not be considered as having settled into any rigid or finally determined procedures insofar as rating and statistical plans are concerned, nor should any of the practices brought over from the individual lines of insurance be considered immutable. Having already demonstrated their present and potential importance with a premium volume in 1962 of over $150,000,000, it is vital that the ratemakers give consideration to the best method of handling this business. As a preliminary to discussing this problem, it is necessary to review briefly some of the events and developments of the past decade or so.

BACKGROUND

Prior to the advent of independent action in the regulated lines of property and casualty insurance, rating was strictly in the hands of the various rating bureaus; and while the bureaus were and are the servants of their member companies, an individual company ordinarily became involved in rating only indirectly unless it had representation on one of the bureau steering or advisory committees. Even then its representative might have no part in the actual development of rates and might only be called upon to pass on the recommendations of the bureau technicians. Similarly, the statistical plans were drawn up as a result of board, bureau or industry committee action. Thus, an individual company typically had little active or detailed concern in the mechanics of either statistical or rating plans. If the company used its data classified in accordance with industry statistical plans at all, it was usually for comparison with industry loss ratios both by class and total and with industry premium distributions by geographical or class breakdowns.

The foregoing was typical of the situation at most companies prior to the independent moves starting in various lines in the late 1940's and early 1950's. (Independent is used as meaning actually different in rate, form, or coverage rather than the technically independent filings which are in fact identical to the bureau filings.) However, when a company became different and was no longer running with the pack, it had to prepare itself so that it would have data available to justify its actions and to indicate future courses which it should follow. In other words, when a company became directly involved in ratemaking and in rate level decisions, it had to develop information on which to base such decisions. To accomplish this, it required statistics as described in the following quotation:

"More recently, statistics has usually meant the science (and art) concerned with

the collection, presentation, and analysis of quantitative data so that intelligent judg-
ments may be formed upon them. . . ." [1]

This by-product of independence was first encountered as a major problem
by the direct writers in the auto field, and they soon evolved or introduced
coding procedures and classifications patterned to meet their own particular
needs.

Homeowners: The first major ventures in independence in the multiple line
area were, of course, with respect to the Homeowners Policy. The statistical
problems of independence in this field were greatly eased by the fact that
companies which later became independent participated in the drafting of
the original statistical plans, and the final basic plan issued by MPIRO (Mul-
tiple Peril Insurance Rating Organization) was drawn along lines which re-
flected the thinking of more than one segment of the industry. One funda-
mental concept, the indivisible premium approach, prevailed at that time as
the basis of industry statistical data and greatly simplified the problem of
coordinating independent plans with standard industry plans. Subsequently,
for internal purposes, some companies amplified the industry plan by pro-
viding greater coding detail for the single premium for mandatory coverages.
At the same time, these companies moved away from the indivisible premium
approach by providing separate coding for certain of the optional coverages.
Over the years this separate coding became onerous since it required the
punching of additional premium detail cards on a significant and increasing
proportion of Homeowners policies. Furthermore, it was found that all too
often the additional information either was not available, was of very limited
use or was of questionable accuracy so that little reliance could be placed upon
it. When more than one premium classification appeared on package policy
coding slips, it was apparently very difficult to obtain any material degree of
accuracy in the application of the appropriate classification code to losses. In
studying runs of the losses coded as falling under a given optional endorse-
ment, discrepancies were found between the coded cause of loss and the
coverage provided by the endorsement. These discrepancies simply pointed
up the fact that any increase in detail requirements entailed a reduction
in accuracy as well as an increase in processing cost. Thus, while the sepa-
rate coding and punching of certain items on Homeowners policies required
a considerable expenditure, there was not a commensurate return in usable
or available information.

Commercial Packages: As a natural outgrowth of the highly saleable Home-
owners program, the package principle was applied to classes of business out-
side the dwelling field. One of the first packages in the commercial field was
the funeral directors policy and the introduction of this package on an in-
dependent basis preceded any action on the part of the bureaus. The prem-
iums for this first commercial package were published in a manner similar to

[1] Kenney, J. F., and Keeping, E. S., *Mathematics of Statistics*, 3rd Edition, Vol. 1, p. 1,
D. Van Nostrand Co., Inc., 1954.

Homeowners, that is, a single premium for the basic property and liability coverages with additional premiums for various optional coverages. Accordingly, the first statistical plans drawn up for use on this package used the same approach which had been adopted in some quarters for internal purposes for Homeowners; that is, the basic premium was coded as a single premium while as many as five different optional coverages were coded separately. These first plans were relatively simple and were designed to produce experience for the total package with very little further information other than construction-protection and an exposure such as number of funerals or, in the case of motels, sleeping units.

As further progress was made into the commercial field, it was soon found that more detailed information seemed to be needed and also that publishing single premiums for the basic coverage was impractical (at least in the developmental stage). As a result, statistical plans similar to the example in Exhibit I have evolved. These commercial package statistical plans were aimed at breaking premiums and losses back to components—not just to property and liability but to building, contents, optional property coverages, standard liability, elevators, etc. At the time these plans were drafted, it was recognized by many that they would be expensive to administer since they could require the separate coding of dozens of items for a single policy. However, with high average premiums (five to ten times as large as Homeowners) and the value of the resulting information, it was felt that such an expense was justified.

The Statistical and Rating Problems: Several factors have combined to bring to a head various companies' problems with multiple peril package statistical plans. Particularly in the commercial package field there has been increasing concern with the cost of processing the business. The complexities involved in implementing the component statistical plans have been creating an extremely expensive mass of detail. Developments have been producing a split personality in that while premiums for most packages have in effect been developed from components on a readily divisible basis, packages have been introduced more recently for which a large portion of the premium was developed from a single rate not readily divisible into components. As a result of these factors, it became increasingly apparent that commercial package statistical plans needed to be reviewed with a view toward making them as simple and uniform as possible and more economical to apply.

As a complicating factor, pressure developed because the commercial package plans of some independent companies were drawn up prior to the development of the industry plans. Even though these plans involved considerable detail and were almost as expensive to administer, the independent plans were not necessarily exactly compatible with or readily convertible to the industry plan, thus making virtually impossible the compilation of meaningful data on an industry basis.

As a result of the foregoing, the authors commenced various separate reviews and investigations of the various facets of these multiple peril package

problems, statistical and rating. In discussing their separate studies, it be-
came increasingly apparent to the authors that not only were the present
statistical plans expensive to administer, but that much of the information
the plans could produce was useless from a rating point of view. As a result,
it was decided to commence with research and discussions on a joint basis.
The goal was to find solutions first to the problem of how to rate the pack-
ages and second to the problem of what statistical plan or plans would best
enable application of such a rating method. The results of these studies with
respect to the commercial package phase of these problems were presented
at a panel discussion by the authors at the May 1963 meeting of the Casualty
Actuarial Society. This paper is an end product of the studies made and ma-
terials prepared for that panel presentation.

SELECTION OF THE RATING METHOD

As noted previously, premiums for package policies were developed origi-
nally by taking premiums for the separate coverages from the respective
manuals. Such premiums were added together, and an overall discount was
applied to the total. This method, which will be referred to as the traditional
method, seemed to be the logical one with which to begin the study of rating
methods.

The Traditional Method: The traditional method was perhaps the only method
that could have been used in the rating of commercial package policies before
any actual package experience became available. As a result, there seemed
to be little justification for continuing the traditional method on a permanent
basis unless it would provide the best ultimate basis for making rates. A
review of the pros and cons of such a method, therefore, seemed advisable.
The advantages can be summarized as follows:

1. The traditional method would afford a proper basis for determining
   an adequate loss cost level for the aggregate of all risks in each pack-
   age.

2. The traditional method would provide a certain measure of safety
   and would be consistent with the past.

3. This method would provide a reliable means for preserving a flexible
   position in the future.

4. Because this method would combine the experience of package and
   non-package policies, many people have concluded that the greater
   volume of data would produce more credible experience. (This was
   listed as one of the advantages of the traditional method even though
   there is no general agreement on the conclusion that the figures
   would be more reliable.)

These were the advantages; the primary disadvantages were as follows:

1. The traditional method would not produce equitable loss costs by

type or class of insureds *within* one package policy program. Only the package code would make it possible to identify individual package experience. Thus, only one overall loss cost differential could be computed per package; and all risks in the package, regardless of type or combination of coverages taken, would therefore receive the same experience modification. This would, indeed, be inequitable and discriminatory—and would only lead to the establishment of more refined package forms which would in turn lead to thinner and thinner experience data in each grouping.

2. The traditional method would not encourage any change or standardization in coverages presently taken. This would result because the loss cost differential would be uniform for all risks within the package. Thus, there would be no incentive to add or change coverage; and the package program, therefore, would in essence do no more than continue the "a la carte" selection that existed in prepackage days. The only difference would be that one more refinement, the calculation of loss cost differentials by package policy form, would be incorporated in the rating calculation. Perhaps this refinement would redistribute the loss cost charges in a more equitable fashion between package and non-package risks, but the aggregate loss costs for the entire population of risks would not change. As a result, the "net" reduction in loss costs (lower package premiums not offset by higher non-package premium levels) anticipated in the original premium charges would indeed vanish; and in the end, the industry would be almost back where it started from, having lost a considerable amount of money in the interim.

3. The traditional method would require a feed-back of experience into the manual classifications for the various coverages involved, a procedure which would be tremendously complicated. It would, therefore, be necessary to keep different statistical detail for each coverage, and in some instances it would .be necessary to keep different statistical detail even for the same coverage. To illustrate: fire and E.C. coverages on the smaller funeral directors and motel risks are rated as dwellings; for larger risks, these coverages are rated on a mercantile basis.

4. Package loss costs developed by the traditional method would depend upon the loss costs inherent in the rates from the various manuals for each of the individual coverages. Thus, if any of these non-package rates were changed, the traditional rating method properly applied would require a corresponding change in the package rates with a subsequent review of the package loss cost differential. On this basis, the ratemaker would be forever reviewing package rate levels.

From the analysis above, it was evident that the ratemaking technique used in determining the original commercial package premiums left much to be de-

sired and would be inappropriate as an ultimate rating method for these policies. The logical conclusion, therefore, was to reject the traditional method and design something new.

A quote from Jean Monnet, father of the Common Market concept, was particularly pertinent at this point: "Material problems are not very hard to resolve. What counts is to make up our minds to see things in the perspective of building the future and not of preserving the past." "Preserving the past" was inherent by definition in the traditional method and, after a review of the disadvantages listed above, it was evident that these disadvantages were the result of the limitations and complications superimposed on the collection of data solely for the purpose of combining package and non-package experience. Thus it appeared that any new plan ought to be designed so that package policy loss costs could be developed on the basis of package policy experience only. In this way, package policy experience would not be limited, complicated, distorted or lost by being combined with non-package experience.

As a result of this conclusion, it became necessary to determine how package experience should be classified for rating purposes. In other words, how should the pie be cut? There were two possibilities:

1. Loss costs could be calculated for each component coverage within the package, which when added together would produce the package premium for each insured. This approach will be called the component method.

2. Loss costs could be calculated for the package as a whole for each type of insured. This approach will be called the indivisible premium method.

The "component" method would develop premiums for each coverage (fire, E.C., time element, comprehensive crime, basic liability, elevators, products, etc.) by type of insured, and the "indivisible premium" method would develop premiums by type of insured, according to the combination of coverages selected.

Indivisible Premium or Component Approach: At first blush, it might appear that there would be little difference between these two methods, but subsequent study showed that there was quite a difference — and that one approach was indeed superior to the other.

First of all, both methods would be equally adept at producing the proper loss cost for the entire package in the aggregate. This was true because both plans would identify loss experience for each package policy form and, therefore, total loss experience by package would be available under either method. It would also be possible in either method to develop pure premiums or to develop loss ratios at current premium levels for the experience period.

There were four areas, however, in which the two plans differed materially:

1. The first area had to do with the compliance of these plans with the philosophy of package policies. This philosophy encompasses the

principle that certain types of insureds provide a better basis for classification than does a classification system based upon the individual perils. Such a philosophy anticipates that a motel with a swimming pool will have a different type of customer and general maintenance than a motel without a swimming pool. This same rationale would apply to motels with restaurants and without, new versus old, etc. Likewise, it would be expected that a different type of insured would select different combinations of coverage. Thus, the package loss cost for a particular insured might not equal the sum of the loss costs for the coverages rated individually for all insureds. Homeowners furnished a good illustration of this concept. Suppose that Homeowners had been rated on a component basis as follows:

a. The basic policy was Homeowners A.
b. The B endorsement provided the additional coverage in the Homeowners B policy over the A policy.
c. The B+ endorsement provided the additional coverage in the Homeowners B+ policy over the B policy.
d. The C endorsement provided the additional coverage in the Homeowners C policy over the B+ policy.

The component method of rating would have established loss costs for a, b, c and d separately. (The method actually used, the indivisible premium approach, established loss costs for each of these plans.) However, had the component method been used, improper premium charges would have resulted because experience has shown that there were differences in the four plans not completely attributable to the differences in the endorsements involved. In other words, it is highly probable that the component method might not produce the most equitable rate by type of insured — a situation inconsistent with the underlying philosophy of package policies. It would be folly then to select a method which would move away from this particular package concept when it may very well have considerable potential merit. Just through general reasoning, this package concept makes sense because it incorporates the logic in the old saying, "Birds of a feather flock together." It could indeed be possible that risks, like birds, would combine into classes or flocks according to common interest and insurance needs, with such homogeneity being reflected in the loss experience. And if this homogeneity had no influence on the loss experience, which would indicate that this package principle did not exist in the commercial field, then the use of the indivisible premium rating method would be justified because it would succeed in making such evidence available. With the component method, such data would not be available and, therefore, the truth of this package principle would never be known or tested in the commercial package field.

2. The second difference between the two methods of rating was that
    the indivisible premium approach would encourage a reduction in
    the number of forms available; whereas the component method
    would not. With the indivisible premium method, statistics would
    be collected by combinations of coverage and, therefore, it would
    be possible to determine which combinations were the most popu-
    lar, which combinations produced the lowest relative premium levels,
    and which combinations earned no advantage over non-package
    premiums and as a result should be discontinued. This knowledge
    would be most significant in keeping the commercial package policy
    field successful. Information of this kind could not be made avail-
    able under the component rating approach.

3. The third area of difference was the difficulty that would occur in
    getting a proper rate for a particular coverage with the component
    method, even when no variation in the loss cost by type of insured
    existed. This would result because of the duplication in coverage.
    For instance, if glass were damaged by wind, the loss would be cov-
    ered both under the E.C. coverage (in the basic physical damage
    coverage) and under the optional glass endorsement. Such a loss
    would be coded to E.C. if no glass endorsement were involved, and
    to the glass endorsement if one existed. Likewise, some products
    coverage is furnished under the basic coverage in a motel policy,
    covering such items as continental breakfasts and vending machines.
    However, if a products endorsement exists on the policy, any prod-
    ucts loss would be charged to the products endorsement. As a re-
    sult, when duplication in coverage exists between two of the com-
    ponent coverages, it would be difficult to get accurate loss cost meas-
    urements for the optional endorsements involved. This would be-
    come a further complication in the coding of losses because one cause
    of loss could be assigned to two different coverages, depending upon
    what endorsements exist on the policy.

4. The fourth area of difference was in the coding of experience data
    under both methods. With the indivisible premium approach, experi-
    ence would be collected *by policy;* whereas experience would be
    collected *by coverage* under the component rating method. To code
    and collect experience by policy would be a much simpler opera-
    tion than it would be by coverage. This would be so because a
    single statistical code could be used for each policy. This one code
    would identify the type of insured, the combination of coverages,
    and the exposure bases—the only limitation being the space avail-
    able on the statistical record. This single statistical code would be
    the only statistical identification (except for cause of loss) that would
    be recorded on premium and loss transactions affecting that policy,
    and all transactions would therefore be identified by one and the

same statistical code. On a component basis, a different statistical code would be necessary for each coverage afforded under the policy — both as respects premium and loss transactions. To visualize the concept of the single statistical code per policy, the necessary statistical records are illustrated in the form of an 80 column punch card — one for premiums and one for losses — as shown in Exhibits III and IV. The cards were divided into the general areas of information recorded so that the statistical code, to which reference is being made, could be identified and shown in its proper perspective. The cards also set forth those codes which are common to all transactions affecting one particular policy. The statistical code is so designated. Thus from this elementary punch card illustration, one can easily visualize the concept of one statistical code (except for cause of loss) per policy. With only a moment's reflection, the advantages implicit in such a coding method are apparent. To name a few:

a. There would be only one statistical code per policy. All subsequent classification coding for both losses and endorsements could be copied. This would simplify the coding; and, as a result, the statistics would be more accurate. On a component basis, there would be as many statistical codes per policy as there were coverages contained therein. This would require several premium codes and a "choice" of codes when each loss occurred.

b. There would be only one statistical code (including cause of loss) per occurrence per claimant. This would have a tremendous advantage over the "component" rating method. An illustration should further clarify this point. With the single statistical code per policy, a fire loss would require only one code for all payments to one claimant; on a component basis, three possible codes might be necessary — one for the building loss, one for the contents, and one for time element.

c. With one statistical code, each loss would be identified by cause of loss and would be coded the same regardless of the endorsements on the policy. This would eliminate the complication discussed earlier where a loss could be coded two different ways depending upon the endorsements on the policy.

There were four areas in which the indivisible premium rating method and the component rating method differed materially. These areas are summarized below:

1. Compliance with the philosophy of package policies so as to achieve maximum equity.

2. Basis for screening and reducing the number of plans available so as to keep the package program both attractive and profitable.

3. Elimination of complications caused by duplication of coverage between endorsements and the basic policy.

4. Simplicity in the method of coding experience data for the double benefit of greater accuracy and lower expenses.

Because of these differences, it was believed that the indivisible premium rating method was indeed superior in theory to the component rating approach. The adoption of the indivisible premium rating method, therefore, depended upon its feasibility.

INDIVISIBLE PREMIUM STATISTICAL PLAN

As set forth in the previous section, the indivisible premium method of rating should be based upon experience collected *by policy* by means of a single statistical code; this concept is not new. This approach in one form or another had been used very successfully in both Accident and Sickness, and Marine, to mention only two. It was present in the National Board 1958 Homeowners Statistical Plan where there were separate single codes designated for Forms 1, 2, 3 and 5 — said forms differed from one another basically in the combinations of coverage afforded.

Further, the statistical plan for the Special Multi-Peril Policy endeavored to use the same statistical code on each component split where possible; this was an attempt to gather together information on the various identifiable classes of insureds and on the combinations of coverages selected by these insureds. Thus, there were divisions such as garden apartments, three family apartments, and four family apartments for identification of classes; and, for combinations of coverages there were divisions such as with or without elevators, named peril or all risk. These were attempts to use modified versions of the single statistical code.

A statistical plan using a single statistical code designed for one of the commercial package policies — motels — is shown in Exhibit II. A statistical plan supporting the component method, illustrated by the Special Multi-Peril Policy (SMP) Statistical Plan for motels, is shown in a simplified form in Exhibit I. The SMP Plan has been included not only for purposes of comparison but also because the model single statistical code plan was developed simply by building from the present SMP Plan. Thus, a review of the SMP Plan will expedite the analysis of the single statistical code plan.

SMP Statistical Plan: For motels, the SMP plan calls for all of the basic identifying information such as state, zone, term, transaction, year of loss, and catastrophe codes; the exhibit, though, has been limited to a description of only the statistical information.

The first two columns of the statistical field are to be used for major peril codes which would split the experience into categories to preserve the data along major bureau lines. The next three columns are to be used to identify the program and class and will be the same for all major peril codes; these

columns will distinguish between motels with and without swimming pools or restaurants, and those policies with only personal property insured and those which insure the building.

For the property peril, two additional columns are to be used; one column will code the standard fire classification of protection and construction, and the other column will identify three different types of deductible situations, the main emphasis being placed on the presence or absence of the windstorm deductible. The liability peril calls for the coding of limits in one column and the actual exposure must be recorded in ten columns. Comprehensive Crime Coverage Insuring Agreement; IA and IB — Fidelity calls for the coding of two digit classes provided. Cause of loss must be recorded in two columns for each of the seven perils called for.

It is obvious that only three columns would give information about the package as a whole; these are the program and class code columns. Almost no information would be available about the combinations of coverage selected by the various classes of insured. Instead of using the other required columns to gain information about the package, each of these remaining statistical columns was used to split the experience for purposes other than the evaluation of package experience or package classification.

A review of the model single statistical code plan, illustrated in Exhibit II, will show the modifications necessary to funnel the flow of information into combinations of coverage rather than into separate coverage categories.

Model Statistical Plan — Single Statistical Code: The model single statistical code plan in Exhibit II was built around the SMP split experience statistical plan; the sample plan is an indivisible premium plan and contemplates that there will be only one direct insurer on each risk.

Two columns would have to be used to identify the major peril (that is, the subline of insurance which would be the same for all commercial package policies) and two for the policy form or program (such as motels, apartments, etc.)—this is basic information. Then, additional columns would be used to identify the various classes of insured and the combinations of coverage selected by insureds. By judicious use of columns, the package experience could be obtained on the following classes of insured:

1. Motels with and without swimming pools and restaurants.
2. Motor Hotels (three or more stories) as opposed to conventional motel structures.
3. Ownership of the motel.
4. Age of the motel buildings.
5. Construction and protection including sprinklered risks.
6. Limit of Section II liability.
7. Size of policy (amount of insurance).

On the combinations of coverages selected, package experience would be available as follows:

1. Basic perils, broad perils, and all risk policies.
2. Policies with and without comprehensive crime.
3. Building only, contents only, and building and contents policies.
4. Policies with elevator liability and consequently insureds with elevators.
5. Various deductible combinations.

Of course, it would be necessary to have a cause of loss so that experience would be available by desired cause of loss.

With the single statistical code plan, experience could be pulled together for the package or for any combination of codes desired. Thus, it would be possible to accumulate overall package experience in any pre-determined manner.

One can easily see from the review of these two statistical plans that there would be an increase in the amount of available classification information per policy in the indivisible premium plan as compared to the component split plan; for example, the SMP Plan for motels has only eight items of classification and coverage combination experience available; the single statistical code plan has a considerably greater number of potential groupings for review and evaluation. This result, of course, was inherent in the design of the plan, and this preference for data by policy was made possible through the sacrifice of statistical detail by individual coverage.

INDIVISIBLE PREMIUM RATEMAKING PROCEDURES

The ratemaking procedures cannot be spelled out in detail under an indivisible premium approach because until the data becomes available the significance of the various combinations and refinements will not be known. However, the statistical plan was designed to furnish a flexible framework under which data could be compiled for ratemaking purposes. The scope of the ratemaking techniques contemplated will be set forth in this section.

Amount of Insurance—Exposure Base or Classification: As shown in Exhibit II and in the punch card illustration, the model single statistical code plan provides four digits for exposure, thus making it possible to develop rates on a pure premium basis. The exposure base designated in Exhibit II is "amount of insurance." Other exposure bases would be useful, such as floor area, number of elevators, number of pony rides and so on, but the space available on the statistical records is limited. Insured value is a more universally applicable exposure basis than any other for commercial package policies, and it is also the most important rating basis since about two-thirds of the package was originally rated on the basis of insured value. Moreover, insured value is correlated with many of the other exposure bases. For example, the value of a building is closely correlated with the

number of square feet of floor area, especially when the buildings are classi-fied by type of construction and by occupancy.

The use of "amount of insurance" as exposure implies that rates per thou-sand dollars of protection would be established for the various combinations of coverage by statistical classification. Although subsequent experience may indicate that pure premiums per thousand dollars of protection have little application in the development of equitable rates in the commercial package field, the model statistical plan was designed so that such conclusions would be possible. There is no question that some use of pure premiums per thou-sand dollars of insurance will be made for some causes of loss by statistical classification.

The extent to which amount of insurance would be used as an exposure base, however, was not a matter of serious consequence in the early stages of the development of a ratemaking procedure because this information would be needed as a size of risk classification to the extent that it would not succeed as an exposure base. The significant point here is that it was necessary to include amount of insurance in the model statistical plan to provide for either use in the ultimate development of rates.

If amount of insurance were to be used as an exposure base, such statisti-cal coding would be necessary only on the premium record. If, however, amount of insurance were to be used as a part of the statistical classification, it would be necessary to record it on both the premium and loss records. This was provided for in the model statistical plan outlined.

If future experience proved that thousand dollars of insurance had no merit as an exposure base in commercial package ratemaking, such statisti-cal detail would be used for classification purposes only. Then the sole ex-posure base in the model statistical plan outlined would be number of policy years. Number of earned policy-years would be approximated from a compi-lation of the number of policies-in-force. Such a count would be obtained from the transaction field in the management and accounting (premiums only) portion of the statistical record illustrated by punch card in a previous sec-tion. Such a method of deriving earned policy-years has been assumed in this paper; however, number of earned policy-years could be obtained by direct recording which would require an additional two-digit field in the premium record similar to the handling of cause of loss in the loss records. On this basis number of policy-years would be recorded in tenths similar to the use of car-years in automobile insurance; then pure premiums would be developed per policy-year in any classification detail desired including size of risk.

It would, of course, be possible to use amount of insurance both as a classi-fication and as an exposure base. This dual role would be possible if the experience data were collected by size groupings and then reduced to pure premiums per thousand dollars of insurance on building and contents within each size grouping.

If amount of insurance was used as a classification, it would then be pos-

sible to evaluate the experience by size of policy. It has already been shown in other areas that experience is different for small policies as compared to large policies. Unit reports have been used in Workmen's Compensation to bring together all the premiums and losses for each risk and to obtain the experience by size of risk. Homeowners was one of the few other areas where experience was easily obtained by size of risk and that was because the amount of insurance was coded on both premiums and losses. Many valuable benefits have been derived from the ability to study Homeowners experience by size of risk. Commercial packages should also greatly benefit from the adoption of the same procedure which proved so useful in Homeowners.

In addition, the use of amount of insurance as a classification would make it possible to introduce improved rating-by-layer techniques for property perils. Amount of insurance would indicate the size of the largest potential property loss. Ratemaking with limited volumes of data would then be made a great deal easier if the data were in a form suitable for making rates by layer of insurance. If a certain class had experience premium of $1,000,000 and the largest potential property loss in that class was $1,000,000, the experience losses would not be fully credible. Either the experience included a loss of $1,000,000 or it did not, and in either case the experience would not be representative. In liability insurance unlimited losses have not been used to make rates because there has not been sufficient volume to absorb the fluctuations caused by very large losses. The same principles would apply to property insurance. Depending on the volume of data available and the size of risk group being studied, it might be decided to limit each loss to $10,000 or perhaps to $25,000 in order to eliminate the shock losses and to increase the reliability of the indications. If the losses were limited, it would also be necessary to limit the premium so that basic losses could be compared with basic premiums. The amount of insurance would be vital in making this kind of evaluation of property losses. This technique would also be useful in the rating of deductibles, excesses and coinsurance.

The discussion so far has been limited to the use of amount of insurance as an exposure base or as a classification. Now to the ratemaking procedures for commercial package policies. If exposure were recorded as recommended, pure premiums could be obtained. Thus, both pure premiums and loss ratios would be available for making rates.

The Pure Premium Method of Ratemaking: The pure premium approach will be discussed first. For a given package, such as the motel package, an overall average pure premium could be obtained for the entire package. Then the experience for the entire package could be subdivided according to the class of insured and the combinations of coverages selected by each insured. For example, using the model statistical plan shown in Exhibit II, the motel package experience could be subdivided according to policy type (item 5)— basic perils, broad perils, or all risk. Pure premiums could be developed for

each of these subdivisions and relativities or relationships established among them. Then the same experience could be re-subdivided according to ownership (item 6); and separate pure premiums could be obtained for owner occupied, absentee owners, and tenants, thus making it possible to establish relationships or relativities among these subdivisions. This could be done for amount of insurance, construction-protection, deductible, age, whether there was a swimming pool, and so on, through all the categories coded by the statistical plan. Depending on the volume of data available, the data could be subdivided two or three ways at the same time. For example, the data for the motel package could be subdivided according to basic perils, broad perils, and all risk; and, at the same time, according to whether the policy were owner occupied, absentee owner, or tenant. Pure premiums and relativities would be established for each combination. This same data could be further subdivided according to, for example, whether or not the policy included a restaurant. In this manner, pure premiums and relationships could be established among the various classes of insureds and combinations of coverage in the motel policies.

This whole procedure of establishing pure premiums and relativities among the various classes would be similar to the procedure used in automobile insurance where relativities have been established among the classes of driver, merit rating groups, territories, and so on. These relativities have been established in automobile liability insurance on a pure premium basis (per car year) or on a modified form of the pure premium basis, using premiums obtained by extending the exposures at present manual rates. All these sets of relativities have then been meshed together to produce the actual rates. A similar procedure could be used for commercial package policies.

In all of this, judgment limitations would be used as is inevitable in rate-making. For risks which were the same in every other aspect, a higher rate would presumably always be charged for frame risks than for brick risks. And similarly more would be charged for broad perils than for basic perils. Other judgment limitations would be applied in the relationship of the package premiums to the non-package premiums. In this manner an average pure premium could be established for each subdivision of the motel policy that was coded.

Using the cause of loss coding, it would be possible to analyze the experience on a pure premium basis for separate perils or groups of perils. In this way the pure premium for certain perils in the motel policy could be compared with a pure premium for the same perils in some other policy, such as a fire pure premium or a wind pure premium or a liability pure premium. If two or more packages were expected to have the same pure premium or similar pure premiums for given perils, the experience from these packages would be combined in order that a more credible pure premium cost for selected perils or groups of perils could be established. The cause of loss codes could also be used to pinpoint the source of unusual fluctuations in the losses, such as a hurricane might create.

In commercial package policies, there will always be rate variations which will not be coded either because an insufficient volume of data would be involved or because of the practical limitations of the statistical records. This situation has existed in many lines of insurance where certain rate variations, such as the non-standard floor opening in fire insurance, have never been coded. Only the most important rate variations would be coded, subject to the limitations of the statistical records. For those variations which would not be coded, a schedule of modifications would be established which would apply to a basis rate. The basis rate would be the pure premium established for each class. The schedule of modifications would consist of credits and debits which would apply to the basis rate. Such modifications would be based on judgment and would reflect all pertinent knowledge and information available, including the charges or credits for such features in existing rating schedules. This would be the same technique used originally to make rates for some of the coverages included in the commercial package policies.

The Loss Ratio Method of Making Rates: Now, the loss ratio method can be reviewed. The overall loss ratio would make it possible to calculate an indicated rate level change which would provide an excellent check on the analysis on a pure premium basis. It also could be used independently of any pure premiums to revise rates, similar to the way the loss ratio method is used today in fire insurance. The rate level change indicated by the loss ratio could be distributed by class of insureds and combination of coverages either on a formula basis using credibility weights or by some other reasonable method, just as an overall rate level change for O.L.&T. insurance would be distributed by group of classes, class, and territory. An overall check on a loss ratio basis is important in any line of business where schedule modifications are used. Such a check is extremely important in the commercial package field because of the recent adoption of the casualty type of experience and schedule modification in addition to the type of modification contemplated by the traditional fire rating schedules. Under such conditions it would be essential either to use a rating method which would reflect the experience on modifications actually used or a method which would provide a satisfactory check. Loss ratios based upon collected premiums would fulfill this essential requirement.

The ratemaking procedures discussed have been confined to the loss portion of the premium dollar only. It is in this area that decisions have to be made prior to the actual recording of the data, if the experience data is to be the servant of the ratemaker. The expense loading is certainly a significant portion of the total premium; but except for the reflection of efficiency in the processing of statistics, the determination of the expense loading is independent of the rating method selected. Therefore, this omission will not jeopardize any of the conclusions made in this paper concerning the measurement of the loss portion of the premium dollar.

CONCLUSION

In concluding this paper, it is pertinent to recall a comment made by Clarence Kulp, one of the stalwarts of this society. With reference to insurance rates, he said:

> "The rate has essentially only two functions. It should produce total funds sufficient to cover the insurer's obligation; it should distribute the cost of insurance fairly among insured persons." [2]

The authors believe that the thinking expressed in this paper ties in with Dr. Kulp's views. Included in this study are considerations of many facets of the problem, among which are the complications of integrating package and non-package experience, the importance of charging the single insured covered by the package the correct, adequate and not excessive total premium, and the need for maximum simplicity both for reasons of accuracy and expense.

From all of this, the authors concluded that the indivisible premium approach would not only be a theoretically correct method of rating but that it would also work in actual application. In addition, this approach would enable the compilation of meaningful statistics with greater ease, at less cost and with greater accuracy. Therefore, the individual premium approach appeared to be by far the best method to use in rating commercial package policies.

[2] Kulp. C. A., "The Ratemaking Process in Property and Casualty Insurance—Goals, Technics, and Limits", *Law and Contemporary Problems*, Autumn, 1950, Vol. 15, No. 4, pp. 493, 521, The Duke University School of Law.

EXHIBIT I

STATISTICAL PLAN FOR SPECIAL MULTI-PERIL POLICY—
MOTEL PROGRAM
(Component or Divisible Premium Plan)

Code

1. . . . .

2. . . . .

3. Major Peril Code (2 columns) (Sub-line of insurance)
   a. Property Coverage (Section I)   90
   b. Liability Coverage (Section II)   91
   c. Comp. Crime Cov. Ins. Agreement II, III & IV—Burglary   92
   d. "   "   "   "   "   IA and IB—Fidelity   93
   e. "   "   "   "   "   V—Forgery   94
   f. Open Stock Burglary and Theft Coverages (when separate rate
        or premium charge)   95
   g. Boiler and Machinery   96

4. Program and Class Code (3 columns)
   Motel (Exposure: Number of Rental Units)
      a. Motel—with swimming pool and restaurant
         (1) Building only, or Building and Personal Property   101
         (2) Personal Property Only   102
      b. Motel—with swimming pool
         (1) Building only, or Building and Personal Property   103
         (2) Personal Property Only   104
      c. Motel—with restaurant
         (1) Building only, or Building and Personal Property   105
         (2) Personal Property only   106
      d. Motel—all other
         (1) Building only, or Building and Personal Property   107
         (2) Personal Property Only   108

5. . . . .

6. Construction and Protection Code—Major Peril 90 only (1 column)

7. Deductible Code—Major Peril 90 only (1 column)
   a. No deductible   1
   b. Wind deductible only   2
   c. Wind deductible and other deductible   3

8. Limits Code—Major Peril 91 only (1 column)
   a. $ 25,000   1
   b.   50,000   2
   c.   100,000   3
   d.   200,000   4
   e.   300,000   5
   f.   500,000   6
   g. 1,000,000   7
   h. Over 1,000,000   8
   i. All Other   9

Exhibit I (Continued)

Code

9. Exposure—Major Peril 91 only (10 columns)
   For motels, report number of rental units

10. Type of Loss Code (2 columns)

11. . . . .

12. . . . .

13. . . . .

(Besides the above, Major Peril 93 must be broken down into numerous business classifications)

NOTE:
  Items are numbered in accordance with the published industry SMP statistical plan. Blank items are codes in the management-accounting field.

EXHIBIT II

PROPOSED MODEL STATISTICAL PLAN FOR SPECIAL MULTI-PERIL POLICY—MOTEL PROGRAM

(Indivisible Premium Plan)

(Direct insurance is 100% with one Company)

				Code	Accumulated Number of Columns
1.	. . . .				
2.	. . . .				
3.	Major Peril (Sub-line of insurance)			90	2
4.	Policy Form				
	a. Motels			01	4
5.	Policy Type				

a. First Column	*Swim-ming Pool*	*Three or more Stories*	*Restau-rant*		
	No	No	No	1	
	"	"	Yes	2	
	"	Yes	No	3	
	"	"	Yes	4	
	Yes	No	No	5	
	"	"	Yes	6	
	"	Yes	No	7	
	"	"	Yes	8	5

b. Second Column	*Comprehensive Crime*		
Basic Perils Policy			
	No	1	
	Yes	2	
Broad Perils Policy			
	No	3	
	Yes	4	
All Risk Policy			
	No	5	
	Yes	6	6

Exhibit II (Continued)

		Code	*Accumulated Number of Columns*

6. Ownership

	Passenger Elevator or Escalator Liability	*Code*	*Accumulated Number of Columns*
Owner Occupied (*Bldg. & Cts. Insured*)	No	1	
	Yes	2	
Absentee Owner (*Bldg. only Insured*)	No	3	
	Yes	4	
Absentee Owner (*Bldg. & Cts. Insured*)	No	5	
	Yes	· 6	
Tenant (*Contents Only Insured*)	No	7	
	Yes	8	7

7.   .   .   .   .

8. Construction Protection

	Code	*Accumulated Number of Columns*
a. Frame Protected	1	
b. Frame Unprotected	2	
c. Brick Protected	3	
d. Brick Unprotected	4	
e. Fire Resistive Protected	5	
f. Fire Resistive Unprotected	6	
g. Frame Sprinklered	7	
h. Brick Sprinklered	8	
i. Fire Resistive Sprinklered	9	8

9. Deductible Code

a. All Perils Deductibles

	Code	*Accumulated Number of Columns*
(1) $100	1	
(2) $500	2	
(3) Other	3	

b. Named Peril Deductibles

	Code	*Accumulated Number of Columns*
(1) Full Coverage Wind with no deductible on Broad Perils	4	
(2) Full Coverage Wind with deductible on Broad Perils	5	
(3) Windstorm Deductible with no deductible on Broad Perils	6	
(4) Windstorm Deductible with deductible on Broad Perils	7	

	Code	*Accumulated Number of Columns*
c. All other deductibles	8	9

Exhibit II (Continued)

	Code	*Accumulated Number of Columns*
10. Age of building		
a. New (0-14 years)	1	
b. Medium (15-39 years)	2	
c. Old (40 and over)	3	10
11. Basic Section II Liability		
a. $ 25,000	1	
b. 50,000	2	
c. 100,000	3	
d. 200,000	4	
e. 300,000	5	
f. 500,000	6	
g. 1,000,000	7	
h. Over 1,000,000	8	
i. All Other	9	11
12. Amount of insurance		
Enter actual number of thousands of insurance on Building and Contents; if total is in excess of $9,999,000, enter 9999	xxxx	15
13. Type of Loss		
Fire, Lightning and removal	10	
Windstorm and Hail	11	
Explosion; riot and civil commotion; vandalism and malicious mischief; aircraft and vehicles; smoke	12	
Water Damage including sprinkler leakage	13	
Theft including burglary, robbery, mysterious disappearance (if presumed to be theft)	14	
"Employee dishonesty" and "depositors forgery"	15	
All other Property Perils	16	
Liability	17	
Medical Payments	18	

NOTE:

Items are numbered so as to be compatible with the SMP Component or Divisible Premium Plan insofar as possible.

EXHIBIT III

PREMIUM CARD			
MANAGEMENT - ACCOUNTING CODES		STATISTICAL CODE BOTH PREM & LOSSES	DOLLARS OF PREMIUM
BOTH PREMIUMS AND LOSSES	PREMIUMS ONLY	CLASS / EXPOS.	

```
0000000000000000000000000000000 0000000000000000000000000000000 000000000000 000 0000000
1111111111111111111111111111111 1111111111111111111111111111111 111111111111 111 1111111
2222222222222222222222222222222 2222222222222222222222222222222 222222222222 222 2222222
3333333333333333333333333333333 3333333333333333333333333333333 333333333333 333 3333333
4444444444444444444444444444444 4444444444444444444444444444444 444444444444 444 4444444
5555555555555555555555555555555 5555555555555555555555555555555 555555555555 555 5555555
6666666666666666666666666666666 6666666666666666666666666666666 666666666666 666 6666666
7777777777777777777777777777777 7777777777777777777777777777777 777777777777 777 7777777
8888888888888888888888888888888 8888888888888888888888888888888 888888888888 888 8888888
9999999999999999999999999999999 9999999999999999999999999999999 999999999999 999 9999999
```

COMMERCIAL PACKAGE POLICIES

EXHIBIT IV

LOSS CARD

MANAGEMENT - ACCOUNTING CODES		STATISTICAL CODE BOTH PREM & LOSSES		CAUSE OF LOSS	DOLLARS OF	
BOTH PREMIUMS AND LOSSES	LOSSES ONLY	CLASS	EXPOS		LOSS	LOSS EXP.

IBM 5081

COMPREHENSIVE MEDICAL INSURANCE —
STATISTICAL ANALYSIS FOR RATEMAKING

JOHN R. BEVAN

INTRODUCTION

In their original form, Accident and Health policies typically extended coverage on the basis of stipulated benefits for hospital, surgical and medical expenses. About 15 years ago, however, the concept of Major Medical coverage began to emerge, which concept tended to cut across benefit maximums by type of medical expense and imposed only maximums of $5,000 or $10,000 for all expenses combined arising out of one disability. Such policies usually carried a relatively high deductible of $300 or $500 and provided that the policyholder, in addition to the deductible, would share in the loss at a fixed coinsurance percentage above the deductible.

Under such Major Medical policies, the typical pattern was to build this coverage upon a foundation of basic hospital and surgical coverages, the benefits under which helped to satisfy the Major Medical deductible. As time went on, however, the product designers developed policies of the Major Medical type which contained low deductibles and high maximums and eliminated the necessity of basic coverages. They came to be known as Comprehensive Medical policies and this is the general definition used in this paper.

In developing this new coverage concept, actuaries and company management tended to adopt and sell inadequate rate levels. Inflationary tendencies, broad contracts and unknown medical expense areas produced unprofitable experience. Only recently have solid data started to emerge as to costs of this coverage. This paper is an attempt to outline the type of statistical data required and an approach to ratemaking for this type of insurance on the basis of such data.

BASIS OF STATISTICAL ANALYSIS

Source and Scope of Data: Ideally, it would be desirable to study intensively all our Comprehensive Medical business. However, non-standard contracts and the lack of detailed exposure on a current basis made such an approach impossible. Rather, it was decided for our own preliminary analysis and for purposes of this paper to concentrate on one large policyholder and to maintain detailed data on claims originating in the two and one-half year period from July 1, 1957 through December 31, 1959. Such an approach, it was felt, would provide meaningful relativity data and a point of departure from which rate patterns could be designed for coverage variations more frequently requested. A total of 9,304 claims reported during this period were tabulated and analyzed.

The policyholder in question has had about 8,500 employees insured over the two and one-half year experience period of which about 59 percent were females. Approximately 3,000 of the 3,500 male employees were also cov-

ered for their dependents. Although most of this paper is devoted to claim analysis, it is to be emphasized that the exposure information cited above is equally vital. Our approach was to secure from our premium records the total number of employees and dependents insured at quarterly intervals and to derive "exposure years" therefrom. In addition, the employer cooperated in providing periodic data on age breakdowns from its personnel records. Since self-administration is the rule in Group insurance wherein the employer simply multiplies the number of employees and dependents by a flat rate and submits the resulting total premium to the company, it is virtually impossible, as indicated above, to maintain detailed exposures (by age, income, and area) on total business.

A loss card with columnar headings as shown below was first designed to produce on closed cases the types of detailed data considered necessary.

		Yr.	No.						
Emp.		Mo.	Mos.	No.			89		
or		of	of	Mos.	81		(Other	Total	Am't.
Dep.	Age Diag. Disa.	Pay	Open	Days	Am't. 82 83 84 85 86 87 88		Ins.)	Chgs.	Check

Code numbers 81 through 88 refer to the type of medical expense incurred as follows:

    81 Hospital Room and Board
    82 Hospital Extras (Other than Room and Board—In Patient)
    83 Hospital Extras (Out Patient)
    84 Doctors' Charges—Surgery
    85 Doctors' Charges—Other than Surgery
    86 Nurses
    87 Drugs
    88 All Other

It will be noted that the significant data in such a study are not the claims paid, but the expenses incurred before imposition of deductibles and coinsurance percentages. Only on this basis can the material be arranged in such a way that frequency and severity indications are produced by various deductibles and coinsurance provisions. As respects frequency and severity indications, it was decided to use the number of claims incurred during the period from July 1, 1957 to December 31, 1959 for frequency indications and the expenses on claims incurred during the period July 1, 1957 to December 31, 1958 for severity indications. As of the time of the last experience review at July 1, 1961, it was found that many claims with disability dates in 1959 were sufficiently indeterminate so as to make it advisable to discard them for severity purposes. However, at that time, knowledge of the number of claims incurred in 1959 was a virtual certainty so that reliability for frequency purposes was assured. Frequency indications, therefore, are based on a two and one-half

year period and severity results are based on all medical expenses paid through July 1, 1961 on claims with disability dates in the period from July 1, 1957 through December 31, 1958.

Those readers who are familiar with Accident and Health rating techniques will note that although area and income differentials are typically used in developing rates for this coverage, such data are not listed on the tabulating card. Their absence is traceable not to the fact that they were considered insignificant in their affect on losses, but to the facts that income data were not available and other published data on area cost differentials from such organizations as the American Hospital Association and the Health Insurance Association were deemed more reliable. Further, and in order to provide a meaningful point of departure for appraising the data, the nature of the exposure was such that for all practical purposes, the male and female income distribution could be considered to fall in the "to $10,000" and "to $5,000" brackets, respectively. Areawise, the exposure was weighted in the direction of high cost medical areas but it is impossible to relate the weighted exposure to some accepted standard of country-wide medical costs since no such yardstick exists.

However, it seemed advisable for evaluation purposes to at least rate the exposure on the company's area schedule used in rating Major Medical coverages which schedule of premium differentials reflects broad averages of published hospital and surgical cost differentials by area. The results together with the area classifications and the differentials are given below: (The area classifications are shown in Appendix A.)

Area	Differential	Percent of Exposure
1	.80	1.6
2	.90	9.2
3	1.00	17.0
4	1.10	43.3
5	1.20	28.9
Average Weighted Differential		1.09

Even if income and area data were available on exposures and losses, the ever-present actuarial problem of data fragmentation into small non-credible groups presents itself. Without pressing the point further, it is felt that in such a study the isolation of variables which influence losses while holding others constant is almost impossible without virtually unlimited data. That is, loss cost differentials by income would be valid only if age homogeneity were maintained in the group to be studied. If exposure dilution by area was also imposed the experience cells to be examined would expand to the point where resulting data would become almost meaningless.

Coverage: The tabulated losses are those arising from a policy which contained the following provisions and limitations:

"This insurance pays for the reasonable expense, incurred while the insurance is in effect, of medical care and treatment of accidental bodily injury and sickness.

The injury or sickness must have been due to non-occupational causes.

The injury or sickness must have been treated by a licensed physician.

The care or treatment must have been prescribed as necessary by a licensed physican. Physician includes a chiropracter when licensed by state authorities and a Christian Science Practitioner.

When these conditions are met the insurance will pay the excess over deductible amounts, hereinafter stated, up to $7,500 of expenses incurred for each separate injury or sickness.

The deductible amounts are as follows:

In the case of employees, 15% of the expenses, or $25.00, whichever is greater incurred for each separate injury or sickness in each successive 90 day period starting with the date of the first expense incurred for such injury or sickness.

In the case of dependents, 25% of the expenses, or $25.00, whichever is greater incurred for each separate injury or sickness in each successive 90 day period starting with the date of the first expense incurred for such injury or sickness.

Complications of sickness, related conditions and recurrences of the original sickness or of any complication or related condition are not considered a separate sickness. Injury includes sickness which results directly from the accident.

Hospital expense for room and board will be limited to the usual charge made by the hospital for two bed semi-private accommodations.

Benefits are not payable for:
1. dentistry, unless required:
    (a) by accidental injury externally caused
    (b) bacterial infection other than tooth decay
    (c) for removal of impacted teeth
2. eye examinations and eyeglasses
3. hearing aids or fitting thereof

Benefits are not payable for care in an institution whose services are primarily custodial rather than curative."

Thus, it is seen that we are dealing generally with claims which exceed $25.00 of reasonable medical expense in successive 90-day periods, which are limited to the usual charge for semi-private hospital accommodations, and which may continue without a time limit subject only to a maximum of $7,500.

EXPERIENCE ANALYSIS

Basic Data: The underlying data on which further calculations are based is set forth in Table I.

The frequency indications for spouses are not as reliable by age as those for employees since the figures were grouped by age of the insured husband not of the spouse. If it is reasonable to assume that the wife's age averages

two or three years less than the husband's, the exposures shown for higher ages are probably understated and result, therefore, in producing somewhat lower frequencies than if the results could be determined on a more refined exposure base. Exposures for maternity experience were based on those assignable to the "to 39" age bracket for both female employees and dependent spouses.

Claim Expenses by Size of Claim: Of vital importance in Major Medical rate-making is the availability of loss distributions by size. Only with such data can rates be determined for varying deductibles and maximums. Although unlimited data by age would be helpful in determining differing deductible and maximum rates by age, such refinement leads to non-credible results and it was therefore decided to group the size data generally by type of person covered, i.e., male employee, female employee, spouse, and children. One exception was made in the case of male employees, however, wherein the distribution for males up to age 39 is shown as well as the totals for all males. In this way, the data for male and female employees becomes more comparable, as about 85% of all females were less than 39. Refer to Table IIA for this data.

In general, two characteristics of the distribution are worth noting but might have been forecast without inspection: (a) The many small claims account for only a small proportion of total charges. About 60% of all claims (excluding children's) are less than $200, but such charges represent only about 15% of the total charges; (b) The claims for children form a different distributional pattern than do those for adults. That is, the experience for children understandably indicates that the incidence of smaller size claims is sharply greater than the incidence for adults. It need not be emphasized to the actuary that some smoothing or graduation techniques should be applied to these crude data prior to their ratemaking application.

It is always illuminating to compare the results of any research study with those independently determined by others. Fortunately, a similar type study has been completed in the Major Medical field authored by Messrs. Gingery and Mellman and appearing in Volume XIII of the *Transactions of the Society of Actuaries.* Although coverage differentials and varying incurred loss definitions limit the possible areas of direct comparison, it is of interest to show the following frequency and severity comparisons by size of total charges. It will be noted that frequency indices follow the same general pattern but that the severity data tend to be higher in the subject study as compared to that of the Society of Actuaries.

This phenomenon is generally traceable to the fact that our definition of loss runs to all expenses incurred arising out of a disability until either all expenses have been paid or the $7,500 maximum has been reached, whichever first occurs. Under our definition, for example, payments on a chronic disability may have been accumulated over a two or three year period, as indicated above under Scope of Data, while the definition used in the Society

of Actuaries' Study was: "* . . . all of the reported charges, including those used to satisfy the deductible, incurred in 1957 for an individual claimant once he had satisfied the deductible." Thus, in the latter case, major medical expenses were limited to those expenses generated by one calendar year's medical bills while in our case the time dimension imposed no restriction on the total expenses accumulated. Obviously, this difference in loss definition should produce marked severity differences, but minor frequency differences.

It should also be mentioned that the mid-point of our experience study can be considered to be in 1959 as compared to the 1957 period in the other aforementioned study. The inflationary trend between these periods may well account for about 10% of the severity difference.

Comparison is set forth in Table IIB.

Claim Charges by Type of Medical Expense: In the merchandising of Comprehensive Medical Insurance, it is often necessary to develop variations in the coverage pattern such that, for example, hospital expenses are covered in full up to $300 or $500 before application of coinsurance while all other medical expenses are subject to an initial deductible and then coinsurance. Consequently, it is vital to have a segregation of medical expenses by general category to assess cost differentials for the variations desired. Table III sets forth medical costs by type as a percentage of total and shows such percentages by age for the four exposure classes used heretofore. As a by-product of our tabulations for this study, we accumulated additional data on hospital claims and show average room and board benefits and average lengths of stay.

Some characteristics of the tabulated data are immediately apparent:

1. Hospital expenses comprise a smaller percentage of total expenses for male employees than for female employees and spouse. Note that the male category accounts for only 33% of the total while comparable figures for female employees and spouses were 45%.

2. There is a general increase in the average length of hospital stay as age increases.

3. Hospital extras or therapeutic expenses tend to be about the same as room and board expenses at the lower ages where the average stay is close to the norm but as age increases, the room and board charges tend to be more costly than the extras.

4. Doctors' charges for surgery show a downward trend with increasing age. Although the dollar amounts spent for this category remain about the same by age, the fact that hospital confinements and thus expenses increase with age tends to depress surgical percentages to total.

5. Indications for exposure groups over 60 in age should be discounted because of the thinness of data.

---

* Page 517, Volume XIII, "An Investigation of Group Major Medical Expense Insurance Experience."

APPLICATION OF STATISTICS TO RATEMAKING

In the construction of a manual table from statistical data, there are almost unlimited variations in the form that such tables may take. No industry uniformity has emerged and there are about as many approaches to this problem as there are companies merchandising this coverage. Regardless of the form of the rate table, however, actuaries have found it necessary to compromise between overly-refined rate tables and those which weave differing coverage provisions and exposure mixes into the rates on an averaging basis.

The purpose of this paper is not to produce manual rates or rate tables which purport to be proper for use by any company or for any one risk but to demonstrate the type of statistical data necessary for and its use in producing rates. This section will attempt to demonstrate how statistical data *could* be used in the fundamental processes of rate preparation for this line.

In our company we have chosen to relate our comprehensive medical rating to basic rates for males segregated by age and by deductible. Such base rates contemplate:

a. A coinsurance percentage of 75%.
b. The payment of a maximum benefit of $5,000 per disability after the deductible has been satisfied.
c. Average area classification (i.e., Area 3 from our 5 area classes of 1 through 5).
d. Employees earning less than $6,000 per annum.

With these rates as a point of departure, final policy rates are produced by the application of factors or rate increments depending on differing coverage conditions or characteristics of the exposure. From our raw statistical data described above, it is now possible to construct a basic rate table. Although most of the frequency and severity data are based on foregoing tables, it will be noted that a basic-excess severity approach has been adopted based on the familiar casualty concept that excess claims are erratic and largely happenstance. In deriving basic rates, we have chosen to limit average claim costs used in the severity ingredient to the first $1,000 of charges. Increments are added thereto based on a judgment "excess limits" table to build the rate to contemplate $5,000 maximum benefit. Although attempts were made to test the application of a mathematical model to the excess data, they proved abortive. It was finally felt that a judgment determination based on a blend of indications, judgment and other related experience data would produce reasonable results. Infinitely more excess experience is necessary before the confidence limits surrounding the use of the subject table may be significantly increased.

See Table IV which is in three parts and Table V.

One of the most frequent variations of Comprehensive Plans involved the grant of first dollar, no coinsurance coverage for hospital expenses with all other medical expenses subject to the normal deductible and coinsurance pro-

visions. Typically, this coverage is offered only in conjunction with low $25 or $50 deductible plans and accurate ratemaking for such variation would require a distribution of hospital only charges by size. However, reasonable approximations to the additional cost can be derived as shown in Table VI. Although our example demonstrates the method used for the determination of the additional charges for males under age 40 at a $25 deductible, in practice one factor by deductible for employees (all ages) and for two classes of dependents (spouses and children) would suffice because of the small charges involved and since at best the techniques used are rather crude.

Other variations in coverage may involve first dollar surgical coverage, the imposition of higher or lower maximums, the application of the deductible each calendar year on prolonged disabilities, and many others. Rate differentials for such variations depend upon the compilation of the type of data recorded under our statistical plan but in far greater quantities. It is hoped that emerging statistics will lead to the development of the credible ratemaking material needed.

CONCLUSION

The scope of this paper has been intentionally limited to a discussion of the type of statistics needed for Comprehensive Medical ratemaking and a few examples as to how such derived data may be processed into rates. In the absence of bureau-promulgated statistical plans as we know them in other casualty lines, companies writing this relatively new type of Accident and Health insurance must develop their own record-keeping techniques. This paper attempts to outline Liberty Mutual's approach.

Table I

Male Employees	Age Group				Total
	To 39	40-49	50-59	60 & Over	(All Ages)
1. Number of Claims	967	287	229	(77)	1560
2. Exposure (Life Years)	6161	1517	893	(357)	8928
3. Frequency Per 100 Lives	15.7	18.9	25.6	(21.6)	17.5
4. Severity (Average Claim)	$284	$462	$755	($850)	$419

Female Employees (Excl. Maternity)

	To 39	40-49	50-59	60 & Over	(All Ages)
1. Number of Claims	1796	259	128	(23)	2206
2. Exposure (Life Years)	10696	1258	504	(126)	12584
3. Frequency Per 100 Lives	16.8	20.6	25.4	(18.3)	17.5
4. Severity (Average Claim)	$270	$420	$455	($221)	$298

Dependent Spouse (Excl. Maternity)

	To 39	40-49	50-59	60 & Over	(All Ages)
1. Number of Claims	941	342	157	(58)	1498
2. Exposure (Life Years)	5051	1365	805	(223)	7444
3. Frequency Per 100 Lives	18.6	25.1	19.5	(26.0)	20.1
4. Severity (Average Claim)	$274	$414	$630	($578)	$357

Children		Maternity	
		Female Employees	Dependent Spouse
1. Number of Claims	1553	644	1241
2. Exposure (Life Years)	8459	10696	5051
3. Frequency	18.4	6.0	24.6
4. Severity (Average Claim)	$243	$299	$299

NOTE

As to Table I, it will be noted that frequency and severity trends are significantly upward as ages increase and that aging affects severity to a greater extent than frequency. The fact that data for the 60 and over age range does not round out the rising trend is largely attributable to meagre experience in which the presence or lack of a serious claim can distort the results.

DISTRIBUTION OF CLAIM CHARGES BY SIZE OF CHARGE (EXCLUDING MATERNITY)

Upper Limit of Claim Expense	Percentage of Total Charges Represented by Charges on Claims up to Limit Shown					Percentage of Total Number of Claims Represented by All Claims up to Limit Shown			
	Total Male Empl.	Male Empl. (To 39)	Female Empl.	Spouse	Child	Total Male Empl.	Female Empl.	Spouse	Child
($25) – $ 49	1.8	2.9	1.9	1.6	2.9	19.3	15.4	14.2	17.2
99	6.5	10.5	7.4	6.1	9.0	47.6	39.4	38.5	38.2
199	12.0	19.0	17.2	14.8	28.0	64.3	59.7	59.7	70.5
299	17.2	27.2	27.6	22.6	38.4	73.5	72.3	71.2	80.9
399	22.7	35.3	36.7	29.9	48.4	80.1	80.3	78.6	87.9
499	28.0	42.9	44.6	35.6	55.0	85.0	85.6	83.1	91.4
999	38.5	56.8	67.5	55.3	69.7	91.4	95.2	93.8	96.7
1,999	50.2	66.7	80.9	65.7	82.4	95.1	98.3	96.7	99.0
2,999	61.6	74.2	88.2	76.0	84.4	97.0	99.2	98.3	99.2
3,999	72.5	78.4	91.8	79.9	88.5	98.4	99.5	98.8	99.5
4,999	74.8	81.0	92.9	82.6	92.2	98.6	99.6	99.0	99.7
6,667	81.3	85.7	95.9	88.7	96.3	99.1	99.8	99.5	99.9
7,499	86.6	89.2	97.7	88.7	96.3	99.4	99.9	99.5	99.9
10,000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Totals Used	$399,969	$165,278	$384,629	$326,753	$241,649	955	1,291	915	994

FREQUENCY AND SEVERITY COMPARISONS WITH DATA UNDERLYING TABLE 5A OF SOCIETY OF ACTUARIES' STUDY BY SIZE OF TOTAL CHARGE

	Age	Ded.	Frequency per 100 Exposed of Claims with Total Charges Exceeding Deductible Amount Shown		Severity — Average Amount of Total Charges per Claim	Subject Study Per Claim Limit on Total Charges	
			Society of Actuaries	Subject Study	Society of Actuaries	$2,500	$10,000
Employee	less than 40	$ 25	N.A.	15.9	$ N.A.	$ 244	$ 281
		50	11.7	12.7	292	294	340
		100	8.9	8.1	365	424	500
		300	3.6	3.5	634	741	914
		500	1.7	1.7	914	1,125	1,491
	40-49	25	N.A.	19.4	N.A.	365	454
		50	14.9	15.1	352	433	570
		100	11.0	9.6	434	641	851
		300	5.2	5.6	725	1,009	1,410
		500	2.8	3.1	1,007	1,533	2,281
	50-59	25	N.A.	25.6	N.A.	537	695
		50	19.3	21.7	399	622	806
		100	14.9	16.1	491	817	1,066
		300	7.2	10.4	816	1,167	1,554
		500	4.4	7.3	1,096	1,486	2,031
Dependents (Spouse and Children	(All Ages)	25	N.A.	38.3	N.A.	265	298
		50	31.5	32.2	287	308	347
		100	22.8	23.6	359	395	448
		300	8.1	9.1	691	705	893
		500	4.0	4.8	1,002	1,090	1,354

NOTES:

1. The employee data in our study were separately derived by males and females but were weighted 80% — 20%, respectively, in the above table for comparative purposes since the Society of Actuaries' data were not refined by age or by sex. However, the female content in the latter study was about 20% in the aggregate.

2. Dependent frequency data are related to the number of employees insured with respect to their dependents.

3. Because of the paucity of data on employees over age 60, no comparative data are shown for this age group.

4. In order to eliminate the impact of catastrophic claims on our severity data and to make the data slightly more comparable with the Society of Actuaries', average claims based on the first $2,500 of total charges on claims which exceed this amount are shown as well as those without the imposition of any limit. (Shown under $10,000 Limit Column, since no claim exceeds $10,000.)

5. Although the frequency comparison reveals a striking similarity and adds some reinforcement to the credibility of our study, the severity indications (even after the $2,500 limit) are dissimilar with the general exceptions of employees under age 40 and of dependents. Because the incidence of chronic cases generating longer term disabilities tends to increase with age, it is to be expected perhaps that our "per disability" loss definition would pick up relatively greater loss amounts than the Society of Actuaries' definition as age increases. This fact together with a more limited exposure base may account for the widening gap of average claim costs for age groups over age 40.

Table III

122

CHARGES BY TYPE OF MEDICAL EXPENSE AS PERCENT OF TOTAL CHARGES

Male	Ave. Daily R & B Ben.	Hospital Room & Board Ave. R & B Stay	% R & B Charges To Total	In & Out Patient Therapeutics	Hosp. Total	Doctor- Surgery	Doctor Excl. Surgery	Nurses	Drugs	All Other	Total Charges
To 29	$17.87	9 days	14%	15%	32%	15%	32%	5%	7%	9%	$ 89,990
30-39	18.84	7	16	15	34	14	40	3	7	2	75,288
40-49	18.55	15	20	17	37	11	31	1	16	4	80,896
50-59	19.79	20	23	19	42	12	19	9	10	8	115,556
60 & Over	20.31	21	26	19	45	9	19	21	4	2	38,239
Total	$19.08	13	16	17	33	13	29	7	9	9	$ 399,969
Female (Excl. Mat.)											
To 29	$18.26	7 days	23%	23%	46%	19%	21%	1%	4%	9%	$ 204,706
30-39	18.14	8	21	19	40	21	31	1	5	2	80,570
40-49	19.84	13	29	21	50	13	27	1	6	3	67,970
50-59	17.93	21	34	13	47	13	18	6	12	4	30,055
60 & Over	21.11	6	30	20	50	25	24	–	–	1	1,328
Total	$18.50	8	24	21	45	18	24	1	5	7	$ 384,629
Spouse (Excl. Mat.)											
To 29	$16.65	6 days	21%	22%	43%	25%	23%	1%	6%	2%	$ 65,734
30-39	20.37	10	29	23	52	16	20	2	6	4	89,814
40-49	22.45	10	24	17	41	17	29	2	8	3	87,435
50-59	17.66	16	23	21	44	13	18	6	15	4	62,941
60 & Over	19.86	20	31	20	51	5	27	1	14	2	20,753
Total	$19.58	10	25	20	46	17	24	2	8	3	$ 326,753
(Spouse and Children	$16.89	5 days	20%	27%	47%	21%	20%	1%	5%	6%	$ 241,649
Total (Excl. Mat.)	$18.61	9 days	22%	21%	43%	17%	24%	3%	7%	6%	$1,353,000
Maternity											
Spouse	$17.80	5 days	30%	20%	50%	46%	3%	–	–	1%	$ 226,114
Female Employee	$17.92	6 days	31%	20%	51%	46%	2%	–	–	1%	$ 116,143

Table IV

TABLE OF ANNUAL CLAIM COSTS
MALES

Deductible	$25			$50			$100			$300			$500		
Age	To 40	40-49	50-59	To 40	40-49	50-59	To 40	40-49	50-59	To 40	40-49	50-59	To 40	40-49	50-59
1. Frequency per 100 Lives Exposed	15.6	17.5	25.6	12.3	13.5	22.0	7.6	8.3	16.4	3.3	4.5	10.8	1.6	2.4	7.7
2. Average Charge less Ded. (Total Charge per Claim Limited to $1,000)	$162	215	354	176	250	384	223	345	461	212	370	459	144	407	400
3. Charge in (2) after 75% Coins. (.75) × (2)	$122	161	266	132	188	288	167	259	346	159	278	344	108	305	300
4. Annual Basic Claim Cost [(1) × (3)]	$19.00	28.20	68.10	16.20	25.40	63.40	12.70	21.50	56.70	5.20	12.50	37.20	1.70	7.30	23.10
5. *Excess Charge for $5,000 Maximum Benefit	$12.50	25.00	50.00	12.50	25.00	50.00	12.50	25.00	50.00	12.50	25.00	50.00	12.50	25.00	50.00
6. Total Annual Claim Cost Assumed to be Reflective of Costs 109% above Base Area Level and 110% above Base Income Level (4) + (5)	$31.50	53.20	118.10	28.70	50.40	113.40	25.20	46.50	106.70	17.70	37.50	87.20	14.20	32.30	73.10
7. Total Annual Claim Cost Adjusted to Base Area and Income Levels (6) ÷ (1.09) × (1.10) = (6) ÷ 1.20	$26.25	44.33	98.42	23.92	42.00	94.50	21.00	38.75	88.92	14.75	31.25	72.67	11.83	26.92	60.92

*From Table of Charges for Increasing Maximum Benefits.

Table IV (Cont'd.) 124

TABLE OF ANNUAL CLAIM COSTS
FEMALES, SPOUSE AND CHILDREN

	Deductible	$25				$50				$100			
		Females		Spouse	Child.	Females		Spouse	Child.	Females		Spouse	Child.
	Age	To 40	40-49	(All Ages)		To 40	40-49	(All Ages)		To 40	40-49	(All Ages)	
A1.	Frequency per 100 Lives Exposed	16.8	20.4	20.1	18.2	14.3	17.1	17.1	15.1	10.1	12.4	12.3	11.3
2.	Average Charge less Ded. (Total Charge per Claim Limited to $1,000)	$211	285	232	178	222	312	245	186	254	371	283	192
3.	Charge in (2) after 75% Coins. (.75) × (2)	$158	214	174	134	167	234	184	140	191	278	212	144
4.	Annual Basic Claim Cost [(1) × (3)]	$26.50	43.70	35.00	24.40	23.90	40.00	31.50	21.10	19.30	34.50	26.10	16.30
5.	*Excess Charge for $5,000 Maximum Benefit	$ 8.50	17.50	12.50	8.50	8.50	17.50	12.50	8.50	8.50	17.50	12.50	8.50
6.	Total Annual Claim Cost Assumed to be Reflective of Costs 109% above Base Area Level and 110% above Base Income Level (4) + (5)	$35.00	61.20	47.50	32.90	32.40	57.50	44.00	29.60	27.80	52.00	38.60	24.80
7.	Total Annual Claim Cost Adjusted to Base Area and Income Levels (6) ÷ (1.09) × (1.10) = (6) ÷ 1.20	$29.17	51.00	39.58	27.42	27.00	47.92	36.67	24.67	23.17	43.33	32.17	20.67

A For Spouses and Children, frequency base is the number of employees insuring dependent Spouses and Children.

* From Table of Charges for Increasing Maximum Benefits.

Table IV (Cont'd.)

TABLE OF ANNUAL CLAIM COSTS
FEMALES, SPOUSE AND CHILDREN (Cont'd.)

	Deductible	$300				$500			
		Females		Spouse	Child.	Females		Spouse	Child.
	Age	To 40	40-49	(All Ages)		To 40	40-49	(All Ages)	
A1. Frequency per 100 Lives Exposed		4.4	8.2	5.6	3.5	2.2	4.7	3.2	1.6
2. Average Charge less Ded. (Total Charge per Claim Limited to $1,000)		$284	331	320	269	286	312	290	298
3. Charge in (2) after 75% Coins. (.75) × (2)		$213	248	240	202	215	234	218	224
4. Annual Basic Claim Cost [(1) × (3)]		$ 9.40	20.30	13.40	7.10	4.70	11.00	7.00	3.60
5.*Excess Charge for $5,000 Maximum Benefit		$ 8.50	17.50	12.50	8.50	8.50	17.50	12.50	8.50
6. Total Annual Claim Cost Assumed to be Reflective of Costs 109% above Base Area Level and 110% above Base Income Level (4) + (5)		$17.90	37.80	25.90	15.60	13.20	28.50	19.50	12.10
7. Total Annual Claim Cost Adjusted to Base Area and Income Levels (6) ÷ (1.09) × (1.10) = (6) ÷ 1.20		$14.92	31.50	21.58	13.00	11.00	23.75	16.25	10.08

A For Spouses and Children, frequency base is the number of employees insuring dependent Spouses and Children.

* From Table of Charges for Increasing Maximum Benefits.

COMPREHENSIVE MEDICAL INSURANCE

Table V

126

TABLE OF INCREASED RATES FOR BENEFITS PAYABLE ON CHARGES IN EXCESS OF $1,000 PER CLAIM
(Maximum Benefit = $5,000)

		Indicated Additional Rates for:			Selected Additional Rates for:		
		$2,500 Max. Benefit	$5,000 Max. Over $2,500	Total for $5,000 Max.	$2,500 Max. Benefit	$5,000 Max. Over $2,500	Total for $5,000 Max.
		(1)	(2)	(1) + (2)	(3)	(4)	(3) + (4)
Males	To 40	6.20	4.30	10.50	7.50	5.00	12.50
	40-49	14.63	15.00	29.63	15.00	10.00	25.00
	50-59	43.08	31.34	74.42	30.00	20.00	50.00
Females	To 40	3.20	1.50	4.70	5.00	3.33	*8.50
	40-49	9.80	7.80	17.60	10.00	7.50	17.50
Spouses (All Ages)		8.00	5.00	13.00	7.50	5.00	12.50
Children		3.30	2.30	5.60	5.00	3.33	*8.50

*Rounded

BASIS OF SELECTIONS:

1. Male "To Age 40" rate for $2,500 maximum benefit based on Indicated Charge rounded up to nearest $2.50.

2. Each successive age bracket = 2.0 preceding charge. This formula produces the following relative pattern selected excess costs by age group. For comparative purposes, ours and the latest industry consensus of age relativity for basic costs are also included. The latter is derived from a paper by Messrs. D. Pettengill and B. Burton written for the Society of Actuaries meeting in March 1963 and entitled "Development of Expected Claim Costs for Comprehensive Medical Expense Benefits and Ratios of 1959 and 1960 Actual Experience Thereto."

	Relative Costs by Age Group Subject Paper		Society of Actuaries' Paper
Age	*Basic Costs	Selected Excess Costs	(Basic Costs)
Less Than 40	67%	50%	60%
40 - 49	100	100	100
50 - 59	240	200	153

3. Female charges equal two-thirds male charges. Spouse charges equal average of female charges for two age groups. Children charges equal two-thirds spouse charges.

4. Charges for $5,000 maximum over $2,500 maximum equal two-thirds of charge for $2,500 maximum.

5. Although it is not entirely accurate to use the same "excess" rate for each deductible from $25 through 500 under a $5,000 maximum benefit plan, it was decided to do so because of the minor indicated differences in such rates by deductible. It was determined that the maximum difference would be on the order of 3% or 4% and in view of the judgment approach used in the derivation of the charges, it was considered an over-refinement to reflect such nominal differences.

*$25 Deductible Plan

Table VI

DERIVATION OF BASIC CLAIM COST FOR HOSPITAL EXPENSES IN FULL – $25 DEDUCTIBLE, 75% CO-INSURANCE FOR ALL OTHER EXPENSES

Males Under Age 40

	Hospital	All Other Expenses	Total
1. No. of Claims per 1,000 of Employees	47	109	156
2. Total Charges before Deductible and Co-insurance – Assuming 1,000 Employees Covered	$9,750	$19,450	$29,200
3. Total Charges after Deductible $[(2) - (1) \times \$25]$	$8,575	$16,725	$25,300
4. Total Charges after 75% Co-insurance $[.75 \times (3)]$	$6,431	$12,544	$18,975
5. Total Cost per 1,000 Covered [Hospital Line (2) $9,750 + A/O Line (4) $12,544]			$22,294
6. Cost per Person (Rounded) $(5) \div 1,000$			$ 22.30
7. Excess Charge for $5,000 Maximum Benefit			12.50
8. Total Annual Claim Cost (6) + (7)			34.80
9. Claim Cost Adjusted to Base Area and Income Level $(8) \div 1.20$			29.00
10. Annual Claim Cost – Co-Insurance and Deductible Applicable to all Expenses per Table of Annual Claim Costs (Table IV)			26.25

NOTES:

1. The frequency of 156 per 1,000 is equivalent to 15.6 per 100 shown for males up to age 40 in Table IV.

2. From Table III, Charges by Types of Medical Expense, it will be noted that Hospital Charges constitute about 33% of total charges. (Other studies show that the number of hospital claims is about 30% of total.) Thus, 30% × 156 = 47 hospital claims and $29,200 × 33% = $9,750 of Hospital Charges.

3. Total Charges after Deductible of $25,300 is equivalent to 156 claims times average claim for males under 40 of $162 as in Table IV.

AREA CODES

If 85% of the exposure is concentrated in any one area, the base rate for the entire group will be that shown for the area containing the 85% exposure. Otherwise, the base rate for each area times the percentage of exposure in each area will be applicable.

Location	Area Code	Location	Area Code
Alabama		Montana	3
Birmingham	2	Nebraska	2
Remainder of State	1	Nevada	4
Alaska	5	New Hampshire	3
Arizona	4	New Jersey	
Arkansas	2	Newark	5
California	5	Remainder of State	4
Colorado	2	New Mexico	3
Connecticut	5	New York	
Delaware	3	New York City	5
Florida		Buffalo	4
Miami	3	Rochester	4
Remainder of State	2	Remainder of State	3
Georgia	2	North Carolina	1
Hawaii	2	North Dakota	2
Idaho	3	Ohio	
Illinois		Cleveland	5
Chicago	5	Akron	5
Remainder of State	4	Toledo	4
Indiana		Remainder of State	3
Indianapolis	3	Oklahoma	2
Remainder of State	2	Oregon	4
Iowa	2	Pennsylvania	3
Kansas	2	Rhode Island	4
Kentucky		South Carolina	1
Louisville	3	South Dakota	2
Remainder of State	2	Tennessee	2
Louisiana		Texas	
New Orleans	3	Houston	4
Remainder of State	2	Dallas	4
Maine	3	Fort Worth	4
Maryland	3	Remainder of State	3
Massachusetts	4	Utah	3
Michigan		Vermont	3
Detroit	5	Virginia	2
Remainder of State	3	West Virginia	2
Minnesota		Washington	4
Minneapolis-St. Paul	5	Wisconsin	
Remainder of State	3	Milwaukee	4
Mississippi	1	Remainder of State	2
Missouri		Wyoming	2
St. Louis	4	District of Columbia	5
Remainder of State	3		

DISCUSSION BY ELDON J. KLAASSEN

Mr. Bevan has presented a paper on a subject where it is unlikely that we will ever be surfeited with data. Every study of comprehensive medical insurance reveals some new fact, sometimes difficult to reconcile with previous experience. The ratemaking problem is thus a matter of grappling with these disparities using as many sources of information as are available to the actuary. Mr. Bevan's contribution is a significant addition to our sources.

The approach taken by Mr. Bevan is constructive, giving us a model statistical plan to follow in generating internal data. Bearing in mind the ever-present difficulty of obtaining accurate exposure data for group health insurance contracts and the extent to which contracts are tailor-made to each insured's demands, we are forced to the approach of analyzing a single case at a time. Only certain segments of the experience of several cases can subsequently be combined in a meaningful manner.

The loss card outlined is very suitable for the collection of loss information. In order to accommodate the tailoring of individual contracts in the rate-making process, some improvement could be made in items 85 and 86. This would involve segregating "Doctors' charges — Other than Surgery" into two classes, in hospital and out of hospital, and indicating for each the number of calls as well as the charges. Similarly, Nurse charges could be segregated as to hospital or non-hospital and the number of days of care for each. It would then be possible to establish relativities for various inside limits or exclusions of coverage.

The author has indicated that, for severity indications, claims incurred during the last twelve months of the experience period were omitted because a substantial number of claims were still open. An alternative means of getting severity data would have been to obtain all the claims closed during the experience period (whether incurred during this period or not). Provided the case had been in force for two or three years prior to the experience period and the exposure had been fairly stable, this type of loss information would have been relatively unbiased and the amount of data would have been increased by two-thirds.

The discussion of area and income differentials indicates these differentials as independent variables. This is, of course, the industry practice and further refinement may be unwarranted at present. The income and area variables are, however, probably correlated to some extent. For example, one of the principal costs of a hospital is labor cost; therefore, in an area where income levels are relatively high, hospital charges will be high. An improvement might be made in these relativities by relating the average area cost relativity to the average income for that area. This would give rise to a two way table of relativities for the income and area variables somewhat as follows:

Area	Average Income			
	$4000	$4000-5999	$6000-7999	$8000 or more
1	.80	.90	1.00	1.10
2	.85	.95	1.05	1.15
3	.90	1.00	1.10	1.20
4	.95	1.05	1.15	1.25
5	1.00	1.10	1.20	1.30

This table was not constructed from any specific data but merely indicates the form that such a table might take. The use of average income as an index of income level instead of brackets of income ties in with the National Council on Compensation Insurance construction of its Standard Wage Scale. There it was found that the ratio of a given salary to the average for the group was reasonably consistent from group to group.

The study of charges by size of loss is always a fascinating one. Curve fitting techniques often provide more frustration than results when applied to comprehensive medical data. In my company, however, Tom Friedberg, a student of our society, produced a reasonable fit to the data presented by Gingery and Mellman (*TSA* XIII). The equation in its final form was as follows:

$$R = 10^{(.00168\ x^{1.42335} + 2.45455)\ -\ y(.01006\ x^{-.40293}\ -\ .00067)}$$
$$+\ 10^{(.04459\ x\ -\ .30819)} + 40.56$$

where x = age in years
      y = deductible in dollars

R is a relativity function using age 29, $500 deductible, $5,000 maximum benefit as a base equal to 100. Age 29 is assumed equivalent to a group population under age 40. An abbreviated table of these relativities follows:

Deductible	Age				
	25	35	45	55	65
25	416	533	716	1023	1590
100	304	410	573	850	1372
300	146	217	332	542	971
500	85	130	212	376	741

It is quite possible that a suitable modification of the parameters in this equation would suffice to fit the Liberty Mutual data.

The author has expressed some concern for the lack of spouse exposure data by age. It would seem that this is irrelevant. It is quite likely that we will continue rating group business on the basis of employee age data alone for some time. Spouse loss experience should, therefore, be related to "em-

ployee with spouse" exposure data to obtain the most reasonable ratemaking data. This could be accomplished merely by indicating employee's age in the loss card instead of claimant's age.

The apparent discrepancy in frequency data, where the frequency for ages over 60 is less than for the group aged 50-59, was passed by Mr. Bevan as a statistical fluke caused by lack of data. It may, however, be an inherent characteristic of this particular group. If a company has unusually liberal early retirement benefits, for example, it is entirely possible that the employees over age 60 and still working are healthier than the employees aged 50-59 and have lower claim frequencies. We would not, however, expect this result in the majority of cases. For purposes of making manual rates, it would, therefore, be necessary to use the experience of a more typical group to establish age relativities for the higher ages.

In his conclusion, Mr. Bevan has chosen to emphasize that companies must develop their own record-keeping techniques for comprehensive medical insurance. This allows for a maximum of flexibility as the ratemaking techniques become more sophisticated.

DISCUSSION BY ALLEN D. PINNEY

One of the most difficult tasks facing the Group Actuary today is the development of proper rates for Comprehensive Medical Insurance. The newness of the coverage, the variety of benefit provisions offered, and the many variables which affect the cost of this product have combined to raise numerous questions as to what statistical data should be assembled and how it should be analyzed for the purposes of ratemaking. The fact that Mr. Bevan had to approach this problem by making a detailed analysis of one large case rather than a study of several cases serves to illustrate the difficulties that most of us face in this area. Nevertheless, he was able to enlighten us on many aspects of this subject, and his paper is a most welcome and needed addition to our *Proceedings*. Mr. Bevan shows how important it is to have detailed statistical information of the claim charges. His method of using these charges to determine rates for various types and sizes of deductibles is sound. The only weakness in the approach used is that it does not measure the effect that differing deductibles may have on the actual utilization of the coverage. This, however, could only be measured if sufficient data were available to study the experience of many similar type plans separately by deductible.

The data obtained from any one risk will, of course, reflect any abnormality inherent in that particular risk, but it is interesting to compare the results so obtained with one's own findings. One noticeable difference appears in the distribution of charges for male employees shown in Table III where the percentage of hospital charges to total charges is significantly lower than the percentage developed from our studies.

In using the data collected from this risk to produce rates for males segre-

gated by age and deductible, Mr. Bevan develops a basic claim Cost by limiting claim amounts to the first $1,000 of charge, and then superimposes upon this an excess charge which varies according to the size of the maximum. I favor developing a basic claim Cost for the more common maximum of $5,000, and then adjust for lower or higher maximums. Mr. Bevan's severity data tend to be higher than the data appearing in a similar study by Messrs. Gingery and Mellman. He attributes this to the fact that his data reflects an unlimited time maximum while their data reflects a calendar year maximum. This abnormal severity data is reflected in the size of the excess charges used in Table IV and Table V. The use of an unlimited time maximum is uncommon, but I find it difficult to believe that this alone could produce such a drastic difference in the excess charges over $1,000 or over $2,500 than what our studies of data with a two-year benefit period indicate. Actually, I believe that the increased cost for higher maximum benefit plans may be primarily the result of groups with higher income purchasing these plans than with the increased maximums themselves.

The development of proper area and wage factors is an important consideration in producing rates for Comprehensive Medical Insurance. Recent articles appearing in the *Transactions of the Society of Actuaries* provide important data for area factors, age factors, and other variables, but little has yet been published on wage factors.

These comments notwithstanding, Mr. Bevan is to be commended for presenting an interesting and timely paper.

MINUTES OF THE MEETING

OCTOBER 30, 31 and NOVEMBER 1, 1963

TRAYMORE HOTEL, ATLANTIC CITY, NEW JERSEY

The 1963 Annual Meeting of the Casualty Actuarial Society convened at 2:15 P.M. in the Rose Room of the Traymore Hotel with President Longley-Cook presiding, and the following 91 Fellows, 47 Associates, and 35 Guests in attendance.

FELLOWS

Allen, E. S.	Hobbs, E. J.	Otteson, P. M.
Balcarek, R. J.	Hope, F. J.	Pennycook, R. B.
Barber, H. T.	Hunt, F. J., Jr.	Perkins, W. J.
Barker, L. M.	Hurley, R. L.	Petz, E. F.
Bennett, N. J.	Johe, R. L.	Phillips, H. J., Jr.
Berkeley, E. T.	Johnson, R. A.	Pinney, A. D.
Berquist, J. R.	Kallop, R. H.	Richards, H. R.
Bevan, J. R.	Kates, P. B.	Roberts, L. H.
Blodget, H. R.	Klaassen, E. J.	Rodermund, M.
Bondy, M.	Linden, J. R.	Ruchlis, E.
Boyajian, J. H.	Linder, J.	Salzmann, R. E.
Boyle, J. I.	Lino, R.	Sarason, H. M.
Byrne, H. T.	Liscord, P. S.	Simon, L. J.
Cahill, J. M.	Longley-Cook, L. H.	Skelding, A. Z.
Carlson, T. O.	MacGinnitie, W. J.	Tarbell, L. L.
Crowley, J. H.	Magrath, J. J.	Thomas, J. W.
Curry, H. E.	Makgill, S. S.	Trist, J. A. W.
Dickerson, O. D.	Masterson, N. E.	Uhthoff, D. R.
Dropkin, L. B.	Mayerson, A. L.	Valerius, N. M.
Elliott, G. B.	McClure, R. D.	Walsh, A. J.
Espie, R. G.	McGuinness, J. S.	Wieder, J. W., Jr.
Faust, J. E., Jr.	Meenaghan, J. J.	Wilcken, C. L.
Foster, R. B.	Menzel, H. W.	Williams, D. G.
Gillam, W. S.	Miller, J. H.	Williams, P. A.
Goddard, R. P.	Mills, R. J.	Williamson, W. R.
Graham, C. M.	Moseley, J.	Wilson, J. C.
Graves, C. H.	Muetterties, J. H.	Wittick, H. E.
Hart, W. V. B., Jr.	Murrin, T. E.	Wolfrum, R. J.
Harwayne, F.	Nelson, S. T.	Wright, B.
Hazam, W. J.	Niles, C. L., Jr.	
Hewitt, C. C.	Oberhaus, T. M.	

ASSOCIATES

Aldrich, W. C.
Berkman, J. M.
Blumenfeld, M. E.
Carson, D. E. A.
Cima, A.
Coates, W. D.
Craig, R. A.
Dahme, O. E.
DeMelio, J. J.
Durkin, J. H.
Feldman, M. F.
Franklin, N. M.
Gerundo, L. P., Jr.
Gill, J. F.
Gillespie, J. E.
Gould, D. E.

Greene, T. A.
Guertin, A. N.
Hammer, S. M.
Harack, J.
Hart, W. V. B., Sr.
Jensen, J. P.
Jones, N. F.
Lange, J. T.
Margolis, D. R.
McDonald, M. G.
McIntosh, K. L.
Mohnblatt, A. S.
Muir, J. M.
Muniz, R. M.
Nelson, D. A.
Rood, H. F.

Royer, A. F.
Ryan, K. M.
Scammon, L. W.
Scheel, P. J.
Schneiker, H. C.
Shaver, C. O.
Singer, P. E.
Stern, P. K.
Stevens, W. A.
Strug, E. J.
Switzer, V. J.
Thompson, P. R.
Wooddy, J. C.
Young, R. G.
Zory, P. B.

GUESTS

Beard, R. E.
Black, C. B., Jr.
Bunyan, A. T.
Callahan, W. E.
Caputo, R. N.
Cooper, W. P.
Crane, J.
Donovan, H. G.
Fergason, G.
Foody, W. M., Jr.
Green, S. A.
Hartman, J.

Hoyt, F. A.
Kemble, J. W.
Marshall, A.
Marshall, R. E.
McSherry, H.
Mehlman, C.
Monnin, H. A.
Nelson, H.
Reinbolt, J. B.
Rosser, H.
Rothbart, H.
Sabbagh, M. J.

Sheehy, J. J.
Simmons, J. E.
Sohmer, H.
Strong, H. L.
Syfert, R. K.
Thompson, J. S., Jr.
Van Kreusen, B. B.
Watkins, J. W.
Wayne, H. L.
Webster, A. C.
Young, R. H.

Prior to the formal convening of the Annual 1963 Meeting of the Casualty Actuarial Society, members of the Society were privileged to join with the Society of Actuaries, as part of the program of the meeting of that organization, in a general discussion on health insurance on the morning of October 30.

After a brief greeting to the assembled members and guests, the President made a number of announcements including the fact that the Committee on Review of Papers had voted that no paper submitted during the past year had been considered eligible for the Woodward-Fondiller Prize under the criteria governing that award and, therefore, no award would be made at the 1963 Annual Meeting.

Mr. A. Trevor Haynes, President of the Faculty of Actuaries, an invited

guest, was then welcomed by the President. Mr. Haynes spoke briefly and expressed the hope that, from time to time, members of the Casualty Actuarial Society would find it convenient to attend gatherings of the Faculty of Actuaries.

There then followed a panel discussion on "Commercial Package Policies —Rating and Statistics" with the following panel members: Norman J. Bennett, Chairman, David E. A. Carson, Clyde H. Graves, Richard L. Johe and John W. Wieder, Jr. After conclusion of the presentation by the panel members there was a lively exchange of discussion, questions, and answers from the floor.

This session was then recessed at 4:30 P.M.

The Annual Meeting reconvened at 9:45 A.M. on October 31 with President Longley-Cook presiding.

Norton E. Masterson, past President of the Casualty Actuarial Society, then reported on current activities of Astin and the International Congress of Actuaries. He then introduced Robert E. Beard of England, Chairman and Secretary of Astin who addressed the gathering briefly.

Thomas O. Carlson, a past President of the Casualty Actuarial Society, then urged the members of the Casualty Actuarial Society to consider taking out membership in the American Risk Insurance Association.

Mr. John H. Miller, a Fellow of the Casualty Actuarial Society and past President of the Society of Actuaries, followed by Mr. Andrew C. Webster, President of the Society of Actuaries, reported on the progress being made on the anticipated program for the accreditation or licensing of actuaries, a project in which the Casualty Actuarial Society has joined with the Society of Actuaries and other national actuarial organizations.

Mr. Joseph Linder, Chairman of the Casualty Actuarial Society Committee on Professional Status, supplemented the state of progress remarks of Mr. Miller and Mr. Webster and stated that at the present it appeared that in the not too distant future, the Council of the Casualty Actuarial Society should have before it for consideration a proposed Charter, Constitution, and By-Laws of the new organization. It was expected that the conclusions of the Council on these matters could then be presented to the full membership of the Casualty Actuarial Society for further discussions and deliberations at the Spring 1964 Meeting in Portsmouth, New Hampshire.

President Laurence H. Longley-Cook then presented his Presidential Address. This will be printed in the next volume of the *Proceedings*.

Mr. Nathan F. Jones, an Associate of the Casualty Actuarial Society, then brought the members up to date on the travel arrangements for those planning to attend the International Congress in London and Edinburgh in the late Spring of 1964.

The Secretary-Treasurer then presented his report on the activities of the Council subsequent to the November 1963 meeting, including the financial report for the fiscal period October 1, 1962 through September 30, 1963. Copies of the financial report were distributed to the members desiring it.

The complete report of the Secretary-Treasurer is attached as part of these minutes.

The following Committee reports were then made by the respective Committee Chairmen:

(a) *Committee on Annual Statement*—Joseph Linder.
Progress was being made and it was expected a detailed report would be presented at the May 1964 meeting.

(b) *Committee on Automobile Research*—Harold E. Curry.
It was reported that progress was made and research is continuing.

(c) *Committee on Distribution of Losses*—Matthew Rodermund.
The Committee has accumulated a fairly large volume of data on excess losses on both a per accident and per claim basis which will be broken down into geographical groupings. The Committee hopes to study all available data on liability, workmen's compensation, and property insurance. It is hoped these studies will give rise to interesting papers for the *Proceedings*.

(d) *Committee on Mathematical Theory of Risk*—Charles C. Hewitt, Jr.
The Committee is working on an interim report. It was noted that the Society of Actuaries is working on a draft of material on Mathematical Theory of Risk for use in connection with future examinations of that organization.

(e) *Educational Committee*—John W. Wieder, Jr.
The Committee is working toward a program of a joint, identical examination on Associateship Part II, Probability and Statistics, as has already been done for the General Mathematics section. Accordingly, the *Recommendations For Study* is being revised and should be available for distribution within a month.

Note:
Details of changes in the examination procedure, particularly as respects the Probability and Statistics section, were bulletined to all members of the Casualty Actuarial Society and registered students under date of November 12, 1963.

It was also announced that reprints of the recommended readings and other material for the examinations which are now out of print will be available shortly.

(f) *Publicity Committee*—William S. Gillam.
It was reported that press releases on the activities of the Society had been issued to 25 insurance trade publications. In addition, along with the Society of Actuaries, contribution was made in revising the section dealing with the actuarial profession in *Professional Opportunities in Mathematics,* a publication of the Mathematical Association of America.

At this point, Vice President Thomas E. Murrin took over as presiding officer of the meeting.

The following written reviews of previous papers were then presented.

(a) "Insurance Rates With Minimum Bias" by Robert A. Bailey.
Reviewed separately by James R. Berquist and Stephen S. Makgill.

(b) "Actuarial Note: Fixed and Variable Expenses" by Lewis H. Roberts.
Reviewed separately by Paul S. Liscord and John H. Muetterties.

(c) "Rating By Layer Of Insurance" by Ruth E. Salzmann.
Reviewed separately by Robert L. Hurley and Robert Pollack (presented by William J. Hazam in Mr. Pollack's absence).

The session was then recessed at 12:30 P.M. to reconvene the following day.

In the evening there was a brief social hour followed by an informal banquet at 7:00 P.M.

The session reconvened in the Rose Room at 9:40 A.M. with Vice President Richard J. Wolfrum presiding.

The first item on the program was the presentation of a paper, "An Approximation for the Testing of Private Passenger Liability Territorial Rate Levels Using Statewide Distribution of Classification Data," by James F. Gill. This paper had cleared the Committee on Review of Papers too late to be noted in the program which had been distributed in advance of the meeting.

The President then presented diplomas to the following new FELLOWS:

W. JAMES MacGINNITIE
Assistant Actuary
Continental National Ins. Group
310 S. Michigan Avenue
Chicago, Illinois 60604

S. TYLER NELSON
Manager and Actuary, Casualty Div.
American Agricultural Mutual Ins. Co.
Room 1000 Merchandise Mart Plaza
Chicago, Illinois 60654

RICHARD D. McCLURE
Assistant Vice President
American Mutual Liability
  Insurance Co.
Wakefield, Massachusetts 01881

HARRY R. RICHARDS
Chief Supervisor
Travelers Insurance Co.
700 Main Street
Hartford, Connecticut 06115

NICHOLAS F. MILLER, JR.
Aetna Casualty and Surety Co.
151 Farmington Avenue
Hartford, Connecticut 06115

WILLIAM A. RIDDLESWORTH
Actuarial Assistant
Aetna Casualty and Surety Co.,
  & Standard Fire Insurance Co.
151 Farmington Avenue
Hartford, Connecticut 06115

HARRY M. SARASON
Managing Actuary
Woodward and Fondiller, Inc.
3625 W. 6th Street
Los Angeles, California 90005

DEWEY G. WILLIAMS
Assistant Secretary
Texas Employers' Insurance Assoc.
P. O. Box 2759
Dallas, Texas 75221

He also introduced the following new ASSOCIATES to the gathering:

AUGUSTIN CIMA
Allstate Insurance Company
7447 Skokie Boulevard
Skokie, Illinois

ROBERT M. MUNIZ
Actuarial Trainee
National Bureau of Casualty
    Underwriters
125 Maiden Lane
New York, New York 10038

*WILLIAM H. CRANDALL
Special Agent
Insurance Company of North America
734 Ellicott Square Building
Buffalo, New York 14203

DALE A. NELSON
Senior Actuarial Assistant
State Farm Mutual Automobile Ins. Co.
112 E. Washington Street
Bloomington, Illinois 61701

ORVAL E. DAHME
Assistant Actuary
State Farm Mutual Automobile Ins. Co.
112 E. Washington Street
Bloomington, Illinois 61701

KEVIN M. RYAN
Actuarial Division
Aetna Casualty and Surety Co.,
    & Standard Fire Insurance Company
151 Farmington Avenue
Hartford, Connecticut 06115

JAMES H. DURKIN
Actuary
Wolfe, Corcoran and Linder
116 John Street
New York, New York 10038

PAUL J. SCHEEL
Actuarial Assistant
United States Fidelity and Guaranty Co.
Calvert and Redwood Streets
Baltimore, Maryland 21203

JAMES F. GILL
Actuary
Nat. Assoc. of Independent Insurers
30 West Monroe Street
Inland Steel Building
Chicago, Illinois

PAUL E. SINGER
Assistant Vice President
Continental National Insurance Group
310 S. Michigan Avenue
Chicago, Illinois 60604

SIDNEY M. HAMMER
Assistant Actuary
The Home Insurance Co.
59 Maiden Lane
New York, New York 10008

HARLOW B. STALEY
Vice President &
    Director of Administration
Farm Bureau Mutual Insurance Co.
10th and Grand Streets
Des Moines, Iowa 50307

PHILIP R. THOMPSON
Statistician
Federated Mutual Implement
   & Hardware Ins. Co.
129 East Broadway
Owatonna, Minnesota 55060

PETER B. ZORY
Actuarial Department
National Bureau of Casualty
   Underwriters
125 Maiden Lane
New York, New York 10038

*Admitted at May 1963 Meeting.

The gathering then stood in silence in memory of the following Fellows and Associates:

Fellows	*Date of Death*
William H. Burhop	October 11, 1963
William J. Graham	February 11, 1963
H. Pierson Hammond	April 10, 1963

Associates	*Date of Death*
Nellas C. Black	December 24, 1962
Louis Buffler	July 19, 1963

Past President Thomas O. Carlson, a member of the Nominating Committee together with William Leslie, Jr. and Seymour E. Smith, then presented the following slate of officers and three members of the Council:

President	Thomas E. Murrin
Vice President	Harold E. Curry
Vice President	William J. Hazam
Secretary-Treasurer	Albert Z. Skelding
Member of Council	Ronald L. Bornhuetter
Member of Council	Paul M. Otteson
Member of Council	P. Adger Williams

These nominations were seconded. The presiding officer then called for any additional nominates for each office from the floor. There being none the Secretary-Treasurer was directed to cast one ballot for the nominees who were declared duly elected.

The gathering was then informed that, in accordance with the procedure provided by Article V of the Constitution, the Council had elected the following incumbents to serve for another year but such action by the Council, to become approved, required confirmation by majority ballot by the members present at the Annual Meeting:

Editor	Harold W. Schloss
Librarian	Richard Lino
General Chairman-Examination Committee	Norman J. Bennett

The membership confirmed the action of the Council and the foregoing were then declared duly elected.

The President then announced that, in accordance with the announced program, the session would divide into three groups for a discussion in depth of new papers and the 1963 Annual Meeting would adjourn at 12:00 Noon.

There then followed, in separate rooms, a concurrent review and discussion of new papers:

(a) "Comprehensive Medical Insurance—Statistical Analysis for Rate-making" by John R. Bevan. Reviewed separately by Eldon J. Klaassen and Allen D. Pinney.

(b) "Reasonable Margins For Profit And Contingencies In Casualty Insurance Rates" by S. Tyler Nelson. Separately reviewed by James M. Cahill, Harold E. Curry, Milton G. McDonald and Harry V. Williams (presented by D. E. A. Carson in the absence of Mr. Williams).

(c) "The Philosophy Of Statistical Applications To Insurance Operations" by Harry M. Sarason. Reviewed separately by Ernest T. Berkeley and Lester B. Dropkin.

Following the foregoing presentations and reviews of each paper there was an exchange of comments, questions and answers from the floor of each gathering.

This concluded the program for the 1963 Annual Meeting.

Attachments: Report of Secretary-Treasurer
              Financial Report of Secretary-Treasurer

REPORT OF SECRETARY-TREASURER

The following report summarizes those activities of the Council of the Casualty Actuarial Society subsequent to the 1962 Annual Meeting which it is felt will be of particular interest to the membership.

Meeting of February 26, 1963.

    (1) Voted that the President and another Fellow of the Casualty Actuarial Society to be designated by him be authorized to represent the Casualty Actuarial Society at a February 18th meeting in Chicago of various actuarial organizations to discuss immediate problems in connection with the accreditation of actuaries. (Note: Laurence H. Longley-Cook and William Leslie, Jr. represented the Casualty Actuarial Society at that meeting and subsequently by mail vote, the Council appointed President Longley-Cook as the Casualty Actuarial Society representative on the Joint Committee on Organization of the Actuarial Profession and Daniel J. Mc-Namara as the Casualty Actuarial Society representative on the Joint Sub-Committee on Accreditation.)

    (2) Adopted a transition procedure with respect to students who, under the waiver rules in effect prior to the modification of such rules at the November 1962 meeting of the Casualty Actuarial Society, had completed one or more steps of the waiver procedure, but had not as yet submitted and received approval of an outline or thesis. Briefly, that procedure provides:

        (a) Outlines must be received by no later than April 1, 1963.

        (b) Theses must be received by no later than October 1, 1963.

    (3) Secretary-Treasurer was authorized to open a savings account in the Chase Manhattan Bank in the name of the Casualty Actuarial Society by transfer of $10,000 from the checking account.

    (4) The position bond of the Secretary-Treasurer was increased from $10,000 to $25,000.

    (5) In effect the Secretary-Treasurer was authorized to take out a public liability policy for the benefit of the Casualty Actuarial Society. That has been done.

    (6) Voted that the 1965 Annual Meeting be held in the Chicago area.

May 21, 1963 Special Meeting.

    (1) Authorized the retention of James B. Donovan and Victor N. Farley to represent the Casualty Actuarial Society as its attorneys in connection with the filing of the application of the Casualty Actuarial Society for exemption from U. S. income tax. (Note: The Casualty Actuarial Society has now been ruled an exempt organization.)

May 21, 1963 Regular Meeting.

(1) May 1965 Meeting. Voted that the President appoint a committee to explore the possibility of **holding** the May 1965 meeting at a site convenient to the campus of some university, with the program to include a symposium of some technical subject such as the Mathematical Theory of Risk.

(2) Voted that a committee to be designated by the President, possibly the Educational Committee, explore the feasibility of preparing reprints of papers from the *Proceedings* and other material which are included in the *Recommendations For Study* but which are now out of print.

October 31, 1963 Meeting.

(1) The Council accepted the report of the Educational Committee, John W. Wieder, Jr., Chairman that:

    (a) Beginning with the 1964 examinations the topics covered in the Probability and Statistics section will be the same as those covered by the Society of Actuaries.

    (b) Therefore, a new edition of the *Recommendations For Study* reflecting this and other changes in this section has been prepared and will shortly be available.

    (c) For the time being, and pending further announcement, the Casualty Actuarial Society will continue to set its own examinations on Probability and Statistics, although the future may bring about a joint, identical examination with the Society of Actuaries as is now the case for the General Mathematics section.

    (d) Beginning with the 1964 examinations, Probability and Statistics will no longer be given in two separate sections. However, candidates who now have credit for only one section of Associate Part II may, upon application to the Secretary-Treasurer, take the other half of Part II in 1964 and 1965. Candidates who still have partial credit for Associateship Part II after the 1965 examinations have been given, will lose such credit and will be required to write the entire Probability and Statistics examination in 1966 or later to receive any credit for Associateship Part II.

(2) The Council voted to contribute $200 to the sponsors of the brochure *Careers in Statistics* toward defraying the printing costs and distribution of the brochure by the American Statistical Association and the Institute of Mathematical Statistics.

(3) The Council voted that the new President, Thomas E. Murrin,

appoint a member of the Casualty Actuarial Society to act in a liaison capacity with the COPSS (Committee of Presidents of Statistical Societies).

The Council considered many other items during the year relating to the welfare of the Casualty Actuarial Society and to the conducting of the business affairs of the Society. The foregoing items are brought to the attention of the membership at this time as a matter of information.

I also mention that during the year a committee of the Casualty Actuarial Society, working with the Insurance Information Institute, prepared a brochure *A Career* to replace the previous brochure *Man With A Future*. Through the generosity of the American Mutual Insurance Association, the Association of Casualty and Surety Company, the Insurance Information Institute and the National Association of Independent Insurers 20,000 copies of this publication were printed without cost to the Casualty Actuarial Society.

I might also add that the processing of the previously mentioned successful application of the Casualty Actuarial Society for exemption from U. S. income tax was handled by our attorneys in this case, James B. Donovan and Victor N. Farley, with no cost to the Casualty Actuarial Society.

Attached will be found the receipts and disbursements report for the fiscal period October 1, 1962 through September 30, 1963. However it is noted that during this period actual cash receipts exceeded disbursements by $3735.58. In other words, the assets of the Society increased by that amount during the period. At the close of business on September 30, 1963 the assets of the Society were distributed as follows:

On Deposit Chase Manhattan Bank — Checking Account —	$11,107.76
On Deposit Chase Manhattan Bank — Savings Account —	10,182.09
U. S. Savings Bonds — Maturity Value —	5,000.00
Total	$26,289.85

FINANCIAL REPORT

Cash Receipts and Disbursements
from October 1, 1962 to September 30, 1963

Receipts

On deposit 10-1-62		
(Checking)		$17,554.27
On deposit 10-1-62 (Savings)		000.00
Members Dues	$11,105.00	
Examination Fees	3,205.50	
Sale of Proceed-		
ings	2,093.79	
Sale of Readings	568.60	
Spring &		
Annual Mtgs.	2,218.00	
Registration Fees	2,622.80	
Invitational Pro-		
gram	1,260.00	
Foreign Exchange	—9.80	
Bond Interest	193.76	
Savings Acc't Int.	182.09	
Michelbacher		
Fund	815.58	
For Actuaries'		
Club N.Y.	842.50	
Miscellaneous	1,364.40	26,462.22
Total		$44,016.49

Disbursements

Printing & Stationery	$13,859.60
Secretary's Office	2,486.07
Examination Expense	1,944.59
Meeting Expense	2,703.79
Library Fund	231.48
Insurance	106.16
Refunds—	
Lun. & Dins.	108.00
Refunds—	
Examination Fees	51.50
Refunds—	
Registration Fees	125.00
Refunds—	
Actuaries' Club (fee)	15.00
To Actuaries' Club	
N.Y. (fees)	827.50
Miscellaneous	267.95
	$22,726.64
On deposit 9-30-63	
Checking Account	11,107.76
Savings Account	10,182.09
Total	$44,016.49

Assets

Cash in Bank		
9-30-63		
Checking	$11,107.76	
Savings	10,182.09	
U.S. Savings		
Bonds	5,000.00	
Total	$26,289.85	

Liabilities

Surplus (Michel-	
bacher Fund)	$14,457.32
Other Surplus	11,832.53
Total	$26,289.85

*   *   *

One U. S. Treasury Bond 3⅞% No. 24277 due for $1000 on May 15, 1968.

Two U. S. Treasury Bonds 3⅞% Nos. 3462-3 due for $1000 each on May 15, 1968.

Two U. S. Treasury Bonds 3⅞% Nos. 1673-4 due for $1000 each on November 15, 1974.

Employers' Fire Insurance Company Policy No. 31F23-85-62 for $5000 on books and book cases stored at 200 East 42nd Street and $2000 on material stored in library of Insurance Society of New York. Expires 9-14-67.

Fidelity Bond No. 044571 for $25,000 in Royal Indemnity Company.

Workmen's Compensation Policy No. 01-681861 in Maryland Casualty Company. Expires 5-10-64.

Public Liability Policy No. 52-414380 in Maryland Casualty Company. Expires 4-23-64.

*   *   *

Note: The "Miscellaneous" item under "Receipts" includes reimbursement of $1305 by (1) American Mutual Insurance Association, (2) Association of Casualty and Surety Companies, (3) National Association of Independent Insurers for printing of booklet "A Career".

*   *   *

This is to certify that we have audited the accounts, examined all vouchers and investments shown above and find same to be correct.

October 18, 1963

HOWARD G. CRANE
Chairman, Auditing Committee

REVIEWS OF PUBLICATIONS

FRANK HARWAYNE, Assistant Editor

E. J. Gumbel, *Statistics of Extremes,* Columbia University Press, New York, Second Printing 1960, pp. 375.

The possibility of the occurrence of an unusually large loss has always been a cause of serious concern to the insurance actuary and underwriter. Whether this be a sweeping hurricane, a devastating tornado, a disastrous conflagration, a major aircraft accident, or a very large liability award, it will have an impact on the financial resources of the insuring company. As defense against such contingencies, sound plans provide for special reserves, reinsurance, underwriting restrictions, or special loadings in the rate formulas.

These catastrophic losses are deviations from the "law of large numbers" which cannot be handled adequately by the ordinary statistical techniques. To all but a few initiates, the inadequacy of ordinary techniques has long meant the lack of any satisfactory way to calculate the probability of occurrence of extreme events. However, developments over the last decade have resulted in a specialized treatment of the "statistics of extremes" which does provide the mathematical basis for such computation.

Written by the world's leading authority, after many years of scholarly study and original research, *Statistics of Extremes* is a comprehensive exposition of that branch of probability theory which describes the statistical behavior of extreme values of random variables and the chance distribution of rare events. In producing the first book ever devoted to this important field, Professor Gumbel has performed a major service by organizing a vast amount of previously scattered material. An inkling of the magnitude of his achievement may be gained from the fact that he has furnished a bibliography of nearly 650 references, dating from 1845 to 1957, and including publications in ten languages, representing over 20 different nations.

Among the uses of extreme value theory illustrated in the text are applications to hydrology, meteorology, geology, and vital statistics. For instance:

1. How to forecast the most probable flood to occur within a fixed period of years, estimate the expected period between floods of stated severity, and calculate a design value for a dam so that the probability of failure to contain a flood within a specified number of years is held to a prescribed low level.

2. How to estimate the probabilities associated with minimum temperatures, maximum snowfalls, or strongest winds during a given length of time.

3. How to test whether unusually large cobbles found in fluvial gravels may be considered as part of the pebble population or as erratics, transported by external media, such as ice.

4. How to explain the fact that the modal value of oldest age at death in human populations tends to decrease as hygienic conditions improve.

Gumbel shows that certain widely accepted engineering rules badly misrepresent the risk of catastrophic events, erring considerably in either direction. One such rule, pertaining to the relative frequency of an observed maximum, overestimates the return period, thus giving a false impression that danger is remote. Another rule, pertaining to safety factors in construction, systematically exaggerates prospective severe loads, with an error that magnifies as the sample size increases, thus leading to absurd overdesign.

The theory of extreme values begins to take hold when the samples in question are drawn from outside of the "normal range," which extends from about the 15th to 85th percentile of the initial population, under ordinary circumstances. Within the normal range, the normal distribution applies to large samples. Outside the normal range, the normal approximation to the limiting form of distribution begins to break down, and the mean and standard deviation cease to characterize the distribution. Different families of limiting distribution then apply, according to the class of initial distribution, and the important parameters become the characteristic extreme value and a second quantity which depends on the family.

Three families of limiting distribution, which Gumbel terms *asymptotes,* are derived. These three, however, are not exhaustive. The first asymptote, known as the *double exponential* seems to be the most important. It applies to initial distributions of "exponential" type, which includes the normal, gamma, and lognormal distributions as special cases. The second asymptote applies to distributions of "Cauchy" type, a feature of which is the divergence of higher moments. The third asymptote applies to initial distributions which are limited in the direction of the considered extreme. Gumbel has devised probability papers to aid in choosing and verifying these asymptotes. He gives methods of estimating the parameters but states that more research is needed to develop better methods of parameter estimation.

Statistics of Extremes, a book of eight chapters plus a summary, is addressed to statisticians and statistically trained research workers. The author's claim to have presented the subject on an elementary level is fair, provided that one appreciates what is meant by advanced mathematics. Unfortunately, the mastery of the recommended study for Associateship: Part II, Probability and Statistics, does not qualify the reader to comprehend the text. One needs in addition a thorough understanding of random variables and must be conversant with methods of deriving and transforming probability distributions. A reader so equipped, however, may need much perseverence, for the style does not make for easy reading. So much of the material is new to the intended readers, and so many topics are covered, that it is difficult to focus on the main structure. To save space, the author makes constant use of the dual form of statement, for example: "If a symmetrical distribution possess a mode (a minimum) at the median, the variance of the mth value possesses

a minimum (maximum) at the median, and the variances increase (decrease) if we pass from the center of symmetry toward the beginning or the end of the distribution." The reader will have to get used to this expedient early in the game. Definitions are sometimes vague or unconventional. For instance, the definition of mutual symmetry is meaningless as it stands; the term "generating function" is often used without qualification when "moment-generating function" is meant; the distribution function is called the "probability," and the probability density function is called the "distribution"; the term "midrange" is used for the sum of the two extremes instead of half the sum.

Notwithstanding these difficulties, the subject is of such potential benefit to actuaries that it might be well to consider adding to the recommendations for study so that the actuary of the future will be better able to make use of this and other of the new statistical techniques.

What is perhaps most needed at this time is a intermediate manual of procedure which would allow the actuary of today to make use of the graphic techniques and probability papers which Gumbel has devised. This would eliminate the necessity of profound understanding of the underlying theories and concentrate on a step-by-step, "how-to-do-it" explanation. As an example, Gringorten has attempted to accomplish this for the meteorological field in his article "A Simplified Method of Estimating Extreme Values from Data Samples" which appeared in the February 1963 edition of the *Journal of Applied Meteorology.*

To sum up, the author deserves admiration and thanks for communicating such a wealth of material and finding ways of expressing so many ideas that have no counterparts in common experience. Although the author's accomplishment is tremendous, the qualified reader's task, nevertheless, is heavy.

<div align="center">DR. JOSEPH G. BRYAN and RICHARD J. ROTH</div>

Roy J. Hensley, *Competition, Regulation, and the Public Interest in Nonlife Insurance,* University of California Press, Berkeley and Los Angeles, 1962, pp. xii, 259.

Professor Hensley has put together a well organized analysis of the nonlife insurance industry, establishing his own criterion for progress as "a willingness to provide insurance for actuarially feasible situations which meet apparent public welfare needs as suggested by current legislation, court decisions, and public opinion." He examines such progress in terms of facility of entry of new capital into the business, cost-trends, development of new products or adaptions of old products, and the satisfaction of demand for insurance. Many of the ideas which govern his approach, both critical and constructive, are drawn from the U. S. Senate hearings on the insurance industry, 1958-1960, and the 1952 edition of Roger Kenney as exemplified in the following quotation:

> "Ratemaking processes have become what amounts to a trade secret possessed by a very small coterie of professional ratemakers and shared in by an equally

small group of dominating and influential executives. . . . To allow such a business to become but the extended shadow of a very small group of individuals who have every temptation to keep ratemaking an adventure in black magic is an open invitation to governmental intrusion."

Both the original statement and this author's several references to it indicate no attempt to recognize or to ascertain the actual facts. His approach is sharply critical, and at times uninformed, and his suggested solution constitutes a complete break far in the direction of state socialism.

Professor Hensley throughout his text includes statements relating to the fire insurance business, which was the chief target in the Senate hearings so frequently quoted, and proceeds to generalize with regard to the entire nonlife business, indicating a startling lack of comprehension. For example, at one point he states: "The laws of 44 states permit independent rate filings; in the other jurisdictions independent companies must affiliate with a bureau and attempt to deviate or pay dividends if they wish to compete in price." Nothing is said to indicate that this is not true of all nonlife insurance; reference is made in the entire section only to nonlife insurance and there is further reference to the New York state situation as respects partial subscribership, with no reference to the fact that this controversy involved only the fire organization. There are many other instances of incorrect or unjustified generalization.

The industry is condemned for making what the author considers to be excessive profits through the years and for not reflecting investment portfolio appreciation in the determination of rates; this entire problem is examined very incompletely, there is no attempt to approach it comprehensively.

The blame for the industry's inadequacies and the criticism of the industry's performance is concentrated principally upon price making in concert. As respects the pooling of statistics he states that "it is unrealistic to expect continuous, effective price competition in the industry as long as loss statistics are gathered and processed by industry-sponsored and controlled bureaus." He bases this conclusion with its implications as respects the entire nonlife field upon an unquoted opinion expressed in testimony before the Senate Sub-committee by an official of a city government that had appeared in public hearings to protest fire rates.

He condemns the American Agency System as an unjustifiable expense on the business, without attempting to go into any justification of the independent agent's commission, and he states that "the average selling cost expenditures of mutual organizations may indicate a desirable level of sales expense for the industry."

A disproportionate number of his criticisms, prefaced by such vague and general phrases as "critics have questioned," are taken from the testimony of a single individual before the Senate Sub-committee, whose ideas have strongly influenced the author in his advancement of a program that, while rejecting complete Federal regulation, would:

"(1) substitute major federal regulation (all interstate aspects of the business)

and minor state regulation for the present division of responsibilities, which is major state regulation and minor federal regulation; (2) have government provision of many more, if not all, nonlife insurance services; and (3) establish a fully competitive market in the industry by removing the existing antitrust exemption." (The underlining is mine.)

In elaboration, he would establish a federal agency to collect statistics and to set pure premium levels for every classification in every line of insurance; each company would then be permitted to establish its own expense provisions subject to state regulation, and no combination of companies or company experience for this purpose would be permitted. The federal government would be responsible for examinations "to assure sound financial conditions in the industry," replacing the "present state examination and regulation of interstate companies." The federal statistical agency would also "perform other service functions for the industry." He would further establish a federal guarantee fund to protect the insuring public against the insolvency of companies. It is emphasized that these suggestions are independent and in discussing federal regulation of interstate aspects it is noted that virtually all business is written in companies that operate on an interstate basis, and that financial standards can in effect be regulated consistently only on the federal level.

The book contains a wealth of informative material, but in the opinion of this reviewer exhibits a serious lack of familiarity with the business which has led the author into numerous pitfalls, so that it should be read with extreme caution; the author in his rather demagogic appeal for extensive federal intrusion not only into the realm of regulation but even into the area of provision of services now furnished through private enterprise sources, has failed to convince as to the necessity or even the desirability of his proposals.

THOMAS O. CARLSON

Frederick G. Crane, *Automobile Insurance Rate Regulation,* The Ohio State University, Columbus, Ohio, 1962, pp. xiii, 161.

Professor Crane has written an understanding and yet objective survey of the problems of rate regulation, trying to consider such from all points of view. It is inevitable that comparisons be made between this book and the study by Professor Hensley that appeared almost at the same time and that is also reviewed in this volume. Professor Crane has approached his subject with an open mind, and unlike the other author has striven to arrive at suggestions that are evolutionary rather than revolutionary.

Some of Professor Crane's conclusions are so diametrically opposed to those of Professor Hensley that it is difficult to understand that they are talking about the same industry in the same country. For example, in speaking of progress as respects changes in the product, i.e., in policy forms, Professor Hensley indicts the industry for its very slow progress in the matter of diversification of available coverages, drawing his conclusions from con-

sideration of the multiple lines, the automobile liability, and the accident and health fields. Professor Crane, on the other hand, concludes: "On one point there is agreement. . . . This is the harm, the waste and the inefficiency involved in the current multitude of rates, forms and rating systems. . . . The public . . . must choose blindly from among a bewildering array of alternatives." While Professor Crane is referring only to the automobile field, would anyone argue that there are fewer alternatives in the multiple lines and the accident and health fields encompassed in Professor Hensley's survey? Professor Crane goes on to say that greater standardization would increase public confidence, would secure for the companies advantages of the joint pricing system, including its operating economies and reliable statistics, and would also benefit the agents because "their task would be enormously simplified if public regulation permitted only a limited number of deviations from well known standard rates and forms."

The author examines fully the advantages of price competition, advancing the cause of maintenance of ideals of free enterprise as applicable to insurance, points out (as recently emphasized by Mr. Morrill in his speech in New Orleans) that rate regulation is not the solution of company solvency problems, and goes very deeply into the study of excessiveness and adequacy standards as presently applied in rate regulation.

As alternatives to rate regulation Professor Crane reviews (1) regulation of reserves (the principle control of solvency in England), (2) the insurance of company solvency through a federal program (specifically proposed by Professor Hensley), (3) regulation by eliminating competition as respects the pure premium portion of the premium dollar (also proposed by Professor Hensley), (4) approach to the problem through a multi-bureau system with differences in rates, rating systems, and policy forms limited to the various bureaus (e.g., three in number), and (5) the abandonment of regulation altogether.

He concludes that regulation of reserves as a solution "is not feasible due to shortcomings in the nature of present reserve requirements." After a full review of the pros and cons of an insurance fund to insure company solvency, he contents himself with stating that "it does not seem that this proposal should be abandoned," since it would eliminate some of the risk to policyholders and since price competition "could to a larger degree be freed from the restraints of public control." He rejects rate regulation in the form of pure premium regulation as "a beguilingly simple and deceptively logical" plan after again reviewing the pros and cons in detail. He seems to favor a multi-bureau system as "a way to preserve the merits of private enterprise and at the same time achieve the objectives which otherwise may be sought through tightened governmental control." As respects the abandonment of regulation he concludes that while regulation "can be simplified and made more uniform," it can also "be made less uncertain in its aim and application" and suggests that adoption of statutory definitions of inadequate and excessive rates "would be a valuable step in this direction," going into considerable

detail with regard to consideration of such definitions at present and suggestions for their improvement.

In closing he makes the following observation pertinent to what have been called the luxury lines as compared with the so-called public-interest lines: "The need for control over one part of the insurance industry (such as automobile insurance) should not be taken as justification for unnecessarily broad controls over other areas of the industry." And his final paragraph refers to the paramount importance of the public interest in working out a proper solution.

There are a number of points which could be criticized by one who is familiar at first hand with the insurance business, such as an occasional deduction from testimony on the fire business before the Senate Sub-committee that is not pertinent to the automobile situation under discussion, and an unfortunate and incorrect allegation that companies attempt to recoup losses in states that have denied rate increases by charging excessive rates in other states "where the control is less strict." These are minor points, however, as compared with the major outlines of the book sketched in the foregoing.

This book is a significant and realistic study of the problems presently facing both management and regulators of the industry, written by an individual who never fails to keep his feet on the ground. Its quiet painstaking review of possible solutions to some of these problems is worthy of close attention by all interested parties.

<div align="right">THOMAS O. CARLSON</div>

J. F. Follmann, Jr., *Medical Care and Health Insurance,* (Irwin Series in Risk and Insurance), Richard D. Irwin, Inc., Homewood, Illinois, 1963, pp. 503.

As the techniques of medical care have advanced scientifically, man has become increasingly concerned with his own personal security through proper health care and the provision of adequate funds to cover the costs of medical care. When medical treatment for most disabilities did not exist, there was little need for medical care funds, but today advanced medicine makes the provision of such funds the duty of every prudent individual. Likewise it has become the duty of society to provide such funds for those who are unable to provide for themselves.

J. F. Follmann regards *Medical Care and Health Insurance* as "a study in social progress." Thoughtfully prepared for the general reader, the book is of broad scope, deals with a subject of increasing social significance and is written with the social need in mind. Statements throughout the text are supported by relevant statistics, making the contents clear and easy to comprehend.

A careful study is made of the methods of financing medical care both in the United States and in other nations. About half of the sovereign powers have some form of compulsory health insurance program, the variations of

which are studied with respect to methods of payment, benefits provided, extent of population covered, and cost of program. A more thorough study of the methods of financing health care in the United States focuses attention on similar aspects of our private insurance plans.

The importance of an even more comprehensive approach to medical care is emphasized. Studies of recent extension of coverage to such groups as the aged, the rural farmer, the migrant worker, and the temporarily unemployed, and of the extension of benefits to cover mental illness, drug costs, dental care, nursing, and vision care should be of interest to the health insurer. The possibility of extending the inadequate existing coverages in some of these difficult areas presents a challenge to the resourceful insurer.

The relationship of loss prevention and rehabilitation to health insurance, some current problems such as overinsurance and rising costs of medical care, and the question of compulsory health insurance in the United States are considered in other sections.

Follmann states that the predominant social development in the twentieth century is the growth of voluntary health insurance. In 1941, 12.3 million people or 12% of the U. S. population were covered by some type of private health insurance; in 1961, 135 million people or 74% of the population were so protected. The effectiveness of such plans is indicated by their growth and the broadening of their benefit pattern. Private enterprise in this country has brought the assurance of adequate medical care within the reach of the majority of the population. Coverage is broad, adaptable to individual needs, and provided cheaply by mass group protection plans and competition among insuring institutions.

Because of the general availability of medical care, the high standard of living, and the role of private insurers, the United States government has never had to introduce a broad medical care program. Government has assumed responsibility for certain categories of people and for the construction of needed facilities for care, training, and research. Part of the book is, therefore, devoted to an examination of government participation in medical care in the United States, including recent congressional issues on medical care.

Mr. Follmann makes a most significant point when he states:

> "The doctors in the United States, the hospitals, the nurses, the pharmacists, the administrators of nursing homes, the entire corps of health care personnel, the various types of private health insurance mechanisms, and many voluntary agencies are engaged today in what is essentially a common endeavor. This joint and several enterprise is that of providing, to the greatest degree possible, medical care of the highest quality for the American people on a private basis, with flexible means available to the public by which the economic impact of costly or protracted illness or injury may be spread over large groups of people. The evolution that has taken place with respect to the use of our medical care facilities and nature and cost of these services has necessitated that this enterprise be a joint one."

Much research appears to have contributed to a successful compilation of facts drawn from different areas of health care and insurance. The book is

one of wide appeal and of particular interest to the providers of medical care and health insurance.

HAROLD F. LACROIX

Duncan M. MacIntyre, *Voluntary Health Insurance and Rate Making,* Cornell University Press, Ithaca, New York, 1962, pp. ix, 297.

The primary concern of this book is the conflicting philosophies underlying experience rating as practiced by private insurance companies and of community rating as championed by Blue Cross - Blue Shield organizations, although there is considerable discussion of several other interrelated issues.

Because an understanding of experience rating and community rating requires a knowledge of insurance principles, there is a discussion of some of the fundamentals of insurance, including the characteristics of insurable hazards. It is pointed out that some forms of health insurance do not meet the requirements normally associated with an insurable hazard because carriers are often forced to write benefits that the buyers want rather than coverages that meet the test of theory. Additional background information is given by a review of insurance company sales, underwriting, and benefit practices, and by a discussion of the basic difference between the plans of private insurance companies and Blue Cross - Blue Shield organizations.

The growth of experience rating, stimulated by competition among private insurance companies for low loss risks, is described together with a discussion of the various forms of rating (schedule, prospective, and retrospective) currently being used in the industry. Mr. MacIntyre believes that this approach of adjusting rates to reflect the quality of individual risks is theoretically justified as a logical expansion of the philosophy of equity.

The use of credibility factors in experience rating is discussed and it is pointed out that although different companies have different credibility formulas and apply them in different ways, their purposes are essentially the same; i.e., to smooth out claim fluctuations on a risk by relating claims to "expected" claims and to give more weight to actual claim experience as the exposure on a risk increases. The principal types of formulas used by different companies are given. It is stated that many companies have been too liberal in experience rating as shown by the frequency of underwriting losses on their group health business.

Blue Cross - Blue Shield organizations are described in this book as community oriented and hospital sponsored institutions which were not originally dedicated to following established insurance principles. Initially, they were successful, but competition and financial problems in recent years have forced them to use traditional insurance methods. Thus, community rating is becoming less and less a trade mark of these organizations as they begin to adopt some form of experience rating. There is still, however, considerable disagreement within Blue Cross - Blue Shield organizations as to the social and economic effects of experience rating.

Mr. MacIntyre draws several conclusions in the final chapter of his book concerning the experience rating-community rating controversy. First, he states that experience rating has been unjustly criticized for being an antisocial and antienrollment device, and further notes that it has been very valuable in a competitive market for low loss risks and large enrollment groups. Secondly, the advantages of community rating have been greatly exaggerated at both the theoretical and operating level. It is his belief that, regardless of what most spokesmen say on behalf of community rating, the ideal of total community enrollment at prices which low income, high loss cost consumers can pay will only be accomplished by governmental assistance. Mr. MacIntyre's ultimate conclusion, however, is that it is impossible to say that one approach is superior to the other because advantages and disadvantages of each type of rating depends upon philosophy, assumptions, and buying objectives.

Mr. MacIntyre has presented in a lucid manner the issues involved in the two types of rating and the two types of health insurance programs. The reader obtains a better understanding of the philosophy behind each plan and why it is sometimes necessary to depart from traditional insurance principles. This book is of particular value in its presentation of the historical background of the development of health insurance rating philosophies.

JOHN A. RESONY

OBITUARY

NELLAS C. BLACK

LOUIS BUFFLER

WILLIAM H. BURHOP

WILLIAM J. GRAHAM

H. PIERSON HAMMOND

NELLAS C. BLACK
1887 — 1962

Nellas C. Black died December 24, 1962 in a disastrous fire in his home which was also responsible for the death of his beloved wife, Celeste. This very tragic occurrence saddened the hearts of their many friends.

He was born in Carroll County, Maryland, March 17, 1887, and shortly thereafter moved to the City of Baltimore where he resided for the remainder of his life. He attended Baltimore City College and Sheldon Science and Industrial Institute.

In 1903 Nellas began his career with the Maryland Casualty Company, as an office boy. He served in the Auditing Department and later was placed in charge of the Bureau of Payroll Audits. He also spent some time in the Claim Disbursement Department. In 1919 he was appointed Statistician and held that position, with distinction, until his retirement on July 1, 1957, after 54 years of continuous and meritorious service.

Having served in the Mexican War, Mr. Black re-entered the service during World War I as a First Lieutenant in the Fourth Maryland Infantry. He received his training at Camp McClellan, Alabama and was subsequently assigned to the 110th Field Artillery at Fort Sill, Oklahoma where he later became Personnel Adjutant. In June 1918 he went overseas as Captain.

Nellas Black became an Associate of the Casualty Actuarial Society on November 17, 1920. He made numerous contributions to the Society during his long association.

Mr. Black is survived by one daughter, Mrs. John R. Richards of Metairie, Louisiana.

LOUIS BUFFLER
1892 — 1963

Louis Buffler, an Associate of the Casualty Actuarial Society since 1915, died July 19, 1963, at the age of 71 in Bethany Deaconess Hospital in Brooklyn.

Although he started his career as an Actuarial Clerk with the New York Life Insurance Co. in 1907, by the time he joined the Society in 1915, he had already left the actuarial field. He was Manager of the Employers Mutual Liability Insurance Company and District Manager of the Utica Mutual Insurance Company. Most recently, he was Director of the Underwriting Department of The State Insurance Fund of New York and, subsequently, Underwriting Consultant, a post from which he retired in March 1960. As a member of the Classification and Rating Committee of the New York Compensation Insurance Rating Board from 1915, he contributed substantially to the establishment of the underwriting principles underlying present Workmen's Compensation insurance ratemaking.

Mr. Buffler was a founder of the American Association of State Compensation Insurance Funds, its first Secretary-Treasurer and later, its President. At the time of his death he was President emeritus.

As Great Incohonee, he was national head of the Improved Order of Red Men of the United States of America. He was past Grand Knight of Knickerbocker Council No. 221, Knights of Columbus, and a member of the Bishop Molloy Retreat League.

He is survived by his widow Margaret Werking Buffler, a daughter, Mrs. Helene Block, and one granddaughter.

WILLIAM H. BURHOP
1889 — 1963

William H. Burhop, a Fellow of the Casualty Actuarial Society since 1917, died October 11, 1963, at the age of 74, in Wausau, Wisconsin.

A native of Wisconsin, he was born in Sheboygan County April 7, 1889. After graduating from the University of Wisconsin School of Commerce in 1913 with an A. B. degree, he was a member of the staff of the Wisconsin Industrial Commission until 1917, when he transferred to the Wisconsin Insurance Department and was placed in charge of workmen's compensation rate regulation. He resigned July 15, 1919 to become an actuary for the Employers Mutual Liability Insurance Company of Wisconsin. He advanced through various executive offices, serving as president of the firm for eight years after which he became chairman of the board in 1960. He retired as a company employee in March 1961, but continued as chairman of the board.

He served as a director of the American Mutual Reinsurance Company, the Protection Mutual Fire Insurance Company, the Wisconsin Valley Trust Company of Wausau, and the First American State Bank in Wausau.

Mr. Burhop took an active role in insurance associations both as a director and committee member and was president of the American Mutual Insurance Alliance in 1957-1958 and of the National Association of Mutual Casualty Companies in 1953-1954. He was also a member of Beta Gamma Sigma, a professional commerce fraternity.

Active in numerous civic and service groups, Mr. Burhop was a past president of both the Wisconsin State Chamber of Commerce and the Wausau Area Chamber of Commerce, a Mason and Shriner, and a deacon, elder, and chairman of the board of trustees of the First Presbyterian Church. He also was a director of Woodson YMCA, a trustee of the Wausau YWCA, and served as chairman of a campaign of the former Wausau Community Chest. A charter member and past president of the Wausau Kiwanis Club, he served a term as division governor and received the Legion of Honor award of Kiwanis International in 1946.

Mr. Burhop received an Award of Merit from the late president Conrad Elvehjem of the University of Wisconsin in 1961 in "commendation for his outstanding personal contribution to the field of workmen's compensation," on the occasion of the 50th Anniversary of workmen's compensation in the United States. A scholarship, the W. H. Burhop Award, was established at the University of Wisconsin. It has been given annually to an outstanding graduate student in the field of insurance or actuarial science.

He is survived by his widow, Mrs. Bernardine C. Burhop; a daughter, Mrs. E. E. Schneider, Wausau; and four grandchildren. Also surviving are three sisters, all of Sheboygan, Wisconsin.

WILLIAM J. GRAHAM
1877 — 1963

William J. Graham, long a prominent actuary and outstanding insurance executive, died February 11, 1963, in Southside Hospital, Bay Shore, Long Island, at the age of 85.

Mr. Graham's name became almost synonymous with the development of group insurance during the first half of the century. He was frequently referred to as the, "Father of Group Insurance," for he played a key part in the 1911 discussions with the Montgomery Ward Company which led to the first of the modern forms of group insurance. From that point on, Mr. Graham crusaded for the use of group insurance in industry and commerce, and he was personally responsible for much of its spectacular growth and enlargement into the fields of annuities and health.

Mr. Graham was born in Louisville, Kentucky, September 23, 1877. A graduate of Xavier College in Louisville, he also held an M.A. from St. Francis Xavier College in New York. In 1938 he was awarded an honorary LL.D. from Hobart College.

His mathematical aptitude early led him into the actuarial field. He became an Associate of the Actuarial Society of America at 21, and four years later became a Fellow. Later, he became a Charter Member of the Casualty Actuarial Society and an Associate of the British Institute of Actuaries.

Mr. Graham started his insurance career as an actuary with the Sun Life Insurance Company of America (Louisville) in 1898, and from 1902 to 1905 he served on the actuarial staff of the Metropolitan Life Insurance Company.

In 1905 his career gained considerable momentum through the service he rendered as consulting actuary (jointly with S. Herbert Wolfe) to the investigation of the life insurance companies of New York conducted by a group of state insurance departments. Almost simultaneously, he was invited to help reorganize the Northwestern National Life Insurance Company, which he served as a vice-president, actuary, and director from 1905 to 1911.

Mr. Graham joined the Equitable as western superintendent of agencies in 1911. When the Equitable established a Group Insurance Department the following year, he was made its superintendent. He thereafter rapidly rose, becoming vice-president in 1929. He was elected a member of the Equitable's Board of Directors in 1937 and given charge of all agency activities, both group and ordinary. After more than 37 years of service with the Equitable, he retired on June 30, 1948, continuing, however, to serve on Equitable's Board until December 31, 1958.

Among Mr. Graham's innumerable writings was an insurance bestseller entitled *The Romance of Life Insurance.* Appearing first as a series of articles in the 1908 issues of *The World Today,* it told a constructive story of life insurance which was much needed in those post-investigation days.

Mr. Graham's broad human sympathies caused his interests to spread far beyond his employment and even beyond the insurance field. He headed the Insurance Institute of America and served as vice-president of the New York Chamber of Commerce; president of the American Management Association (which he helped to found); director of the American Arbitration Association; chairman of the Group Association; member of the Insurance Committee of the United States Chamber of Commerce; governor of the National Industrial Conference Board; and a member of the New York Southern Society. His New York club memberships included the Links, Nassau County, and the Pilgrims. He was also a member of the Pendennis Club in Louisville; the Royal Societies in London, England; and the Kentuckians.

An imaginative, courageous, and dedicated master builder, Mr. Graham has left an indelible imprint not only on the insurance world, but on the social and economic life of our country. A hard taskmaster, he commanded and enjoyed great admiration, respect, and loyalty on all sides. His engaging, attractive personality, and his endless drive and enthusiasm won him high praise not only as an expert technician but as one of the best all-round salesmen in the insurance world.

Mr. Graham is survived by a daughter, Mrs. William S. Adams, Jr., and four grandchildren.

H. PIERSON HAMMOND
1876 — 1963

H. Pierson Hammond, retired Actuary of the Life Actuarial Department of The Travelers Insurance Company and a Fellow of the Casualty Actuarial Society, died in Hartford, Connecticut, April 10, 1963.

He was born in Troy, New York, November 1, 1876. He graduated from Boys' High School, Brooklyn, New York, and in 1900 from Williams College, where he was elected to Phi Beta Kappa. He immediately entered the Actuary's Department of the Mutual Life Insurance Company of New York. In 1908 he became Actuary of the Connecticut Insurance Department. This move set the course of his future career and resulted in his becoming an authority on financial statements of insurance companies in both personal and property lines. In 1919 he joined The Travelers Insurance Company as Assistant Actuary of the Life Actuarial Department and in 1930 was made Actuary, which position he held until his retirement in 1947. He was for thirty-eight years a member of the Committee on Uniform Blanks of the National Association of Insurance Commissioners and presented several papers to that body.

He also served for many years as Actuary of the Ministers and Missionaries Benefit Board of the Northern Baptist Convention, continuing in this position for several years after his retirement from The Travelers.

He was an Associate of the Society of Actuaries, a Fellow of the Royal Statistical Society, and a member of the American Statistical Association. He was a member of the First Baptist Church of West Hartford, Connecticut, and of the Sons of the American Revolution.

His wife, Jennie Seymour Hammond, died in 1945.

In his leisure time, Pierson Hammond was intensely interested in football, and for many years spent part of his vacation watching the games and practice sessions of the Williams teams. His continuing close association with his college resulted in a number of Williams graduates entering the actuarial profession.

His forceful manner of expression gave him a first appearance of gruffness, but on continued acquaintance he was found to be highly sympathetic to the problems of others and to be possessed of a fine sense of humor. He served ably both the insurance business and his church.

EXAMINATION FOR ENROLLMENT AS ASSOCIATE

PART I   GENERAL MATHEMATICS

The questions for Part I were prepared and copyrighted by the Educational Testing Service of Princeton, N. J., and cannot be reprinted. Students may obtain a set of similar questions from the Secretary-Treasurer.

PART II SECTION (a)

PROBABILITY

1. The letters of the word "deeded" are arranged at random on a line. What is the probability that they spell the word "deeded"?

2. One letter is taken at random from each of the words, "assistant" and "statistics". What is the probability they are the same letter?

3. A fair coin is tossed 5 times. What is the probability that at most 4 heads turn up?

4. Seven men are arranged in a circle. What is the probability that A and B are between C and D, and all four are together?

5. If a fair coin is tossed 2n times, what is the probability that n heads will result?

6. A bag contains 6 white balls and 1 black ball. A person draws out one ball at a time, with replacement, until he draws a black one. Find his expectation if he receives a dollar for each white ball drawn.

7. A fair coin was tossed 5 times in a row and the number of heads obtained was 3. What is the probability that at least 2 of the 3 heads were consecutive?

8. A point is picked at random on a line of length 1. What is the probability that the longer segment will be at least 3 times the length of the shorter segment?

9. Three-quarters of the employees of a certain firm are men. 10% of the male employees are classified as executives, as are 5% of the female employees. What is the probability that an employee who is an executive is a man?

10. A man applies for two different jobs. He estimates that the probability of being hired by the first company is 7/10, and that the probability is 3/5 the second company will not hire him. If the probability of at least one of his applications being turned down is 7/10, what is the probability he will be offered at least one of the jobs?

11. An urn contains 6 white balls and 7 black balls. A person draws 4 balls at random and sets them aside without looking at them. What is the probability that the next ball drawn from the urn will be white?

12. Past experience indicates that 5% of the population contracts a certain disease. A new test to determine those who will contract the disease is developed which shows positive reactions for 9% of those tested. Of those who eventually contract the disease, 80% had a positive reaction. Based on these findings, what is the probability that a person showing a positive reaction will not contract the disease?

13. Eight persons are seated at a table, 3 on each side, and 1 at each end. Find the probability that 2 persons chosen at random are on opposite sides or ends of the table.

14. Four nickels are thrown. What is the probability that the number of tails appearing exceeds the number of heads?

15. A bus makes m journeys and carries a total of n passengers. If

each passenger is equally likely to take any journey, what is the probability that the bus will make a given journey with no passengers?

16. A, B, and C play a game in which one point is awarded at the end of each round of play. At each round of play, their respective chances of winning the point are 1/6, 2/6 and 3/6. What is C's chance of winning the game if A needs only 1 point, B 2 points, and C 3 points to win the game?

17. Four experiments have equal probabilities of success. What is the probability that exactly two of the four experiments will result in a success, given that the probability of at least one success is 65/81?

18. The probability that at least one of 5 events will happen is given as 5/6, and that a specified one of the five will happen is given as 2/9. What is the probability that at least one of the other four events will happen?

19. A die is thrown 3 times and the sum of the numbers thrown is 16. What is the probability that the first throw was a six?

20. From a pack of 10 cards numbered 1 to 10, a man draws 10 cards replacing each one before the next is drawn. What is the probability that he will obtain a total score of 13?

(The next two questions refer to a special deck of twelve cards, consisting of the twos, fours, and sixes from an ordinary deck. One hand of five cards is dealt at random from this special deck.)

21. What is the probability that every rank is represented?

22. What is the probability that two and only two suits are represented?

23. Six different things are distributed between 2 men. All possible

distributions being equally likely, what is the probability that the number of things received by each man is odd?

24. A game is played by tossing a fair coin until a tail appears, the player's score being equal to the number of heads thrown. What is the probability that if the game is played n times the player's total score (all games combined) is r?

25. A drawer contains six pairs of socks. If the socks are withdrawn at random one at a time, what is the probability that the sixth sock drawn completes the second pair drawn?

PART II Section (b)

STATISTICS

The Cumulative Normal Distribution for the Normal Variable with Mean 0 and Standard Deviation 1

Z	$\int_{-\infty}^{z} f(z)\,dz$	Z	$\int_{-\infty}^{z} f(z)\,dz$
.00	.500	1.5	.933
.50	.691	1.645	.950
.75	.773	1.7	.955
.90	.816	1.960	.975
1.0	.841	2.0	.977
1.1	.864	2.5	.994
1.3	.903	3.0	.9987

1. Calculate the standard deviation of the following series of numbers: —2, —3, 4, 5, 6.

2. If the mean and variance of x are 50 and 4 respectively, what is $E(x^2)$?

3. If x and y are independent, have means 5 and 7 respectively and standard deviations 1 and 2 respectively, find the mean of xy.

4. If x and y are independently distributed normal variates with means $\bar{x} = 6$, $\bar{y} = 9$ and standard deviations $s_x = 5$, $s_y = 4$, what is the standard deviation of the variate z, where $z = 2x - 6y$?

5. Find the probability that a value, chosen at random from the universe of a normally distributed continuous variate with mean 100 and standard deviation 10, will lie between 70 and 80.

6. Find the mean of the Poisson variate whose probabilities at the points 4 and 3 are in the ratio 4 to 3.

7. Two binomial distributions, both with the same numbers of trials and the same variance, have probabilities of success which differ by 0.1. What is the sum of the probabilities of success for the two distributions?

8. Find the variance of the probability distribution, $f(x) = 2x$, $0 \leq x \leq 1$.

9. A normal distribution has mean 40 and standard deviation 400. Find the probability that the mean of a sample of 25 from the distribution will be negative.

10. A large sample of pairs of values of x and y produced the following:

Variate	Mean	Stand. Dev.	Coeff. of Corr.
x	6	.9	.8
y	8	.6	

What is the slope of the regression line of y on x?

11. Find the standard deviation of the proportion of successes in random samples of 6 items from the population whose distribution is given by:

x	0	1
f(x)	3/5	2/5

($x = 1$ denotes a "success")

12. A sample of 100 items from a Poisson population has a mean of 2. Estimate (using the normal distribution) the 95% confidence limits for the population mean.

13. The random variable x is the number of heads obtained in n tosses of an unbiased coin and the random variable y is the number of sixes obtained in m throws of a fair die. If $E(x) = 20$, what must the value of m be so that $Var(x)$ equals $Var(y)$?

14. A direct mail firm finds that a certain mailing produces 1% replies among towns of 5,000 to 10,000 population. If it is desired to have a probability of $(e^5 - 1)/e^5$ of getting at least one reply from one of these towns, what is the minimum number of mailings required?

15. Population A has mean 457 and standard deviation 36. Population B has mean 448 and standard deviation 24. What is the probability that the mean of a sample of 900 from A will exceed the mean of a sample of 225 from B by 10 or more?

16. If a die is cast 180 times what is the approximate probability of getting less than 25 fives?

17. It is desired to fit a curve of the form $y = kx^2$ by the method of least squares to the following data:

x	0	1	2	3
y	0	2	3	10

What is the resulting value of k?

18. Calculate the correlation coefficient between x and y from the following data.

x	y
−1	1
1	2
2	3

19. A manufacturing process produces objects which average 12.16 inches in length. If a particular one of these objects is known to be more than 20 inches long, what is the probability that it is more than 22.16 inches long? The distribution of lengths is normal with a standard deviation of 4.

20. In a certain normal distribution the standard deviation is one-third of the mean and the probability of a result greater than 5 is .691. What is the standard deviation of this distribution?

21. A certain normal population has a mean equal to 25 and a variance equal to 16. What is the probability that 4 items drawn from this population will have a total exceeding 88?

22. A sample of size 16 is drawn from a normal population with unknown mean and with a variance of 9. The sample mean is 10, and it is desired to make the following statement at the 95% confidence level: "The population mean is greater than k." What is the value of k?

23. Given $\sigma_x = 1$, $\sigma_y = 2$, $r_{xy} = -.5$, find the correlation coefficient between $x + y$ and $x - y$.

24. Samples of size n are taken from a population and it is found that the mean of the sample variance is 12 times the variance of the sample mean. What is the value of n?

25. From n observations of a pair of random variables x and y a least squares line of regression of y on x was determined. How many observations were made if the sum of the squares of the differences between the observed y_1 and the corresponding Y_1 calculated from the regression line was 3.6, given that $\overset{n}{\underset{1}{\Sigma}} y_1^2 = 15$, $\overset{n}{\underset{1}{\Sigma}} y_1 = 5$, and $r_{xy} = .8$?

PART III   Section (a)

1. (a) If $q_x = .05$ for all values of x, calculate the expectation of life (e_x).

   (b) Prove that $\overset{\circ}{x_D} < 1/i$

   (c) Prove that $P_x = \dfrac{vq_x + P_{x+1}\, a_x}{\ddot{a}_x}$

2. (a) A life insurance policy guarantees 3% interest on funds left with the company. A beneficiary under such a policy elects to receive the interest at the end of each year for 10 years on the policy proceeds of $10,000 and to receive the principal sum of $10,000 at the end of 10 years (both interest and principal are payable to either the beneficiary or his survivors). If money is worth $2\frac{1}{2}\%$ compute the present value of the payments under this mode of settlement, given that $a_{\overline{10}|.025} = 8.75$

(b) A loan of $10,000 is to be repaid in equal annual installments, the first payment being due at the end of one year. The amount of the installments is to be so chosen that one-half the loan is outstanding immediately after the tenth payment. Assuming 5% interest what is the amount of the installments?

$$\text{Given } v^{10} = .61391$$
$$s_{\overline{10}|} = 12.5779$$
$$a_{\overline{10}|} = 7.7217$$

3. (a) A twenty payment life insurance policy to a life aged x provides for the following benefits:

$1,000 in event of death during the first five years,

$2,000 in event of death during the next five years,

$3,000 in event of death thereafter.

Express, in terms of commutation symbols, formulas for:

(a) The net annual premium

(b) The 7th terminal reserve by the retrospective method

(c) The 7th terminal reserve by the prospective method.

(b) Given $P^1_{40:\overline{10}|} = .00426$, $P_{40:\overline{5}|} = .18972$, and

$P^1_{40:\overline{5}|} = .00343$, find the value of $_5V^1_{40:\overline{10}|}$

4. (a) A 20-year endowment insurance to a life aged 45 provides $5000 plus the total net premiums paid on death within the term, and $10,000 on survival to the end of the term. Develop an expression for the net annual premium in terms of commutation functions.

(b) Describe the type of insurance whose net single premium is given by each of the following:

i) $\dfrac{1000 \ M_x}{D_x - M_x}$

ii) $\dfrac{1000 \ (M_x + 2R_{x+1})}{D_x}$

iii) $\dfrac{1000 (M_x - M_{x+10} + 2D_{x+10})}{D_x}$

PART III   Section (b)

1. In several states insurers managed by the state write Workmen's Compensation insurance. They are of two types, exclusive and competitive. Distinguish between the two types and state the arguments that have been advanced for and against their existence.

2. Various authors have attempted to classify risks according to type. Briefly explain the meaning of the following types and state what you feel to be each author's purpose in using this division.

    Mowbray — pure risk and speculative risk
    Kulp   — fundamental risk and particular risk (or hazard)
    Willett   — static risk and dynamic risk.

3. Willett distinguishes between "profit" and "reward for risk taking." Explain this difference. In your answer, discuss the derivation of an entrepreneur's income.

4. Describe briefly the powers of the Securities and Exchange Commission.

5. (a) The common stock of American Tel. & Tel. traditionally sells at a lower price-earnings ratio than does the common stock of International Business Machines. What do you think is the primary reason for this difference?

   (b) Give three reasons for financing corporate expansion by the issuance of bonds rather than stocks.

6. (a) It has been said that an insurance company's primary function is to reduce the *risk* of loss but not necessarily to reduce the *chance* of loss. Explain.

    (b) Briefly describe some of the essential characteristics of an insurable risk.

7. (a) The yield of an investment is one of the most important considerations of a potential investor. In what ways is the determination of the future yield of a stock more difficult than that of a bond?

    (b) Discuss Insurance as a Cause of Loss.

PART IV

Section (a)

1. In what respect does the coverage under a Professional Liability Policy and a Products Liability Policy differ from the coverage under most other types of insurance?

2. Define the term "accident" in a standard boiler insurance contract.

3. Name the basic coverages included in the Apartment Owners Special Multi-Peril Policy.

4. The Special Automobile Policy, issued jointly by the N.B.C.U. and the N.A.U.A. includes several important coverage changes from other private passenger policies. One of these differences concerns the application of the policy limits for B.I. and P.D. Another deals with the Other Insurance provision applicable to Medical Payments insurance. Discuss these two changes.

5. Briefly state the purpose of the following types of Bonds
    a. Contract
    b. Fidelity
    c. Judicial
    d. Public Official
    e. Depository.

6. Describe the coinsurance provision of the Mercantile Open Stock Burglary Policy.

7. List the basic provisions in an insurance contract. Include some mention of the points covered in each.

8. What is the difference between a "warranty" and a "representation"?

9. What are the rights and duties of a mortgagee under a Fire policy?

10. Define the three divisions of hazard included in the O. L. & T. policy.

11. Contrast the desirability of including Flood coverage in:
    a. A Flood policy
    b. A Package policy

12. The National Association of Insurance Commissioners has recommended a ruling as respects the definition of the term "non-cancellable" in an Accident and Sickness policy. Describe this ruling.

13. What is a coinsurance clause and what is its purpose?

14. The Family Automobile Policy of the N.B.C.U. provides for four types of "Supplementary Payments" in addition to the applicable limits of liability. Describe these briefly.

15. Define barratry, burglary, larceny and robbery.

16. Define the term "insured" under the Uninsured Motorist coverage of the Family Automobile Policy.

17. Differentiate between "discovery" basis and "loss sustained" basis fidelity bonds.

18. As respects other insurance, policies are generally written on either a "Pro Rata" or an "Excess" basis. Define these two terms and state which applies to:

   (a) Automobile B. I. (Family Policy)

   (b) Automobile Medical Payments (Family Policy)

   (c) Comprehensive Glass Policy

   (d) Homeowners'

   (e) Mercantile Open Stock Burglary Policy

19. Mention and briefly describe the provisions of a Glass policy which might limit the amount of the recovery.

20. The O.L. & T. policy defines four different exposure bases for premium determination. Name and briefly describe these four bases.

SECTION (b)

1(a). In a line of insurance, the current expected loss ratio is .50. Rates for this line are made on the loss ratio method. The current provision for acquisition is .25. It is proposed that the acquisition provision be reduced to .20 for classes representing currently 90% of the total premium volume and to .15 for the remainder. Calculate the effect of this proposal on rate level. (Assume that rates are adequate for all classes of business.)

1(b). In the late 1950's, the private passenger automobile liability rate-making system was changed from a policy year to a calendar-accident year basis. Discuss three major reasons for this change.

2(a). Given the following information regarding a Workmen's Compensation rate revision,

Policy year collectible loss and loss adj. ratio	.691
Calendar year loss and loss adj. ratio	.685
Permissible loss and loss adj. ratio	.668
Change in correction for Off-Balance	1.010

Calculate the Rate Level Adjustment Factor, the change in collectible premium level, and the change in Manual premium level.

2(b). In some states, classification relativities for private passenger automobile liability insurance are determined by comparison of pure premiums for the various classes. In other states, the class relativities are determined by comparing loss ratios (to premium at class 1 rates) of the various classes. Which of these methods is sounder from an actuarial viewpoint? Why?

3(a). There are some basic differences in the treatment of expenses between the method used in private passenger automobile bodily injury ratemaking by the N.B.C.U. and in private passenger automobile physical damage ratemaking by the N.A.U.A. Compare the treatment of the following items in the determination of statewide rate level changes:

(a) Loss Adjustment Expenses
(b) General Administration Expenses
(c) Production Costs.

3(b). The private passenger automobile liability classification plan of the N.B.C.U. recognizes certain differences in potential loss cost among risks. Briefly identify and explain four factors which are recognized by the present plan and three factors which are not now recognized but which you feel would measure potential loss cost.

4(a). The following is an example of a credibility adjustment table for fire insurance ratemaking.

CREDIBILITY ADJUSTMENT TABLE

| Credibility Grading | Points of Tolerance | Tolerance Range | | Limits of Rate Adjustment |
		REDUCTION if Ratio Less than	INCREASE if Ratio More than	
(1)	(2)	(3)	(4)	(5)
81 — 100%	2	47	51	25%
71 — 80%	2	47	51	20%
61 — 70%	6	43	55	15%
55 — 60%	8	41	57	10%
50 — 54%	10	39	59	5%

Explain in detail how such a table is used.

4(b). Following the Inter-Regional recommended procedure, show the calculation of a state indicated overall fire rate level adjustment, given:

    (a) Stock company earned expense ratio
        (excl. Loss Adj. Exp. Ratio)   = 44.0%

    (b) Underwriting Profit factor   = 6.0

    (c) Loss Adjustment Expense Ratio   = 3.4

    (d) Weighted Adjusted Earned-Incurred Loss Ratio
        (excl. Loss Adj. Exp. Ratio)   = 49.7

5(a). The criterion for credibility used for obtaining territory rate levels in Automobile Liability differs from the credibility criterion used to determine classification relativities for Workmen's Compensation. Name the criterion used in each case, and assuming a medium credibility class or territory compare the results under the two methods:

    1) Assuming worsening loss experience for the class or territory.

    2) Assuming favorable loss experience for the class or territory.

5(b). In what ways can competition affect ratemaking and in what ways can ratemaking affect competition?

EXAMINATION FOR ENROLLMENT AS FELLOW

PART I

SECTION (a)

1. Distinguish between the following terms:

   (a) private carrier and common carrier

   (b) waiver and estoppel

   (c) license and franchise

   (d) insurance and suretyship

   (e) representation and warranty

2. In Volume II of the 1962 Proceedings of the NAIC, a final draft of the Non-Admitted Insurance Act is proposed. Section 2 of this Act enumerates the reasons for the Act.

   (a) List four of these reasons.

   (b) Discuss briefly how state revenues are protected under the Act.

3. (a) It has been contended that state taxation of insurance is inconsistent and also inequitable. Do you agree?
       Discuss.

   (b) Name six types of state taxes or fees.

4. List what you consider to be six important events or developments (legislation, decisions, etc.), affecting State regulation, which have taken place in the past two decades and briefly describe the most significant aspect of each.

5. The "Revenue Act of 1962" included an amendment to the Internal Revenue Code specifically applicable to insurance.

   (a) What segment of the business was involved?

   (b) What basic changes in approach were involved?

   (c) Briefly describe the "Protection Against Loss Account" of this law.

6. (a) Define the following types of contracts:

   (1) aleatory

   (2) executory

   (3) parol

   (4) divisible

   (b) Explain briefly how (1) and (2) apply in insurance.

7. (a) What three basic purposes of government regulation of insurance are implicit in most insurance laws?

   (b) What is the object or purpose of the National Association of Insurance Commissioners?

8. What are the five essential elements of an insurance contract? Which of these are omitted in the New York State statutory definition and why?

Section (b)

1. List at least six of the arguments commonly offered in support of compulsory medical or health insurance.

2. Name at least four situations under which Social Security benefits can be paid to a person who has not reached the age of 62.

3. In 1962 a new retirement act covering self-employed persons went into effect. (H.R. 10 known as the Keogh Bill)

   (a) Who is eligible for coverage under this law?

   (b) What is the general purpose of the law?

   (c) How is this purpose accomplished?

4. What are the five types of unemployment? Give an example of the causes of each type.

5. Explain the most probable cause of each of the following hypothetical situations:

   (a) States A and B have identical unemployment insurance programs and similar types and size of industry. State A has had an average unemployment rate for the past two years of 5% while State B has had a rate of 3% for the same period. Although both reserve funds were equal at the start of the period, State B's fund has fallen below State A's.

   (b) States C and D have approximately the same industry payroll yet industry in State C pays almost ten times the Federal Unemployment Tax that is paid by industry in State D.

   (c) Mr. X, an able-bodied worker, was laid off and received unemployment benefits for two weeks. Although fully covered under his State's Plan, he was denied benefits during the third week.

6 . In the article, "New York Statutory Disability Benefits Law . . . etc.", what are listed as the requirements of the Chairman of the New York Workmen's Compensation Board regarding acceptable non-statutory disability insurance plans?

7. (a) What states now have compulsory automobile insurance laws? Name at least three major fears of insurance carriers of the eventual result if compulsory auto insurance is widely adopted.

   (b) What are the eligibility requirements under the Uniform Automobile Assigned Risk Plan?

8. Cite the arguments given for and against an automobile compensation insurance plan.

PART II

SECTION (a)

1. Schedule O—Parts 1 and 1A—was revised in the 1962 statement.

   (a) Describe the changes.

   (b) To complete Parts 1 and 1A for package policies what procedure would you adopt in assigning incurred but not reported reserves by Part?

2. Using a monthly pro rata method, what should the total unearned premiums be as of 12/31/62 for these transactions:

(a)	5 yr. policy effective 6/15/61	$240
(b)	3 yr. policy effective 10/15/62	216
(c)	endorsement effective 1/15/62 on 2 year policy expiring 3/15/63	56
(d)	audit premium billed 7/15/62 on expired policy	100
(e)	3 yr. policy cancelled 11/15/62, expiring 2/15/64	—150
(f)	Quarterly deposit premium (on estimated annual premium of $120) effective 12/15/ 62	48

3. In Schedule P, Parts 3 and 4, unallocated loss expense paid in the current calendar year is allocated to policy years in fixed percentages.

   (a) How can this knowledge be used as a basis for establishing unallocated loss expense reserves for the Schedule P lines?

   (b) How would you determine the unallocated loss expense reserve for the 3 latest policy years for Workmen's Compensation as of 12/31/62 with this method? (Percentages in Part 4(B) are 5%, 10%, 45% and 40% in a sequence ending with the current policy year.)

   (c) What use could you make of Schedule P—Part 5B in establishing the reserve in (b) above?

4. Given the following information, what should a company's incurred but not reported reserve be as of 12/31/62? Explain how you arrived at your answer.

	1961	1962
Written Premiums	$5,000,000	$5,500,000
Earned Premiums	4,900,000	5,150,000
Paid Losses:		
Occurring Current Year	1,000,000	1,025,000
Occurring Prior Years	2,000,000	2,100,000
Outstanding Losses (Excluding IBNR) at year end:		
Occurring Current Year	1,250,000	1,284,500
Occurring Prior Years	750,000	800,000
Incurred but not reported (IBNR) Reserve Year End	800,000	?
Number of Claims Reported		
Jan.-Mar.	3,400	3,700
Apr.-June	3,600	3,800
Jul.-Sept.	3,500	3,700
Oct.-Dec.	3,600	3,900
Average Incurred Cost per claim		
Jan.-Mar.	210	215
Apr.-June	200	205
Jul.-Sept.	205	210
Oct.-Dec.	215	220

5. When a company is protected by an excess of loss contract, it tends to have less interest in the accuracy of a loss estimate once it becomes obvious that the loss will exceed its retention. Discuss this situation, giving reasons why accuracy of reserves is important on a total (or gross) basis as well as a net basis.

6. An accountant tells you that the Automobile bodily injury liability loss reserve as of 12/31/61 was redundant by x dollars as evaluated twelve months later, 12/31/62. How could you check his figure, limiting yourself to data in the exhibits of the financial statement?

7. In many areas the fire insurance industry has adopted the "Deferred Premium Payment Plan" under which annual installments are 35% of the three year premium. Could this new plan have any effect on the unearned premium reserve procedures of a company? Describe in general what these effects might be and give one illustration of a change in procedures that could occur.

8. Quotations similar to the following can occasionally be found in a company's report of its operating results:

"When earnings are adjusted to reflect the equity in the increased unearned premium reserve, the adjusted earnings are $......."

Describe the equity to which reference is made. Also, what proportion of the unearned premium reserve would you expect it to be for a stock agency company?

SECTION (b)

1. Describe five bases (methods of distribution) used to allocate expenses. Also, name an operating expense that would be appropriately allocated to line of business on each of the five bases described.

2. Produce a surplus reconciliation (as is done in the Capital and Surplus Accounts on page 4 of the Annual Statement), given the following:

Surplus as regards Policyholders 12/31/61	$20,000,000
Surplus as regards Policyholders 12/31/62	19,300,000
Net Income 1962	3,000,000
Book (Cost) Value of Stocks 12/31/61	10,000,000
Admitted Asset Value of Stocks 12/31/61	25,000,000
Book (Cost) Value of Stocks 12/31/62	12,000,000
Admitted Asset Value of Stocks 12/31/62	25,500,000
Policyholder dividends paid—1962	2,000,000
Reserve for Policyholder dividends 12/31/61	1,900,000
Reserve for Policyholder dividends 12/31/62	2,400,000
Excess of Schedule P Statutory reserves over	
case basis: 12/31/61	400,000
12/31/62	200,000
Capital paid in 1961	200,000
Capital paid in 1962	100,000

3. Given the following, determine how much cash was made available to the company from its insurance operation during the year 1962 (this cash being the source for additional investment by the company):

Premiums Earned—1962	$20,000,000
Losses Incurred—1962	10,500,000
Expenses Incurred—1962	9,000,000
Unearned Premiums—12/31/61	10,000,000
Unearned Premiums—12/31/62	12,000,000
Loss Reserves 12/31/61	8,500,000
Loss Reserves 12/31/62	10,000,000
Expense Reserves 12/31/61	2,000,000
Expense Reserves 12/31/62	2,250,000
Agents Balances or Uncollected Premiums—12/31/61	700,000
Agents Balances or Uncollected Premiums—12/31/62	750,000

4. If a direct-writing insurance company writes a $600 fire policy for a 5 year term, effective 7/15/61 and expiring 7/15/66, with annual installments of $120 each,

   (a) Briefly describe 2 methods of recording this transaction in Premiums Written, Premium-in-Force and Uncollected Premiums on the company records in 1961.

   (b) In each method, calculate Premiums Written and Premiums Earned for the year 1962; and Premiums-in-Force, Unearned Premiums and Uncollected Premiums as of 12/31/62.

   Note: Assume that installments are paid on the billed date.

5(a). What are the five major groups to which a company's total expenses are allocated in Part I of the Insurance Expense Exhibit?

   (b). The Insurance Expense Exhibit contains lines for "Adjusted Direct Premiums Written" and "Adjusted Direct Commission and Brokerage Incurred". What are the adjustments and what is their purpose?

6. In 1949 an industry committee conducted a study of expenses by size of risk. On what two methods of analysis did the companies principally rely in allocating expenses by size of premium? List three operations to which each method was applied and discuss the reasons for the choice of method.

7. Given the following information, what was the company's net under-

writing gain or loss as shown on Page 4 (Statement of Income) of its Annual Statement?

Direct Premiums Written	$38,000,000
Direct Losses Paid	4,000,000
Reinsurance Premium Ceded	3,000,000
Losses Recovered on Reinsurance Ceded	1,000,000
Reinsurance Premiums Assumed	15,000,000
Losses Paid on Reinsurance Assumed	4,000,000
Net Unearned Premiums End of Period	35,000,000
Net Unearned Premiums Beginning of Period	24,000,000
Net Losses Unpaid End of Period	22,000,000
Net Losses Unpaid Beginning of Period	7,000,000
Loss Adjustment Expenses Incurred	2,000,000
Other Underwriting Expenses Incurred	15,000,000
Investment Expenses Incurred	1,000,000

8(a). What is Regulation 30 (Instructions for Uniform Classification of Expenses) and what are its purposes?

  (b) The Insurance Expense Exhibit is by line of insurance. What are the advantages and disadvantages of a line of business breakdown of expense as contrasted to a type of policy breakdown?

PART III

SECTION (a)

1. (a) What objections are usually raised against deductible fire insurance?

  (b) How would you defend the use of fire deductibles against these objections?

2. Develop the revised D-ratio (Dr) for the following class using the formula suggested by A. L. Bailey in P.C.A.S. XXXV.

Class	No. of Losses	Primary Losses	Total Losses
2070	2,000	$400,000	$500,000

Given Du = the underlying D-ratio = .80
Df = the functional D-ratio = .60
Di = the D-ratio indicated by the experience to be used for the revision
Zf = the credibility of Df = .10 and
$$Zi = \frac{N}{N + 500}$$

3. Calculate the indicated discount for $250 deductible coverage for the O.L. & T. Public Liability line given:

Total indemnity losses (5/10 limits) = $10,000,000
Incurred indemnity losses under $250 per claim = $4,000,000
Number of claims over $250 per claim = 8,000
Full Coverage cost factors:

Losses (excl. allocated claim exp.)	.475
Claim expense	.120
Administration	.070
Inspection	.035
Acquisition, Taxes & Profits	.300
	1.000

4. (a) Compare "normal" and "excess" loss costs under "Split" and "Multi-Split" plans.

   (b) What two important questions must be answered before the discounting method is selected for a multi-split plan?

5. Define what is meant by the following terms as used by K. L. McIntosh in his paper "The Rationale of the Fire Schedule";

   Constant hazard
   Variable hazard
   Contagion of hazard

6. Briefly describe in general terms the reason for and operation of composite rating plans.

7. The average compensation death claim in a state is $7,142.85. 30% of the total cases and 50% of the total costs are from cases at or above $10,000. What percent of the losses are in excess of $10,000? Explain the meaning of each step of your calculation.

8. When making manual rates for workmen's compensation what steps are taken to remove the effect of individual risk rating?

9. From the following excerpt of Table M, develop the method for determining the risk distribution by loss ratio underlying the given in-

surance charges. Assume an expected loss ratio of 50%. It is not necessary to perform the actual calculations.

Ratio of Rated Losses to Expected Losses	Insurance Charge
.10	.900
.30	.700
.50	.507
.70	.326
.90	.180
1.10	.087
1.30	.042
1.50	.019

10. Over the course of years there has shown up a consistent net credit off-balance in most Experience Rating Plans. How do you account for this?

SECTION (b)

1. Define the term "surplus lines." What two avenues are available to the surplus lines market?

2. (a) What are the major points for and against the mandatory "fund" type of uninsured motorists coverage?

   (b) Outline a program you would suggest as an alternate to this as well as other compulsory type legislation.

3. What guide lines would you use for determining the strength of a casualty company?

4. The workmen's compensation average earned rate for state A is 10% higher than the average earned rate for state B. The statutory benefits, on the other hand, are 10% lower in state B. On the basis of these facts a charge is made that rates in state A are excessive. Discuss the shortcomings involved in jumping to this conclusion and list other variations in workmen's compensation cost, in addition to benefit scales, which would influence average rates.

5. Sometimes groups of companies centralize their reinsurance by using a method known as "group underwriting." Discuss the advantages and disadvantages of this method.

6. During World War II automobile insurance premiums varied with amount of gas ration.

    1. What was the assumption underlying the use of this base?

    2. Does this contradict the assumptions now underlying the classification and rating structure of private passenger automobile insurance?

7. Briefly justify merit rating from a competitive and an accident prevention standpoint.

8. Briefly describe the major differences between the two basic policies being offered by the Foreign Credit Insurance Association.

9. Comment briefly on the following statement:
   "Multiple line underwriting will improve the solvency of insurance companies."

10. Comment on some of the problems entailed in the underwriting of Commercial Multiple Peril Policies—both in the selection of risks and in the organization of the underwriting responsibility.

PART IV

SECTION (a)

1. Cite the "Policyholders' Rating" classifications used in Best's Insurance Reports — Fire and Casualty and describe briefly the five principal factors considered in assigning a rating to a company.

2. What is the purpose of the Statistical Plan for Expenses of the National Board of Fire Underwriters?
   What are the schedules which must be submitted under this plan?

3. Describe the differences between the National Bureau of Casualty Underwriters Statistical Plans for glass and burglary insurance.

4. In the Boiler and Machinery Statistical Plan of the National Bureau of Casualty Underwriters:

   (a) What experience is to be reported?

   (b) How is the exposure determined for seasonal objects? Reserve objects?

   (c) What special distinctions are made in the reporting of Boiler-Broad Coverage and Turbine Insurance direct damage paid losses?

5. Name a source where each of the following insurance statistics can be found:

   (a) A list of state insurance officials' names, addresses and titles.

   (b) Aggregate assets of Lloyd's organizations.

   (c) Liquidating value per share of a medium sized company.

   (d) State Workmen's Compensation funds.

   (e) The incurred-but-not-reported reserve for Burglary of a large stock company.

6(a). Name four media used for recording data for communication with machines.

   (b). Name four storage media involving magnetism and rank them as regards speed of access to stored data.

   (c). Name four devices counterpart to the type bar on an IBM 402 printer which can be used to provide a visual record of data from a computer system.

7. Computer programs may be written either in machine coding or by more advanced systems of program writing.

   (a) What is meant by machine coding?

   (b) Cite three disadvantages of writing a program using machine coding.

   (c) Cite three programming advantages of using macro-instructions.

8. Define data buffering and demonstrate graphically the greater efficiency a computer system with several buffers has as compared to an unbuffered system.

9. A bureau which is the statistical agent for a large number of stock and mutual companies has installed EDP equipment and requests that its members change from punched cards to magnetic tape as the reporting media. Discuss this request.

SECTION (b)

1. Comment briefly on the length of record, size of area and frequency of rate revisions under crop-hail insurance rating and cite the three variables upon which a crop-hail rate depends.

2. Describe briefly the four methods most commonly used for the measurement of the actual experience under individual accident and sickness coverages.

3. Develop a method of eliminating the effect of severe catastrophe losses from experience of a line of insurance such as Glass Insurance.

4. What factors should be taken into consideration when making surety rates?

5. The expense loading in workmen's compensation rates has been criticized as being too big when compared with group accident and health expenses. How would you reply to such criticism?

6. What are the fundamental principles underlying the making of fire dwelling rates?

7. What is the exposure measure used in making rates for the Homeowner's policy?

   Discuss the advantages and disadvantages of this base.

8. The allegation has been made that rate competition does not exist in Workmen's Compensation since no one ever asks for a deviation. Discuss this statement.

9. In "An Actuarial Note on the Credibility of Experience of a Single Private Passenger Car", relative claim frequency was calculated on the basis of premium rather than car years.

    (a) Why was this approach taken?

    (b) What are the assumptions underlying this approach?

INDEX TO VOLUME L

INDEX TO VOLUME L (Cont.)

INDEX TO VOLUME L (Cont.)

192

INDEX TO VOLUME L (Cont.)

INDEX TO PROCEEDINGS

OF THE

Casualty Actuarial Society

___

VOLUMES XLI TO L INCLUSIVE

___

NEW YORK

1964

Introduction

This Index covers Volumes XLI through L of the *Proceedings* of the Casualty Actuarial Society and the *Year Books* which have been bound as appendices in the corresponding volumes. The subjects are listed in alphabetical order with items under each subject in chronological order. The names of all members admitted to the Society during the period covered by the Index are included with the date of admission. The names of all members taking any active part in the Casualty Actuarial Society are included with the offices held and all papers, discussions, book reviews and seminar reports presented during the period. Schedules of all officers and committee memberships are given at the end of the Index.

LUTHER L. TARBELL, JR.,

Assistant Editor

GENERAL INDEX

BANNISTER, DAN W., Associate, November 19, 1959.

BARBER, HARMON T.

    Discussion:

        The Census Method (Laurence H. Longley-Cook), XLVII, 219.

    Seminar Reports:

        Personnel Problems – Student Recruiting, XLV, 244.

        The Theory of Private Passenger Automobile Merit Rating, XLVII, 225.

BARKER, GORDON M., Fellow, November 19, 1954.

BEERS, HENRY S.

    Address:

        Tomorrow's Actuary, XLIX, 56.

BECKWITH, ROYAL M.

    Discussion:

        Revision of Rates Applicable to a Class of Property Fire Insurance (C. Otis Shaver), XLV, 233.

BENBROOK, PAUL, Fellow, November 14, 1958.

    Paper:

        The Advantages of Calendar-Accident Year Experience and the Need for Appropriate Trend and Projection Factors in the Determination of Automobile Liability Rates, XLV, 20; Discussion, R. Lino, XLVI, 301.

BENNETT, NORMAN J., Fellow, November 16, 1956; Council, 1959-1962; Chairman Examination Committee, 1962-1963.

    Discussion:

        Ratemaking for Fire Insurance (Joseph J. Magrath), XLVI, 324.

    Seminar Report:

        Statistics for Rating and Research, XLVII, 242.

BERG, ROY A., JR., Associate, November 16, 1956.

BERKELEY, ERNEST T., Council, 1956-1959; Vice President, 1959-1960.

    Discussions:

        Current Ratemaking Procedures for Automobile Liability Insurance (Philipp K. Stern), XLIV, 95.

        Homeowners – The First Decade (Frederic J. Hunt, Jr.), XLIX, 37.

    Seminar Reports:

        Rate Making and Statistics for Multiple Peril Policies, XLVII, 231.

        Accident Proneness, XLVIII, 207.

BERKMAN, JOAN M., Associate, November 19, 1959.

BERNAT, LEO ALLEN, Associate, November 14, 1958.

BERQUIST, JAMES R., Associate, November 18, 1955; Fellow, November 22, 1957.

    Discussion:

        Insurance Rates with Minimum Bias (Robert A. Bailey), L, 11.

BEVAN, JOHN R., Council 1959-1962.

    Paper:

        Comprehensive Medical Insurance – Statistical Analysis for Ratemaking, L, 111; Discussion, Eldon J. Klaassen, L, 129; Allen D. Pinney, L, 131.

Discussions:

Prolonged Illness Insurance (Mark Kormes), XLII, 231.

Patterns of Serious Illness Insurance (Mark Kormes), XLIX, 86.

BLACK, NELLAS C., Obituary, L, 156.

BLACKHALL, JOHN M., Obituary, XLIV, 118.

BLANCHARD, RALPH H.

Book Reviews:

Insurance Words and Their Meanings (Vincent L. Gallagher), XLI, 184.

Introduction to Insurance (Allen L. Mayerson), XLIX, 233.

BLODGET, HUGH R., Associate, November 14, 1958; Fellow, November 19, 1959.

BLUMENFELD, M. EUGENE, Associate, November 14, 1958.

Paper:

Recent Trends and Innovations in Individual Hospital Insurance, XLVIII, 83; Discussion, A. V. Fairbanks, XLIX, 69.

BOILER AND MACHINERY ADJUSTMENT RATING PLAN, THE – Robert B. Foster – XLI, 135; Discussion, Ronald L. Bornhuetter, XLII, 238.

BONDY, MARTIN, Fellow, November 16, 1956; Council, 1962-1965.

Papers:

The Rate Level Adjustment Factor in Workmen's Compensation Ratemaking, XLIII, 106; Discussion, M. G. McDonald, XLIV, 86; G. B. Elliott, XLIV, 86; Author's Review of Discussion, XLIV, 90.

Auto B. I. Liability Rates – Use of 10/20 Experience in the Establishment of Territorial Relativities, XLV, 1; Discussion, LeRoy J. Simon, XLV, 240; R. L. Bornhuetter, XLVI, 300.

Discussions:

Credibility of 10/20 Experience as Compared with 5/10 Experience (Lewis H. Roberts), XLVII, 184.

Fitting Negative Binomial Distributions by the Method of Maximum Likelihood (LeRoy J. Simon), XLVIII, 202.

Seminar Report:

How Can Actuarial Analyses Help Company Claim Departments Control Average Claim Costs?, XLIX, 67.

BOOK REVIEWS

Clarence A. Kulp, Editor, XLI, 183; XLII, 262.

John W. Wieder, Jr., Editor, XLIII, 225; XLIV, 114.

Allen L. Mayerson, Editor, XLVI, 350; XLVII, 244; XLVIII, 234.

Frank Harwayne, Editor, XLIX, 233; L, 146.

Accident and Health Insurance:

History of Accident Insurance in Great Britain (W. A. Dinsdale) – C. A. Kulp – XLII, 263.

Health Insurance (O. D. Dickerson) – A. L. Mayerson – XLVI, 350.

Medical Care and Health Insurance (J. F. Follmann, Jr.) – Harold F. LaCroix – L, 152.

Statistics and Mathematics:

Population Statistics and Their Compilation (Hugh H. Wolfenden) – R. J. Myers – XLI, 184.

How to Lie with Statistics (Darrell Huff) – D. M. Pruitt – XLI, 186.

Introduction to Demography (Mortimer Spiegelman) – L. H. Longley-Cook – XLII, 265.

The Lognormal Distribution (J. Aitchison and J. A. C. Brown) – LeRoy J. Simon – XLIX, 233.

Statistics of Extremes (E. J. Gumbel) – Richard J. Roth – L, 146.

Workmen's Compensation Insurance:

Workmen's Compensation (Herman Miles Somers and Anne Ramsay Somers) – J. Linder – XLII, 266.

BORCH, KARL

Paper:

Reformulation of Some Problems in the Theory of Risk, XLIX, 104.

BORNHUETTER, RONALD L., Associate, November 16, 1956; Fellow, November 22, 1957; Council, 1963-1966.

Discussions:

The Boiler and Machinery Premium Adjustment Rating Plan (Robert B. Foster), XLII, 238.

Auto B. I. Liability Rates – Use of 10/20 Experience in the Establishment of Territorial Relativities (Martin Bondy), XLVI, 300.

Book Review:

The History of Automobile Liability Insurance Rating (H. Jerome Zoffer), XLVII, 244.

BOYAJIAN, JOHN H., Fellow, November 16, 1956.

Discussion:

The "Workmen's Compensation Injury Table" and "Standard Wage Distribution Table" – Their Development and Use in Workmen's Compensation Insurance Ratemaking (Barney Fratello), XLIII, 202.

BOYLE, JAMES I., Associate, November 22, 1957; Fellow, November 19, 1959.

Panel Discussion:

An Analysis of the Adequacy of the Various Factors and Rating Values Used in Retrospective Rating, L, 32.

BRAGG, JOHN M., Associate, November 22, 1957.

BRANNIGAN, JAMES F., Associate, November 18, 1960; Fellow, November 16, 1961.

Panel Discussion:

An Analysis of the Adequacy of the Various Factors and Rating Values Used in Retrospective Rating, L, 32.

BRUNNQUELL, HELMUTH G., Obituary, XLV, 276.

BUCK, GEORGE BURTON, Obituary, XLVIII, 239.

BUDD, EDWARD H., Associate, November 18, 1960; Fellow, November 16, 1961.

DONOVAN, JAMES B.

Seminar Report:
Current Rate Regulatory Problems, XLV, 254.

DOREMUS, FREDERICK W.

Discussion:
Notes on Some Actuarial Problems of Property Insurance (Laurence H. Longley-Cook), XLVI, 339.

DORF, STANLEY A., Associate, November 16, 1956.

DROBISCH, MILES R., Associate, November 16, 1956; Fellow, November 22, 1957.

DROPKIN, LESTER B., Associate, November 16, 1956; Fellow, November 14, 1958.

Papers:
Some Considerations on Automobile Rating Systems Utilizing Individual Driving Records, XLVI, 165; Discussion, R. A. Bailey, XLVII, 152.

Automobile Merit Rating and Inverse Probabilities, XLVII, 37; Discussion, D. C. Weber, XLVIII, 181.

Discussions:
An Introduction to the Negative Binomial Distribution and its Applications (LeRoy J. Simon), XLIX, 9.

Mathematical Limits to the Judgment Factor in Fire Schedule Rating (Kenneth L. McIntosh), XLIX, 71.

DURKIN, JAMES H., Associate, November 1, 1963.

DuROSE, STANLEY C., JR., Associate, November 14, 1958.

Paper:
A Uniform Statistical Plan and Integrated Rate Filing Procedure for Private Passenger Automobile Insurance, XLV, 41; Discussion, C. H. Graves, XLVI, 305.

EATON, KARL F., Associate, November 19, 1954.

EHLERT, DARRELL W., Associate, November 16, 1961.

EIDE, K. ARNE, Associate, November 19, 1954; Fellow, November 19, 1959.

ELECTRONICS, SOME RANDOM COMMENTS ON – Presidential Address of Seymour E. Smith, XLII, 1.

ELLIOTT, GEORGE B., Council, 1955-1958.

Discussion:
The Rate Level Adjustment Factor in Workmen's Compensation Ratemaking (Martin Bondy), XLIV, 86.

ESPIE, ROBERT G., Fellow, November 14, 1958.

Seminar Report:
Analyzing Annual Statements and Expense Exhibits of Other Companies, XLIX, 63.

EVEN, CHARLES A., JR., Associate, November 15, 1962.

EXPENSES

> Observations on the Latest Reported Stock Insurance Company Expenses for 1960 – Frank Harwayne – XLVIII, 109; Discussion, S. E. Smith, XLIX, 79.
>
> The Latest Reported Stock Insurance Company Expenses for 1961 – Frank Harwayne – XLIX, 155.
>
> Actuarial Note: Fixed and Variable Expenses – Lewis H. Roberts – L, 1; Discussion, Paul S. Liscord, L, 2; John H. Muetterties, L, 3.

EXPERIENCE RATING

> The Compensation Experience Rating Plan – A Current Review – Dunbar R. Uhthoff – XLVI, 285; Discussion, R. M. Marshall, XLVIII, 191; R. A. Johnson, XLVII, 198; E. S. Allen, XLVII, 200.
>
> Multiple Coverage Experience Rating Plan – Eldon J. Klaassen – XLVII, 66; Discussion, L. L. Tarbell, Jr., XLVII, 217.
>
> Experience Rating Reassessed – Robert A. Bailey – XLVIII, 60; Discussion, John W. Carleton, XLIX, 90; Lewis H. Roberts, XLIX, 93.
>
> An Actuarial Analysis of a Prospective Experience Rating Approach for Group Hospital-Surgical-Medical Coverage – George E. McLean – XLVIII, 155; Discussion, Roger A. Johnson, XLIX, 81; Author's Review of Discussion, XLIX, 81.
>
> An Analysis of the Adequacy of the Various Factors and Rating Values Used in Retrospective Rating (Panel Discussion) – James I. Boyle, James F. Brannigan, Stephen S. Makgill, and Donald E. Trudeau – L, 32.

FAIRBANKS, ALFRED V., Fellow, November 18, 1955.

> Paper:
>
> Notes on Noncancellable Health and Accident Ratemaking, XLII, 89; Discussion, W. V. B. Hart, XLIII, 206; S. W. Gingery, XLIII, 208.
>
> Discussion:
>
> Recent Trends and Innovations in Individual Hospital Insurance (M. Eugene Blumenfeld), XLIX, 69.

FAUST, J. EDWARD, JR., Associate, November 16, 1956; Fellow, November 18, 1960.

> Papers:
>
> Automobile Bodily Injury Liability Rate-Making on a Prospective Basis, XLIV, 11; Discussion, R. J. Wolfrum, XLV, 221; Author's Review of Discussion, XLV, 227.
>
> The Actuarial Aspects of Blue Cross Plans, XLVI, 177; Discussion, M. Kormes, XLVII, 156; Author's Review of Discussion, XLVII, 159.

FELDMAN, MARTIN F., Associate, November 22, 1957.

FERDEN, STEIN, Associate, November 16, 1961.

FIDELITY RATES, TOWARDS STATISTICALLY BASED – Zenas M. Sykes, Jr. – XLVI, 271; Discussion, J. W. Wieder, Jr., XLVII, 190.

FINKEL, DANIEL, Associate, November 15, 1962.

FINNEGAN, JOSEPH H., Fellow, May 25, 1956.

> Paper:
>
> Statistics of the National Board of Fire Underwriters, XLIII, 82; Discussion, Clyde H. Graves, XLIII, 224.

FIRE INSURANCE

A Credibility Framework for Gauging Fire Classification Experience – Robert L. Hurley – XLI, 161; Discussion, C. H. Graves, XLII, 241; M. H. McConnell, XLII, 243; Author's Review of Discussion, XLII, 251.

Statistics of the National Board of Fire Underwriters – J. H. Finnegan – XLIII, 82; Discussion, Clyde H. Graves, XLIII, 224.

Revision of Rates Applicable to a Class of Property Fire Insurance – Otis C. Shaver – XLIV, 63; Discussion, R. M. Beckwith, XLV, 233.

Ratemaking for Fire Insurance – Joseph J. Magrath – XLV, 176; Discussion, N. J. Bennett, XLVI, 324.

Mathematical Limits to the Judgement Factor in Fire Schedule Rating – Kenneth L. McIntosh – XLVIII, 131; Discussion, L. B. Dropkin, XLIX, 71; Robert L. Hurley XLIX, 76; Author's Review of Discussion, XLIX, 77.

The Low Valued Risk – A Study of the Premium Required for Habitational Risks of Various Policy Amounts – Philip B. Buffinton – XLIX, 119; Discussion, F. J. Hunt, Jr., XLIX, 144; R. L. Hurley, XLIX, 151.

FITZGIBBON, WALTER J., JR., Associate, November 19, 1959; Fellow, November 16, 1961.

FITZHUGH, GILBERT W.

Invitational Address:

Medical Care Insurance – Compulsory or Freedom of Choice?, L, 50.

FLACK, PAUL R., Associate, November 16, 1956.

FONDILLER, RICHARD, Obituary, XLIX, 235.

FOSTER, ROBERT B., Fellow, November 18, 1955.

Paper:

The Boiler and Machinery Adjustment Rating Plan, XLI, 135; Discussion, Ronald L. Bornhuetter, XLII, 238.

FOWLER, THOMAS W., Fellow, November 18, 1955.

FRATELLO, BARNEY

Paper:

The "Workmen's Compensation Injury Table" and "Standard Wage Distribution Table" – Their Development and Use in Workmen's Compensation Insurance Ratemaking, XLII, 110; Discussion, L. W. Scammon, XLIII, 199; J. H. Boyajian, XLIII, 202.

FURNIVALL, MAURICE L., Obituary, XLIX, 235.

GAINES, NATHANIEL, Associate, November 19, 1954.

Paper:

Actuarial Aspects of Unemployment Insurance, XLII, 203.

GERUNDO, LOUIS P., JR., Associate, November 15, 1962.

GIBSON, JOSEPH P., JR.

Discussion:

Liability Insurance for the Nuclear Energy Hazard (Richard H. Butler), XLVI, 336.

HAMMER, SIDNEY M., Associate, November 1, 1963.

HAMMOND, H. PIERSON, Obituary, L, 159.

HART, W. VAN BUREN, JR., Fellow, November 16, 1956.

Discussion:

Notes on Noncancellable Health and Accident Ratemaking (Alfred V. Fairbanks), XLIII, 206.

HARWAYNE, FRANK, Council, 1960-1963.

Book Review Editor, XLIX, 233; L, 146.

Papers:

A Review and Comparison of Workmen's Compensation Experience in New York State and Wisconsin, XLIII, 8; Discussion, D. R. Uhthoff, XLIII, 219; W. W. Greene, XLIV, 84.

Estimating Ultimate Incurred Losses in Auto Liability Insurance, XLV, 63; Discussion, J. M. Cahill, XLVI, 308; Lewis H. Roberts, XLVI, 312; F. J. Hope, XLVI, 315; Author's Review of Discussion, XLVI, 318.

Some Further Notes on Estimating Ultimate Incurred Losses in Auto Liability Insurance, XLVI, 59; Discussion, F. J. Hope, XLVI, 338.

Merit Rating in Private Passenger Automobile Liability Insurance and the California Driver Record Study, XLVI, 189; Discussion, J. H. Muetterties, XLVII, 160; Author's Review of Discussion, XLVII, 162.

A Study of the Size of an Assigned Risk Plan, XLVIII, 9; Discussion, P. S. Liscord, XLVIII, 194.

Observations on the Latest Reported Stock Insurance Company Expenses for 1960, XLVIII, 109; Discussion, S. E. Smith, XLIX, 79.

The Latest Reported Stock Insurance Company Expenses for 1961, XLIX, 155.

Seminar Report:

The Problem of Substandard Automobile Risks, XLVIII, 218.

HATCH, LEONARD W., Obituary, XLV, 278.

HAZAM, WILLIAM J., Council, 1958-1959; Chairman Examination Committee, 1957-1961; Vice President, 1963.

Discussions:

An Actuarial Note on the Credibility of Experience of a Single Private Passenger Car (Robert A. Bailey and LeRoy J. Simon), XLVII, 150.

The Rating of Crop-Hail Insurance (Richard J. Roth), XLVII, 222.

HEWITT, CHARLES C., JR., Council, 1962-1965.

Papers:

A New Approach to Infant and Juvenile Mortality, XLVII, 41; Discussion, A. L. Mayerson, XLVII, 215; Author's Review of Discussion, XLVIII, 183.

The Negative Binomial Applied to the Canadian Merit Rating Plan for Individual Automobile Risks, XLVII, 55; Discussion, O. D. Dickerson, XLVIII, 186; Author's Review of Discussion, XLVIII, 189.

Discussion:

Size, Strength and Profit (LeRoy J. Simon), XLIX, 52.

HICKMAN, JAMES C., Associate, November 19, 1959.

The Low Valued Risk – A Study of the Premium Required for Habitational Risks of Various Policy Amounts (Philip G. Buffinton), XLIX, 144.

HURLEY, ROBERT L., Fellow, November 18, 1955; Council, 1961-1964.

Papers:

A Credibility Framework for Gauging Fire Classification Experience, XLI, 161; Discussion, C. H. Graves, XLII, 241; M. H. McConnell, XLII, 243; Author's Review of Discussion, XLII, 251.

Multiple Peril Rating Problems – Some Statistical Considerations, XLVI, 196; Discussion, P. M. Otteson, XLVII, 166.

Discussions:

Rate Revision Adjustment Factors (LeRoy J. Simon), XLVI, 327.

Mathematical Limits to the Judgment Factor in Fire Schedule Rating (Kenneth L. McIntosh), XLIX, 76.

The Low Valued Risk – A Study of the Premium Required for Habitational Risks of Various Policy Amounts (Philip G. Buffinton), XLIX, 151.

Rating by Layer of Insurance (Ruth E. Salzmann), L, 27.

Seminar Report:

Schedule Rating in Fire Insurance, XLVIII, 216.

Book Review:

All Lines Insurance (Huebner Foundation Lectures, Dan M. McGill, Editor), XLVIII, 234.

INFANT AND JUVENILE MORTALITY, A NEW APPROACH TO – Charles C. Hewitt, Jr. – XLVII, 41; Discussion, A. L. Mayerson, XLVII, 215; Author's Review of Discussion, XLVIII, 183.

INSURANCE LANGUAGE PROBLEMS – Presidential Address of Norton E. Masterson, XLIII, 1.

JACKSON, CHARLES WILLIAM, Obituary, XLVI, 355.

JENSEN, JAMES P., Associate, November 15, 1962.

JOHANSEN, PAUL

Address:

A Casualty Actuary in Europe, XLVIII, 225.

JOHE, RICHARD L., Fellow, November 19, 1954; Council, 1959-1962.

JOHNSON, ROGER A., JR., Council, 1952-1955.

Discussions:

The Compensation Experience Rating Plan – A Current Review (Dunbar R. Uhthoff), XLVII, 198.

An Actuarial Analysis of a Prospective Experience Rating Approach for Group Hospital-Surgical-Medical Coverage (George E. McLean), XLIV, 81.

KAHLER, C. M.

Book Review:

The Business of Reinsurance (William J. Langler), XLII, 262.

KALLOP, ROY H., Fellow, November 16, 1956; Council, 1961-1964.

KATES, PHILLIP B., Fellow, November 22, 1957.

LANGE, JOHN ROBERT, Obituary, XLIV, 121.

LATIMER, MURRAY W., Associate, November 14, 1958; Fellow, May 5, 1961.

Papers:

Methods of Cost Limitation Under Private Unemployment Benefit Plans, XLV, 88; Discussion, P. A. Williams, XLVI, 322.

Costs of Hospital Benefits for Retired Employees, XLVIII, 13; Discussion, A. D. Pinney, XLVIII, 195; R. J. Myers, XLVIII, 197.

LEAL, JAMES RENWICK, SR., Obituary, XLV, 279.

LEIGHT, ARTHUR S., Associate, November 19, 1959.

LESLIE, WILLIAM, Obituary, XLIX, 236.

LESLIE, WILLIAM, JR., Council, 1954-1957; Vice President, 1957-1958; President, 1959-1960.

Presidential Addresses:

Address of the President, XLVII, 25.

Address of the President, XLVIII, 54.

LESSONS FROM ADVERSITY – Presidential Address of Norton E. Masterson, XLIV, 1.

LINDEN, JOHN R., Associate, November 18, 1960; Fellow, November 16, 1961.

LINDER, JOSEPH

Book Review:

Workmen's Compensation (Herman Miles Somers and Anne Ramsay Somers), XLII, 266.

LINO, RICHARD, Fellow, November 16, 1956; Librarian, 1958-1963.

Discussion:

The Advantages of Calendar – Accident Year Experience and the Need for Appropriate Trend and Projection Factors in the Determination of Automobile Liability Rates (Paul Benbrook), XLVI, 301.

LISCORD, PAUL S., Fellow, November 18, 1955; Council, 1961-1964.

Discussions:

A Study of the Size of an Assigned Risk Plan (Frank Harwayne), XLVIII, 194.

Actuarial Aspects of Industry Problems, XLIX, 104.

LIVINGSTON, GILBERT R., Librarian, 1954-1957.

Discussion:

Principles and Practices in Connection with Classification Rating Systems for Liability Insurance as Applied to Private Passenger Automobiles (Joseph M. Muir), XLV, 230.

LONGLEY-COOK, LAURENCE H., Council, 1955-1958; Vice President, 1959-1960; President, 1961-1962.

Presidential Addresses:

Actuarial Aspects of Industry Problems, XLIX, 104.

Address of the President, L, 82.

Papers:

The Employment of Property and Casualty Actuaries, XLV, 9.

The Negative Binomial Applied to the Canadian Merit Rating Plans for Individual Automobile Risks – Charles C. Hewitt, Jr. – XLVII, 55; Discussion, O. D. Dickerson, XLVIII, 186; Author's Review of Discussion, XLVIII, 189.

MICHELBACHER, G. F.

Paper:
The Multiple-Line Principle, XLII, 75; Discussion, L. H. Longley-Cook, XLIII, 216.

MILLER, JOHN H.

Seminar Report:
Premiums and Reserves on Non-Cancellable and Guaranteed Renewable A & S Policies, XLVII, 234.

MILLER, NICHOLAS F., JR., Associate, November 18, 1960; Fellow, November 1, 1963.

MILLS, JOHN A., Vice President 1953-1954.

MILLS, RICHARD J., Fellow, November 22, 1957.

MOHNBLATT, ARNOLD S., Associate, November 18, 1960.

MONTGOMERY, VICTOR, Obituary, XLVII, 247.

MOORE, GEORGE D., Obituary, XLVI, 357.

MORISON, GEORGE D., Associate, November 16, 1961; Fellow, November 15, 1962.

MOSELEY, JACK, Associate, November 19, 1959; Fellow, November 16, 1961.

MOSS, ROBERT G., Associate, November 16, 1961.

MUETTERTIES, JOHN H., Associate, November 18, 1955; Fellow, November 16, 1956.

Discussions:
Merit Rating in Private Passenger Automobile Liability Insurance and the California Driver Record Study (Frank Harwayne), XLVII, 160.

Actuarial Note: Fixed and Variable Expenses (Lewis H. Roberts), L, 3.

Book Review:
Multiple-Line Insurance (G. F. Michelbacher), XLIV, 114.

MUIR, JOSEPH M., Associate, November 22, 1957.

Paper:
Principles and Practices in Connection with Classification Rating Systems for Liability Insurance as Applied to Private Passenger Automobiles, XLIV, 19; Discussion, G. R. Livingston and T. O. Carlson, XLV, 230.

Panel Discussion:
Problems of Rating Organizations, XLIX, 187.

MULTIPLE PERIL INSURANCE

The Multiple-Line Principle – G. F. Michelbacher – XLII, 75; Discussion, L. H. Longley-Cook, XLIII, 216.

Multiple Peril Rating Problems – Some Statistical Considerations – Robert L. Hurley – XLVI, 196; Discussion, P. M. Otteson, XLVII, 166.

Commercial Package Policies – Rating and Statistics – Robert A. Bailey, Edward J. Hobbs, Frederic J. Hunt, Jr., and Ruth E. Salzmann – L, 87.

MUNIZ, ROBERT M., Associate, November 1, 1963.

Discussion:

Any Room Left for Skimming the Cream? (Robert A. Bailey), XLVII, 207.

MURRIN, THOMAS, E., Fellow, November 19, 1954; Council, 1958-1961; Vice President, 1961-1962; President, 1963.

Discussions:

Current Rate Making Procedures for Automobile Liability Insurance (Philipp K. Stern), XLIV, 92.

Coverage and Underwriting Aspects of Burglary Insurance (Walker S. Richardson and Richard J. Wolfrum), XLVIII, 190.

MYERS, ROBERT J., Fellow, November 19, 1959.

Paper:

OASDI Cost Estimates and Valuations, XLVI, 219; Discussion, W. Rulon Williamson, XLVII, 170; Author's Review of Discussion, XLVII, 181.

Current Note:

Report on the Fifty-Years Jubilee Meetings of the Norwegian Society of Actuaries and the Swedish Actuarial Society, XLI, 191.

Discussion:

Costs of Hospital Benefits for Retired Employees (Murray W. Latimer), XLVIII, 197.

Book Reviews:

Population Statistics and Their Compilation (Hugh H. Wolfenden), XLI, 184.

Social Insurance – Some Problems for Statistical Research (Lincoln H. Day, Editor), XLVIII, 236.

NELSON, DALE A., Associate, November 1, 1963.

NELSON, ROLAND E., Associate, November 16, 1961.

NELSON, S. TYLER, Fellow, November 1, 1963.

NILES, CHARLES L., JR., Associate, November 22, 1957; Fellow, November 14, 1958.

Discussion:

Automobile Physical Damage Ratemaking (Luther L. Tarbell, Jr.), XLVII, 149.

NUCLEAR ENERGY HAZARD, LIABILITY INSURANCE FOR THE – Richard H. Butler – XLVI, 23; Discussion, J. P. Gibson, Jr., XLVI, 336.

OASDI COST ESTIMATES AND VALUATIONS – Robert J. Myers – XLVI, 219; Discussion, W. Rulon Williamson, XLVII, 170; Author's Review of Discussion, XLVII, 181.

OBITUARIES

Acker, Milton, XLVII, 227.
Bailey, Arthur L., XLI, 193.
Black, Nellas C., L, 156.
Blackhall, John M., XLIV, 118.
Brunnquell, Helmuth G., XLV, 276.
Buck, George Burton, XLVIII, 239.
Buffler, Louis, L, 156.
Burhop, William H., L, 157.
Cammack, Edmund Ernest, XLV, 277.

Seminar Report:
  Reinsurance, XLVIII, 211.

PANEL DISCUSSIONS

  Ratemaking and Pricing in the Marketplace – Harold E. Curry – XLIX, 184.

  Problems of Rating Organizations – Joseph M. Muir – XLIX, 187.

  Multiple Peril Ratemaking and Statistical Problems – Seymour E. Smith – XLIX, 191.

  An Analysis of the Adequacy of the Various Factors and Rating Values Used in Retrospective Rating – James I. Boyle, James F. Brannigan, Stephen S. Makgill, and Donald E. Trudeau – L, 32.

PARLIN, R. WILLIS, Associate, November 18, 1960; Fellow, November 15, 1962.

PEEL, JERALD P., Associate, November 16, 1961.

PENNYCOOK, RODERICK B., Fellow, November 18, 1960.

PERKINS. WILLIAM J., Fellow, November 22, 1957.

PERRYMAN, FRANCIS SPENCER

  Discussion:
  Compulsory Automobile Insurance in Europe (Frank Astill), XLVI, 334.
  Obituary, XLVII, 248.

PHILLIPS, HERBERT J., JR., Associate, November 16. 1956; Fellow, November 19, 1959.

PHILLIPS, JESSE SNYDER, Obituary, XLI, 196.

PINNEY, ALLEN D., Associate, November 16, 1956; Fellow, November 22, 1957.
  Discussions:
  Canadian Merit Rating Plan for Individual Automobile Risks (Herbert E. Wittick), XLVI, 331.
  Costs of Hospital Benefits for Retired Employees (Murray W. Latimer), XLVIII, 195.
  Comprehensive Medical Insurance – Statistical Analysis for Ratemaking (John R. Bevan), L, 131.

POLLACK, ROBERT, Associate, November 14, 1958; Fellow, November 19, 1959.
  Discussion:
  Rating by Layer of Insurance (Ruth E. Salzmann), L, 30.

PORTERMAIN, NEILL W., Associate, November 15, 1962.

PRESIDENTIAL ADDRESSES

  Smith, Seymour E.
    Expanding Requirements for Actuarial Education, XLI, 1.
    On Our Fortieth Anniversary, XLI, 5.
    Some Random Comments on Electronics, XLII, 1.
    The Contribution of Our Society, XLII, 70.

  Masterson, Norton E.
    Insurance Language Problems, XLIII, 1.
    The Actuary's Niche, XLIII, 100.

Lessons From Adversity, XLIV, 1.

Professional Responsibilities of the Members of the Casualty Actuarial Society, XLIV, 6.

Pruitt, Dudley M.
The Seat of Wisdom, XLV, 11.

St. Vitus's Dance, XLVI, 149.

Leslie, William, Jr.
Address of the President, XLVII, 25.

Address of the President, XLVIII, 54.

Longley-Cook, Laurence H.
Actuarial Aspects of Industry Problems, XLIX, 104.

Address of the President, L, 82.

PROPERTY INSURANCE, NOTES ON SOME ACTUARIAL PROBLEMS OF – Laurence H. Longley-Cook – XLVI, 66; Discussion, F. W. Doremus, XLVI, 339.

PRUITT, DUDLEY M., Vice President, 1953-1954; President, 1957-1958.

Presidential Addresses:
The Seat of Wisdom, XLV, 11.

St. Vitus's Dance, XLVI, 149.

Book Review:
How to Lie with Statistics (Darrell Huff), XLI, 186.

RATEMAKING

Accident and Health Insurance:
Group Accident and Health Therapeutic Benefits – Measurement of Loss Costs for Rate Making Purposes – Paul M. Otteson – XLI, 116; Discussion, Harold F. LaCroix, XLII, 237.

Notes on Noncancellable Health and Accident Ratemaking – Alfred V. Fairbanks – XLII, 89; Discussion, W. V. B. Hart, XLIII, 206; S. W. Gingery, XLIII, 208.

Automobile Insurance (See also Automobile, Merit Rating)
Compulsory Automobile Insurance Rate Making in Massachusetts – Milton G. McDonald – XLII, 19; Discussion, L. W. Scammon, XLII, 258.

Current Rate Making Procedures for Automobile Liability Insurance – Philipp K. Stern – XLIII, 112; Discussion, T. E. Murrin, XLIV, 92; E. T. Berkeley, XLIV, 95.

A Uniform Statistical Plan and Rate Filing Procedure for Private Passenger Automobile Insurance – Stanley C. DuRose, Jr. – XLV, 41; Discussion, C. H. Graves, XLVI, 305.

Automobile Bodily Injury Liability Rate-Making on a Prospective Basis – J. Edward Faust, Jr., – XLIV, 11; Discussion, R. J. Wolfrum, XLV, 221; Author's Review of Discussion, XLV, 227.

Principles and Practices in Connection with Classification Rating Systems for Liability Insurance as Applied to Private Passenger Automobiles – Joseph M. Muir – XLIV, 19; Discussion, G. R. Livingston and T. O. Carlson, XLV, 230.

Auto B. I. Liability Rates – Use of 10/20 Experience in the Establishment of Territorial Relativities – Martin Bondy – XLV, 1; Discussion, LeRoy J. Simon, XLV, 240; R. L. Bornhuetter, XLVI, 300.

REPORTS

ASTIN Colloquium, Rättvik, Sweden, June 1961 – Norton E. Masterson – XLVIII, 226.

An Introduction to Credibility Theory – Laurence H. Longley-Cook, XLIX, 194.

RESERVES

Reserves for Reopened Claims on Workmen's Compensation – Rafal J. Balcarek – XLVIII, 1; Discussion, R. E. Salzmann, XLVIII, 192.

Month of Loss Deficiency Reserves for Automobile Bodily Injury Losses Including Reserves for Incurred But Not Reported Claims – David A. Tapley – XLIII, 166; Discussion, N. M. Valerius, XLIV, 97; L. J. Simon, XLIV, 100; Author's Review of Discussion, XLIV, 110.

RESONY, ALLIE V., Fellow, November 18, 1955.

RESONY, JOHN A., Council, 1956-1959.

Discussion:
Observations on State Taxation of Casualty and Fire Insurance Companies (Edward C. Andrews), XLIII, 212.

Book Review:
Voluntary Health Insurance and Rate Making (Duncan M. MacIntyre), L, 154.

RICCARDO, JOSEPH F., JR., Associate, November 18, 1960.

RICHARDS, HARRY R., Associate, November 18, 1960; Fellow, November 1, 1963.

RICHARDSON, FREDERICK, Obituary, XLII, 269.

RICHARDSON, WALKER S.

Paper:
Coverage and Underwriting Aspects of Burglary Insurance (with Richard J. Wolfrum), XLVII, 87; Discussion, T. E. Murrin, XLVIII, 190.

RICHTER, OTTO C., Obituary, XLVIII, 242.

RIDDLESWORTH, WILLIAM A., Associate, November 16, 1961; Fellow, November 1, 1963.

RIPANDELLI, JOHN S., Associate, November 18, 1960.

ROBERTS, LEWIS H., Associate, November 16, 1956; Fellow, November 14, 1958.

Papers:
Graduation of Excess Ratio Distributions by the Method of Moments, XLIV, 45; Discussion, L. H. Longley-Cook, XLV, 232.

Credibility of 10/20 Experience as Compared with 5/10 Experience, XLVI, 235; Discussion, M. Bondy, XLVII, 184.

Actuarial Note: Fixed and Variable Expenses, L, 1; Discussion, Paul S. Liscord, L, 2; John H. Muetterties, L, 3.

Discussions:
Estimating Ultimate Incurred Losses in Auto Liability Insurance (Frank Harwayne), XLVI, 312.

Two Studies in Automobile Insurance Ratemaking (Robert A. Bailey and LeRoy J. Simon), XLVII, 200.

Any Room Left for Skimming the Cream? (Robert A. Bailey), XLVII, 213.

The Problem of Substandard Automobile Risks – F. Harwayne – XLVIII, 218.

Analyzing Annual Statements and Expense Exhibits of Other Companies – Robert G. Espie – XLIX, 63.

Rating of Excess Coverages – Matthew Rodermund – XLIX, 64.

Package Policy Ratemaking – Edward S. Allen – XLIX, 66.

How Can Actuarial Analyses Help Company Claim Departments Control Average Claim Costs? – Martin Bondy – XLIX, 67.

SHAVER, C. OTIS, Associate, November 22, 1957.

Paper:

Revision of Rates Applicable to a Class of Property Fire Insurance, XLIV, 63; Discussion, R. M. Beckwith, XLV, 233.

SIBLEY, JOHN L., Obituary, XLIV, 122.

SIMON, LEROY J., Fellow, November 19, 1954; Council, 1960-1963.

Papers:

Rate Revision Adjustment Factors, XLV, 196; Discussion, R. L. Hurley, XLVI, 327; Author's Review of Discussion, XLVI, 329.

An Actuarial Note on the Credibility of Experience of a Single Private Passenger Car (with Robert A. Bailey), XLVI, 159; Discussion, W. J. Hazam, XLVII, 150.

Two Studies in Automobile Insurance Ratemaking (with Robert A. Bailey), XLVII, 1; Discussion, L. H. Roberts, XLVII, 200; D. B. Martin, XLVII, 203.

The Negative Binomial and Poisson Distributions Compared, XLVII, 20.

Fitting Negative Binomial Distributions by the Method of Maximum Likelihood, XLVIII, 45; Discussion, M. Bondy, XLVIII, 202.

An Introduction to the Negative Binomial Distribution and its Applications, XLIX, 1; Discussion, L. B. Dropkin, XLIX, 9; L. H. Roberts, XLIX, 10.

Size, Strength and Profit, XLIX, 41; Discussion, R. A. Bailey, XLIX, 49; C. H. Graves, XLIX, 51; C. C. Hewitt, Jr., XLIX, 52; Author's Review of Discussion, XLIX, 54.

Discussions:

Month of Loss Deficiency Reserves for Automobile Bodily Injury Losses Including Reserves for Incurred But Not Reported Claims (David A. Tapley), XLIV, 100.

Auto B. I. Liability Rates – Use of 10/20 Experience in the Establishment of Territorial Relativities (Martin Bondy), XLV, 240.

Any Room Left for Skimming the Cream? (Robert A. Bailey), XLVII, 211.

Seminar Report:

Rate Making for Package Policies, XLVIII, 204.

Book Reviews:

Transition to Multiple-Line Insurance Companies (David Lynn Bickelhaupt) XLVIII, 237

The Lognormal Distribution (J. Aitchison and J. A. C. Brown), XLIX, 233.

SIMONEAU, PAUL W., Associate, November 14, 1958; Fellow, November 18, 1960.

SINGER, PAUL E., Associate, November 1, 1963.

SIZE, STRENGTH AND PROFIT – LeRoy J. Simon – XLIX, 41; Discussion, R. A. Bailey, XLIX, 49; C. H. Graves, XLIX, 51; C. C. Hewitt, Jr., XLIX, 52; Author's Review of Discussion, XLIX, 54.

SKELDING, ALBERT Z., Secretary-Treasurer, 1954-1963.

SMICK, J. J.
   Discussions:
      Workmen's Compensation Insurance Ratemaking (Ralph M. Marshall), XLII, 251.

      Commutation Functions for Individual Policies Providing for Hospital, Surgical and Medical Care Benefits after Retirement (Henry W. Steinhaus), XLVII, 185.
   Book Review:
      Insurance Accounting – Fire and Casualty (Insurance Accounting and Statistical Association), XLI, 187.

SMITH, ARTHUR G., Obituary, XLIII, 229.

SMITH, EDWARD M., Associate, November 16, 1956; Fellow, November 14, 1958.

SMITH, EDWARD R., Associate, November 15, 1962.

SMITH, SEYMOUR E., President, 1953-1954.
   Presidential Addresses:
      Expanding Requirements for Actuarial Education, XLI, 1.

      On Our Fortieth Anniversary, XLI, 5.

      Some Random Comments on Electronics, XLII, 1.

      The Contribution of Our Society, XLII, 70.
   Discussion:
      Observation on the Latest Reported Stock Insurance Company Expenses for 1960 (Frank Harwayne), XLIX, 79.
   Panel Discussion:
      Multiple Peril Ratemaking and Statistical Problems, XLIX, 191.

STALEY, HARLOW B., Associate, November 1, 1963.

STANKUS, LEO M., Associate, November 14, 1958; Fellow, November 15, 1962.
   Seminar Report:
      Guaranteed Renewable Automobile Insurance, XLVII, 240.

STATISTICAL PLANS
      Statistics of the National Board of Fire Underwriters – J. H. Finnegan – XLIII, 82; Discussion, Clyde H. Graves, XLIII, 224.

      A Uniform Statistical Plan and Integrated Rate Filing Procedure for Private Passenger Automobile Insurance – Stanley C. DuRose, Jr. – XLV, 41; Discussion, C. H. Graves, XLVI, 305.

STEINHAUS, HENRY W., Associate, November 19, 1959.
   Paper:
      Commutation Functions for Individual Policies Providing for Hospital, Surgical and Medical Care Benefits after Retirement, XLVI, 251; Discussion, J. J. Smick, XLVII, 185; M. Kormes, XLVII, 187.

WILSON, JAMES C., Associate. November 18, 1955; Fellow, November 16, 1961.

WITTICK, HERBERT E.

Paper:

The Canadian Merit Rating Plan for Individual Automobile Risks, XLV, 214; Discussion, A. D. Pinney, XLVI, 331.

WOLFRUM, RICHARD J., Council, 1958-1961; Vice President, 1961-1962.

Paper:

Coverage and Underwriting Aspects of Burglary Insurance (with Walker S. Richardson), XLVII, 87; Discussion, T. E. Murrin, XLVIII, 190.

Discussion:

Automobile Bodily Injury Liability Rate-Making on a Prospective Basis (J. Edward Faust, Jr.), XLV, 221.

Seminar Report:

Modern Systems of Expense Control, XLV, 263.

WOODMAN, CHARLES E., Obituary, XLIII, 231.

WOODWORTH, JAMES H., Associate, November 16, 1956.

WORKMEN'S COMPENSATION INSURANCE

Workmen's Compensation Insurance Ratemaking – Ralph M. Marshall – XLI, 12; Discussion, J. J. Smick, XLII, 251; Author's Review of Discussion, XLII, 253.

Standard Provisions for Workmen's Compensation and Employers' Liability Policies – Randall C. Kean – XLI, 85.

The "Workmen's Compensation Injury Table" and "Standard Wage Distribution Table" – Their Development and Use in Workmen's Compensation Insurance Ratemaking – Barney Fratello – XLII, 110; Discussion, L. W. Scammon, XLIII, 199; J. H. Boyajian, XLIII, 202.

A Review and Comparison of Workmen's Compensation Experience in New York State and Wisconsin – Frank Harwayne – XLIII, 8; Discussion, W. W. Greene, XLIV, 84; D. R. Uhthoff, XLIII, 219.

The Rate Level Adjustment Factor in Workmen's Compensation Ratemaking – Martin Bondy – XLIII, 106; Discussion, M. G. McDonald, XLIV, 86; G. B. Elliott, XLIV, 86.

A Review of the Experience of Massachusetts Workmen's Compensation Experience Rated Risks – Waldo A. Stevens – XLVI, 87; Discussion, M. G. McDonald, XLVI, 348; R. P. Goddard, XLVII, 147.

The Compensation Experience Rating Plan – A Current Review – Dunbar R. Uhthoff – XLVI, 285; Discussion, R. M. Marshall, XLVII, 191; R. A. Johnson, XLVII, 198; E. S. Allen, XLVII, 200.

A New Approach to Infant and Juvenile Mortality – Charles C. Hewitt – XLVII, 41; Discussion, A. L. Mayerson, XLVII, 215.

Reserves for Reopened Claims on Workmen's Compensation – Rafal J. Balcarek – XLVIII, 1; Discussion, R. E. Salzmann, XLVIII, 192.

WRIGHT, BYRON, Associate, November 19, 1954; Fellow, November 14, 1958.

YOUNG, ROBERT G., Associate, May 5, 1961.

ZORY, PETER B., Associate, November 1, 1963.

OFFICERS

Year Elected	President	Vice-President	Secretary-Treasurer	Editor	Librarian	Gen'l Chairman-Exam. Committee
1954	Smith, S.E.	Pruitt Mills	Skelding	Maycrink	Livingston	Wieder
1955	Masterson	Kulp Matthews	Skelding	Allen	Livingston	Wieder
1956	Masterson	Kulp Matthews	Skelding	Allen	Livingston	Wieder
1957	Pruitt	Carleton Leslie, Jr.	Skelding	Allen	Livingston	Hazam
1958	Pruitt	Carleton Leslie, Jr.	Skelding	Allen	Lino	Hazam
1959	Leslie, Jr.	Berkeley Longley-Cook	Skelding	Goddard	Lino	Hazam
1960	Leslie, Jr.	Berkeley Longley-Cook	Skelding	Goddard	Lino	Hazam
1961	Longley-Cook	Murrin Wolfrum	Skelding	Schloss	Lino	Hazam
1962	Longley-Cook	Murrin Wolfrum	Skelding	Schloss	Lino	Bennett
1963	Murrin	Curry, H.E. Hazam	Skelding	Schloss	Lino	Bennett

COUNCIL

ELECTED MEMBERS

1954	1955	1956	1957	1958
Johnson	Uhthoff	Graves	Goddard	Berkeley
Matthews	Valerius	Leslie, Jr.	Elliott	Hazam
McConnell	Williams, H.V.	Schloss	Longley-Cook	Resony, J.A.
Uhthoff	Graves	Goddard	Berkeley	Hughey
Valerius	Leslie, Jr.	Elliott	Hazam	Rodermund
Williams, H.V.	Schloss	Longley-Cook	Resony, J.A.	Wieder
Graves	Goddard	Berkeley	Hughey	Hope
Leslie, Jr.	Elliott	Hazam	Rodermund	Murrin
Schloss	Longley-Cook	Resony, J.A.	Wieder	Wolfrum

1959	1960	1961	1962	1963
Hughey	Hope	Bennett	Curry, H.E.	Hurley
Rodermund	Murrin	Bevan	Harwayne	Kallop
Wieder	Wolfrum	Johe	Simon	Liscord
Hope	Bennett	Curry, H.E.	Hurley	Bailey, R.A.
Murrin	Bevan	Harwayne	Kallop	Bondy
Wolfrum	Johe	Simon	Liscord	Hewitt
Bennett	Curry, H.E.	Hurley	Bailey, R.A.	Bornhuetter
Bevan	Harwayne	Kallop	Bondy	Otteson
Johe	Simon	Liscord	Hewitt	Williams, P.A.

COMMITTEE ON ADMISSIONS

APPOINTED	CHAIRMAN	MEMBERS			
1954	Cahill	Barber	Ginsburgh	Masterson	Perryman
1955	Cahill	Barber	Ginsburgh	Pruitt	Smith, S.E.
1956	Cahill	Barber	Ginsburgh	Pruitt	Smith, S.E.
1957	Cahill	Barber	Ginsburgh	Masterson	Smith, S.E.
1958	Cahill	Barber	Ginsburgh	Masterson	Smith, S.E.
1959	Cahill	Barber	Ginsburgh	Masterson	Smith, S.E.
1960	Cahill	Barber	Ginsburgh	Masterson	Smith, S.E.
1961	Cahill	Barber	Masterson	Smith, S.E.	
1962	Masterson	Carlson	Leslie, Jr.	Smith, S.E.	
1963	Masterson	Carlson	Leslie, Jr.	Smith, S.E.	

AUDITING COMMITTEE

APPOINTED	CHAIRMAN	MEMBERS	
1954	Crane	Allen	Matthews
1955	Crane	Maycrink	Rodermund
1956	Crane	Maycrink	Rodermund
1957	Crane	Maycrink	Rodermund
1958	Crane	Maycrink	Rodermund
1959	Crane	Maycrink	Rodermund
1960	Crane	Maycrink	Rodermund
1961	Crane	Maycrink	Rodermund
1962	Crane	Maycrink	Rodermund
1963	Crane	Fowler	Rodermund

EDITORIAL COMMITTEE

APPOINTED	CHAIRMAN	ASSISTANT EDITORS			
1954	Maycrink	Allen	Harwayne	Kulp	
1955	Allen	Harwayne	Resony, J.A.		
1956	Allen	Harwayne	Resony, J.A.	Wieder	
1957	Allen	Harwayne	Resony, J.A.	Wieder	
1958	Allen	Harwayne	Mayerson	Resony, J.A.	
1959	Goddard	Harwayne	Mayerson	Resony, J.A.	
1960	Goddard	Harwayne	Mayerson	Resony, J.A.	
1961	Schloss	Harwayne	Mayerson	Resony, J.A.	
1962	Schloss	Harwayne	Mayerson	Resony, J.A.	
1963	Schloss	Harwayne	Mayerson	Resony, J.A.	Tarbell

EDUCATIONAL COMMITTEE

APPOINTED	CHAIRMAN	MEMBERS							
1954	Berkeley	Carleton	Kulp	Longley-Cook	Wieder				
1955	Berkeley	Carleton	Kulp	Longley-Cook	Wieder				
1956	Berkeley	Carleton	Kulp	Longley-Cook	Wieder				
1957	Longley-Cook	Carleton	Hazam	Salzmann	Wieder				
1958	Longley-Cook	Carleton	Hazam	Salzmann	Wieder				
1959	Longley-Cook	Bennett	Hazam	Lino	Salzmann	Wieder	Williams, P.A.		
1960	Longley-Cook	Bennett	Hazam	Lino	Salzmann	Wieder	Williams, P.A.		
1961	Wieder	Bennett	Gillam	Harwayne	Hazam	Johe	Lino	Salzmann	Williams, P.A.
1962	Wieder	Bennett	Gillam	Harwayne	Hazam	Johe	Lino	Salzmann	Williams, P.A.
1963	Wieder	Bennett	Gillam	Harwayne	Hazam	Johe	Lino	Salzmann	Williams, P.A.

EXAMINATION COMMITTEE

		ASSISTANT	FELLOWSHIP			ASSOCIATESHIP		
APPOINTED	GENERAL CHAIRMAN	GENERAL CHAIRMAN	CHAIRMAN	MEMBERS		CHAIRMAN	MEMBERS	
1954	Wieder		Resony, J.A.	Wolfrum Hope	Barker Hazam	Petz	Murrin Bevan	Hewitt Trist
1955	Wieder		Hazam	Hope Murrin	Petz Hewitt	Bevan	Trist Menzel	Johe Resony, A.V.
1956	Wieder	Hazam	Hewitt	Petz Bevan	Murrin Bennett	Johe	Menzel Bailey, R.A.	Resony, A.V. Liscord
1957	Hazam		Murrin	Bevan Johe	Bennett Resony, A.V.	Menzel	Bailey, R.A. Bondy	Liscord Kallop
1958	Hazam		Bennett	Bailey, R.A. Kallop	Johe Menzel	Liscord	Bondy Bornhuetter	Hurley Williams, P.A.
1959	Hazam		Bailey, R.A.	Kallop Hurley	Menzel Liscord	Bondy	Bornhuetter Mills	Williams, P.A. Niles
1960	Hazam		Kallop	Hurley Bondy	Liscord Bornhuetter	Williams, P.A.	Mills Byrne	Niles Dropkin
1961	Hazam		Hurley	Bondy Mills	Bornhuetter Williams, P.A.	Niles	Byrne Blodget	Dropkin Pollack
1962	Bennett		Bornhuetter	Mills Hunt	Williams, P.A. Niles	Byrne	Blodget Dropkin	Pollack Klaassen
1963	Bennett		Mills	Byrne Pollack	Hunt Moseley	Blodget	Balcarek Meenaghan	Boyle Klaassen

COMMITTEE ON DEVELOPMENT OF PAPERS

APPOINTED	CHAIRMAN	MEMBERS			
1954	Williams, H.V.	Allen	Harwayne	Wolfrum	
1955	Williams, H.V.	Edwards	Elliott	Johnson	Wolfrum
1956	Williams, H.V.	Edwards	Elliott	Johnson	Wolfrum
1957	Wolfrum	Edwards	Elliott	Hope	Johnson
1958	Wolfrum	Edwards	Elliott	Hope	Johnson
1959	Wolfrum	Elliott	Hope	Hughey	Murrin
1960	Wolfrum	Elliott	Hope	Hughey	Murrin
1961	Wolfrum	Elliott	Hope	Hughey	Murrin
1962	Elliott	Hope	Hughey	Johnson	
1963	Elliott	Hope	Hughey	Johnson	

COMMITTEE ON REVIEW OF PAPERS

APPOINTED	CHAIRMAN	MEMBERS		EDITOR EX OFFICIO
1954	Goddard	McConnell	Rodermund	Maycrink
1955	Goddard	McConnell	Rodermund	Allen
1956	Goddard	McConnell	Rodermund	Allen
1957	McConnell	Rodermund	Simon	Allen
1958	McConnell	Rodermund	Simon	Allen
1959	Rodermund	Roberts	Simon	Goddard
1960	Rodermund	Roberts	Simon	Goddard
1961	Rodermund	Roberts	Simon	Schloss
1962	Rodermund	Roberts	Simon	Schloss
1963	Rodermund	Roberts	Simon	Schloss

COMMITTEE ON FINANCES

Appointed	Chairman	Members					Member Ex Officio
1959	Bennett	Carleton	Hughey	Linder	Longley-Cook	Schloss	Leslie, Jr.
1960	Bennett	Carleton	Hughey	Linder	Longley-Cook	Schloss	Leslie, Jr.
1961	Bennett	Carleton	Hughey	Leslie, Jr.	Linder	Schloss	Longley-Cook

COMMITTEE ON INFORMAL PUBLICATION

Appointed	Chairman	Assistant Editors		
1954	Graves	Longley-Cook	Rowell	Salzmann
1955	Graves	Longley-Cook	Rowell	Salzmann
1956	Graves	Longley-Cook	Rowell	Salzmann

COMMITTEE ON PROGRAM

Appointed	Chairman	Members		
1954	Smith, S.E.	Mills	Pruitt	Skelding
1955	Masterson	Kulp	Matthews	Skelding
1956	Masterson	Kulp	Matthews	Skelding
1957	Pruitt	Carleton	Leslie, Jr.	Skelding
1958	Pruitt	Carleton	Leslie, Jr.	Skelding
1959	Leslie, Jr.	Berkeley	Longley-Cook	Skelding
1960	Leslie, Jr.	Berkeley	Longley-Cook	Skelding
1961	Longley-Cook	Murrin	Wolfrum	Skelding
1962	Longley-Cook	Murrin	Wolfrum	Skelding
1963	Murrin	Curry, H.E.	Hazam	Skelding

COMMITTEE ON PUBLICATIONS

APPOINTED	CHAIRMAN	MEMBERS			
1954	Smith, S.E.	Graham	Graves	Maycrink	Skelding
1955	Masterson	Allen	Graham	Graves	Skelding
1956	Masterson	Allen	Graham	Graves	Skelding
1957	Pruitt	Allen	Berkeley	Graves	Skelding
1958	Pruitt	Allen	Berkeley	Graves	Skelding

PUBLICITY COMMITTEE

APPOINTED	CHAIRMAN	MEMBERS				
1954	Leslie, Jr.	Berkeley	Hughey	Kuenkler	LaCroix	McConnell
1955	Leslie, Jr.	Barker	Hughey	LaCroix	McConnell	Wittick
1956	Leslie, Jr.	Barker	Hughey	LaCroix	McConnell	Wittick
1957	Murrin	Barker	Hughey	LaCroix	McConnell	Wittick
1958	Murrin	Barker	Hughey	LaCroix	McConnell	Wittick
1959	Murrin	Barker	Hughey	LaCroix	McConnell	Wittick
1960	Murrin	Barker	Hughey	LaCroix	McConnell	Wittick
1961	Murrin	Barker	Hughey	LaCroix	McConnell	Wittick
1962	Gillam	Barker	Hughey	LaCroix	McConnell	Wittick
1963	Gillam	Barker	Hughey	LaCroix	McConnell	Wittick

SPECIAL COMMITTEES

COMMITTEE ON CERTIFICATION OR LICENSING OF ACTUARIES

APPOINTED	CHAIRMAN	MEMBERS			
1958	Masterson	Linder	Longley-Cook	McDonald	Woodward
1959	Masterson	Linder	Longley-Cook	McDonald	Woodward

COMMITTEE ON LOSS AND LOSS EXPENSE RESERVES

APPOINTED	CHAIRMAN	MEMBERS				
1954	Linder	Barber	Carleton	Masterson	Mills	Skillings
1955	Linder	Barber	Carleton	Kuenkler	Mills	Skillings
1956	Linder	Barber	Carleton	Kuenkler	Mills	Skillings
1957	Linder	Barber	Carleton	Kuenkler	Mills	Skillings
1958	Linder	Barber	Carleton	Kuenkler	Mills	Skillings
1959	Linder	Barber	Carleton	Kuenkler	Mills	Skillings
1960	Linder	Barber	Carleton	Kuenkler	Mills	Skillings
1961	Linder	Barber	Carleton	Kuenkler	Mills	Skillings

COMMITTEE ON MEMBERSHIP

APPOINTED	CHAIRMAN	MEMBERS				
1954	Cahill	Barber	Carlson	Ginsburgh	Masterson	Mills	Perryman
1955	Cahill	Barber	Carlson	Ginsburgh	Mills	Perryman	Pruitt
1956	Cahill	Barber	Carlson	Ginsburgh	Mills	Perryman	Pruitt
1957	Cahill	Barber	Carlson	Ginsburgh	Masterson	Mills	Perryman

COMMITTEE ON MORTALITY OF DISABLED LIVES

APPOINTED	CHAIRMAN	MEMBERS					
1955	Matthews	Allen	Bevan	Harwayne	Marshall	Skelding	Valerius
1956	Matthews	Allen	Bevan	Harwayne	Marshall	Skelding	Valerius
1957	Matthews	Allen	Bevan	Harwayne	Marshall	Skelding	Valerius

COMMITTEE ON PROFESSIONAL STATUS

APPOINTED	CHAIRMAN	MEMBERS			
1960	Linder	Cahill	Graves	Longley-Cook	
1961	Linder	Cahill	Graves	Leslie, Jr.	
1962	Linder	Cahill	Graves	Leslie, Jr.	
1963	Linder	Berkeley	Graves	Leslie, Jr.	Longley-Cook

COMMITTEE ON RULES AND STANDARDS OF PROFESSIONAL CONDUCT

APPOINTED	CHAIRMAN	MEMBERS			
1957	Masterson	Linder	Longley-Cook	McDonald	Woodward
1958	Masterson	Linder	Longley-Cook	McDonald	Woodward

COMMITTEE ON SOCIAL INSURANCE

APPOINTED	CHAIRMAN	MEMBERS					
1954	Ginsburgh	Farley	Kirkpatrick	Kulp	Leslie, Jr.	Williamson	
1955	Ginsburgh	Blanchard	Farley	Kirkpatrick	Kulp	Williamson	Yount
1956	Ginsburgh	Blanchard	Farley	Kirkpatrick	Kulp	Williamson	Yount
1957	Ginsburgh	Blanchard	Farley	Linder	Williamson	Yount	
1958	Ginsburgh	Blanchard	Farley	Linder	Williamson	Yount	
1959	Myers	Blanchard	Farley	Linder	Williamson	Yount	
1960	Myers	Blanchard	Farley	Linder	Williamson	Yount	
1961	Myers	Blanchard	Farley	Linder	Williamson	Yount	
1962	Myers	Blanchard	Farley	Linder	Williamson	Yount	
1963	Myers	Blanchard	Farley	Linder	Williamson	Yount	

RESEARCH COMMITTEES

RESEARCH COMMITTEE

APPOINTED	CHAIRMAN	MEMBERS							
1954	Carlson	Brown	Doremus	Hughey	Leslie, Jr.	Uhthoff	Williams, H.V.	Wolfrum	
1955	Curry, H.E.	Bevan	Brown	Doremus	Foster	Hughey	Hurley	Munterich	Uhthoff
1956	Curry, H.E.	Bevan	Brown	Doremus	Foster	Hughey	Hurley	Munterich	Uhthoff
1957	Curry, H.E.	Bevan	Brown	Doremus	Foster	Hughey	Hurley	Munterich	Uhthoff
1958	Curry, H.E.	Bevan	Brown	Doremus	Foster	Hughey	Hurley	Munterich	Uhthoff
1959	Curry, H.E.	Bevan	Doremus	Foster	Hughey	Hurley	Munterich	Uhthoff	
1960	Curry, H.E.	Bevan	Doremus	Foster	Hughey	Hurley	Munterich	Uhthoff	
1961	Curry, H.E.	Bevan	Doremus	Foster	Hughey	Hurley	Munterich	Uhthoff	

RESEARCH ADVISORY COMMITTEE

APPOINTED	CHAIRMAN
1962	Smith, S.E.
1963	Smith, S.E.

COMMITTEE ON ANNUAL STATEMENT

APPOINTED	CHAIRMAN	MEMBERS							
1962	Linder	Carleton	Crane	Espie	Graves	Hewitt	Lino	Salzmann	Schloss
1963	Linder	Carleton	Crane	Espie	Graves	Hewitt	Lino	Salzmann	Schloss

COMMITTEE ON AUTOMOBILE RESEARCH

APPOINTED	CHAIRMAN
1962	Curry, H.E.
1963	Curry, H.E.

COMMITTEE ON DISTRIBUTION OF LOSSES

APPOINTED	CHAIRMAN	MEMBERS						
1962	Rodermund	Berquist	Fowler	Greene, T.A.	Muetterties	Otteson	Roberts	Salzmann
1963	Rodermund	Berquist	Fowler	Greene, T.A.	Muetterties	Otteson	Roberts	Salzmann

COMMITTEE ON MATHEMATICAL THEORY OF RISK

APPOINTED	CHAIRMAN	MEMBERS							
1961	Hewitt	Berquist	Dickerson	Dropkin	Makgill	McIntosh	Roberts	Simon	
1962	Hewitt	Berquist	Carlson	Dickerson	Dropkin	Makgill	McIntosh	Roberts	Simon
1963	Hewitt	Berquist	Carlson	Dickerson	Dropkin	Makgill	McIntosh	Roberts	Simon

CASUALTY

ACTUARIAL SOCIETY

ORGANIZED 1914

1964 YEAR BOOK

Corrected to December 1, 1963

FOREWORD

The Casualty Actuarial Society was organized in 1914 as the Casualty Actuarial and Statistical Society of America, with 97 charter members of the grade of Fellow; the Society adopted its present title on May 14, 1921.

The roots of actuarial science are found in England, dating back as far as 1792, in the early days of life insurance. Due to the technical nature of the business, the first actuaries were mathematicians and eventually the growth of their numbers resulted in the formation of the Institute of Actuaries in Great Britain in 1848. A similar organization, the Faculty of Actuaries, was founded in Scotland in 1856. This was followed in the United States by the Actuarial Society of America in 1889 and the American Institute of Actuaries in 1909. These two actuarial bodies were merged in 1949 to form the Society of Actuaries.

In the meantime, problems requiring actuarial treatment were emerging in sickness, disability and casualty insurance, particularly workmen's compensation which began in 1911. These problems were quite different from life insurance and led to the organization of the Casualty Actuarial Society in 1914 which was brought about through the suggestion of Dr. I. M. Rubinow who became the first president. Since the problems surrounding workmen's compensation were at that time the most urgent, many of the members played a leading part in the development of the scientific basis upon which workmen's compensation insurance now rests. The object of the Society was, and is, the promotion of actuarial and statistical science as applied to the problems of insurance other than life insurance by means of personal intercourse, the presentation and discussion of appropriate papers, the collection of a library and such other means as may be found desirable.

From its beginning the Society has grown constantly in membership, in the scope of its interests and in its contributions to the formulation of scientific standards for the computation of rates and reserves for the many lines of business in the non-life field. These contributions are found in the original papers prepared by members of the Society and printed in the *Proceedings* which are published annually. Other papers deal with acquisition costs, pension funds, legal decisions, investments, claims, reinsurance, accounting, statutory requirements, loss reserves, statistics, and the examination of insurance companies. The presidential addresses constitute a valuable record of the actuarial problems, some of them still unsolved, which have faced the insurance industry over the years.

At the November 1950 meeting of the Society, the Constitution and By-Laws were amended to enlarge the scope of the Society to include all lines of insurance other than life insurance. The effect of the amendment was to include fire and allied lines insurance, in recognition of the multiple line power granted by many states to both casualty companies and fire companies.

The membership of the Society consists of actuaries who are employed by insurance companies, ratemaking organizations, state insurance departments, and as independent consultants. The Society has two grades of membership comprised of Fellowship and Associateship. Examinations for these two classes of membership are held during the second or third week of May in various cities in the United States and Canada. In addition, the examination for Associateship, Part I, is held in November of each year.

On the inside, front cover of the *Year Book* are listed the Proceedings and other publications of the Society and the prices thereof. The *Year Book* is published annually. *Recommendations for Study* is a pamphlet which outlines the course of study to be followed for admission. These two booklets may be obtained free upon application to the Secretary-Treasurer, Albert Z. Skelding, 200 E. 42nd Street, New York, N. Y. 10017.

CASUALTY ACTUARIAL SOCIETY

NOVEMBER 1, 1963

THE COUNCIL

Officers:

THOMAS E. MURRIN	....*President*
HAROLD E. CURRY	..................................*Vice President*
WILLIAM J. HAZAM	................................*Vice President*
ALBERT Z. SKELDING	...........................*Secretary-Treasurer*
HAROLD W. SCHLOSS	......................................*Editor*
RICHARD LINO	....*Librarian*
NORMAN J. BENNETT	........*General Chairman-Examination Committee*

†*Ex-Presidents:*

WILLIAM LESLIE, JR. 1965
LAURENCE H. LONGLEY-COOK 1967

†*Ex-Vice Presidents:*

ERNEST T. BERKELEY 1965
RICHARD J. WOLFRUM 1967

†*Elected:*

ROBERT L. HURLEY 1964
ROY H. KALLOP 1964
PAUL S. LISCORD 1964
ROBERT A. BAILEY 1965
MARTIN BONDY 1965
CHARLES C. HEWITT, JR. 1965
RONALD C. BORNHUETTER 1966
PAUL M. OTTESON 1966
P. ADGER WILLIAMS 1966

*Terms expire at the annual meeting in November 1964.
†Terms expire at the annual meeting in November of the year given.

COMMITTEE ON PROGRAM

THOMAS E. MURRIN (CHAIRMAN) *(ex officio)*
HAROLD E. CURRY *(ex officio)*
WILLIAM J. HAZAM *(ex officio)*
ALBERT Z. SKELDING *(ex officio)*

PUBLICITY COMMITTEE

WILLIAM S. GILLAM (CHAIRMAN)
LORING M. BARKER   HAROLD F. LaCROIX
M. STANLEY HUGHEY   MATTHEW H. McCONNELL
HERBERT E. WITTICK

SPECIAL COMMITTEES
COMMITTEE ON
PROFESSIONAL STATUS

JOSEPH LINDER (CHAIRMAN)
ERNEST T. BERKELEY   CLYDE H. GRAVES
WILLIAM LESLIE, JR.   LAURENCE LONGLEY-COOK

COMMITTEE ON SOCIAL INSURANCE

ROBERT J. MYERS (CHAIRMAN)
RALPH H. BLANCHARD   JOSEPH LINDER
JARVIS FARLEY   W. RULON WILLIAMSON
HUBERT W. YOUNT

RESEARCH COMMITTEES
RESEARCH ADVISORY COMMITTEE

SEYMOUR E. SMITH (CHAIRMAN)

COMMITTEE ON ANNUAL STATEMENT

JOSEPH LINDER (CHAIRMAN)
JOHN W. CARLETON   CHARLES C. HEWITT
HOWARD G. CRANE   RICHARD LINO
ROBERT G. ESPIE   RUTH E. SALZMANN
CLYDE H. GRAVES   HAROLD W. SCHLOSS

COMMITTEE ON
AUTOMOBILE RESEARCH

HAROLD E. CURRY (CHAIRMAN)

COMMITTEE ON
DISTRIBUTION OF LOSSES

MATTHEW RODERMUND (CHAIRMAN)
JAMES R. BERQUIST   JOHN H. MUETTERTIES
THOMAS W. FOWLER   PAUL M. OTTESON
THOMAS A. GREENE   LEWIS H. ROBERTS
RUTH E. SALZMANN

COMMITTEE ON
MATHEMATICAL THEORY OF RISK

CHARLES C. HEWITT, JR. (CHAIRMAN)
JAMES R. BERQUIST   STEPHEN S. MAKGILL
THOMAS O. CARLSON   KENNETH L. McINTOSH
O. D. DICKERSON   LEWIS H. ROBERTS
LESTER B. DROPKIN   LeROY J. SIMON

NOVEMBER 1, 1963

Those Marked (†) were Charter Members at date of organization, November 7, 1914

Admitted	
Nov. 21, 1930	AINLEY, JOHN W., (Retired), 33 Paxton Road, West Hartford, Conn. 06107
Nov. 14, 1947	ALLEN, EDWARD S., Actuary, The Phoenix of Hartford Insurance Companies, 61 Woodland Street, Hartford 15, Conn.
Nov. 13, 1931	AULT, GILBERT E., Actuary, Church Pension Fund & Church Life Insurance Corporation, 20 Exchange Place, New York 5, N. Y.
Nov. 18, 1955	BAILEY, ROBERT A., Vice President, Bank A Count Corporation, P. O. Box 246, Wisconsin Rapids, Wis. 54494
Nov. 15, 1962	BALCAREK, RAFAL J., Actuary, Reliance Insurance Company, 401 Walnut Street, Philadelphia, Pa. 19106
Nov. 20, 1924	BARBER, HARMON T., (Retired), 18 Ridgewood Road, Windsor, Conn.
Nov. 19, 1954	BARKER, GORDON M., Actuary, Great American Group, 99 John Street, New York, N. Y. 10038
Nov. 14, 1947	BARKER, LORING M., Actuary, Fireman's Fund American Insurance Companies, 3333 California Street, San Francisco, Calif. 94120
Nov. 20, 1942	BART, ROBERT D., Director of Industrial Relations and Assistant Treasurer, The West Bend Company, 400 W. Washington Street, West Bend, Wis. 53095
Nov. 18, 1932	BARTER, JOHN L., (Retired), 90 Tunxis Road, West Hartford 7, Conn.
Nov. 13, 1931	BATHO, ELGIN R., Vice President and Actuary, Berkshire Life Insurance Company, 700 South Street, Pittsfield, Mass. 01203
Nov. 14, 1958	BENBROOK, PAUL, Vice President, American General Insurance Company, 700 Rusk Bldg., Houston, Texas 77002
Nov. 16, 1956	BENNETT, NORMAN J., Actuary, Continental Insurance Companies, 80 Maiden Lane, New York, N. Y. 10038
Nov. 22, 1934	BERKELEY, ERNEST T., Actuary, Employers' Group of Insurance Companies, 110 Milk Street, Boston, Mass. 02107
Nov. 22, 1957	BERQUIST, JAMES R., Associate Actuary, Employers Mutuals of Wausau, 407 Grant Street, Wausau, Wis.
Nov. 19, 1953	BEVAN, JOHN R., Assistant Actuary, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 17, Mass.
†	BLACK, S. BRUCE, Honorary Chairman, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 17, Mass.
Apr. 20, 1917	BLANCHARD, RALPH H., Professor Emeritus of Insurance, Columbia University, New York, N. Y.
Nov. 19, 1959	BLODGET, HUGH R., Assistant Actuary, Aetna Casualty and Surety Company & Standard Fire Insurance Company, 151 Farmington Avenue, Hartford 15, Conn.
Nov. 16, 1956	BONDY, MARTIN, Assistant Vice President and Actuary, Consolidated Mutual Insurance Company, 345 Adams Street, Brooklyn 1, N. Y.
Nov. 22, 1957	BORNHUETTER, RONALD L., Manager, Actuarial Division, National Bureau of Casualty Underwriters, 125 Maiden Lane, New York, N. Y. 10038
Nov. 16, 1956	BOYAJIAN, JOHN H., Actuary, National Board of Fire Underwriters, 85 John Street, New York 38, N. Y.
Nov. 19, 1959	BOYLE, JAMES I., Assistant Actuary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 16, 1961	BRANNIGAN, JAMES F., Assistant Actuary, The Travelers Insurance Company, 700 Main Street, Hartford, Conn. 06115

Admitted	
†	BREIBY, WILLIAM, Consulting Actuary, William Breiby, F.S.A., F.C.A.S., Pacific Mutual Life Bldg., 523 West 6th St., Los Angeles, Calif. 90014
Nov. 21, 1952	BRINDISE, RALPH SULLIVAN, Supervisor, Insured Benefit Plans, Standard Oil Company (Indiana), Box 5910A, Chicago, Ill. 60680
Nov. 18, 1927	BROWN, F. STUART, (Retired), Cedar Land Road, Orleans, Mass. 02653
Oct. 22, 1915	BROWN, HERBERT D., (Retired), Glenora-on-Lake Seneca, Dundee, N. Y.
Nov. 16, 1961	BUDD, EDWARD H., Assistant Secretary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 23, 1928	BURLING, WILLIAM H., Manager and Actuary for Canada Group, The Travelers Insurance Company, Suite 1306, 7 King Street, East, Toronto 1, Ontario, Canada
Nov. 19, 1959	BYRNE, HARRY T., Assistant Actuary, Aetna Casualty and Surety Company & Standard Fire Insurance Company, 151 Farmington Avenue, Hartford 15, Conn.
Nov. 19, 1929	CAHILL, JAMES M., Secretary, National Bureau of Casualty Underwriters, 125 Maiden Lane, New York 38, N. Y.
Nov. 18, 1932	CAMERON, FREELAND R., Senior Vice President, Swiss National Insurance Company, 901 N. E. Second Avenue, Miami, Fla. 33132
Nov. 17, 1938	CARLETON, JOHN W., Vice President, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 17, Mass.
Nov. 21, 1930	CARLSON, THOMAS O., Manager, Southeastern Branch, National Bureau of Casualty Underwriters, 1627 Peachtree Street, N. E., Atlanta 9, Ga.
Nov. 18, 1949	CLARKE, JOHN W., President, General Reinsurance Life Corporation, 400 Park Avenue, New York 22, N. Y.
Nov. 15, 1918	COATES, BARRETT N., (Retired), 1007 Cragmont Avenue, Berkeley, Calif. 94708
Nov. 17, 1922	COATES, CLARENCE S., Actuary, Lumbermens Mutual Casualty Company, 4750 Sheridan Road, Chicago 40, Ill.
Feb. 19, 1915	COLLINS, HENRY, (Retired), Lochbrae, Windermere, Fla.
Nov. 22, 1934	COOK, EDWIN A., President and General Manager, Interboro Mutual Indemnity Insurance Company, 270 Madison Avenue, New York 16, N. Y.
Nov. 18, 1925	CORCORAN, WILLIAM M., Consulting Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York 38, N. Y.
Nov. 19, 1926	CRANE, HOWARD G., Vice President and Treasurer, General Reinsurance Corporation, 400 Park Avenue, New York 22, N. Y.
Nov. 21, 1952	CRITCHLEY, DOUGLAS, E. B. Savory & Company, London, England.
Nov. 22, 1946	CROUSE, CHARLES W., Consulting Actuary, C. E. Preslan & Company, Inc., 20015 Detroit Road, Cleveland 16, Ohio.
Nov. 18, 1960	CROWLEY, JAMES H., JR., Assistant Secretary, Accounts Dept., Aetna Life Affiliated Companies, 151 Farmington Avenue, Hartford 15, Conn.
Nov. 19, 1953	CURRY, HAROLD E., Senior Vice President, State Farm Mutual Automobile Insurance Company, 112 E. Washington Street, Bloomington, Ill. 61701
Nov. 18, 1932	DAVIES, E. ALFRED, (Retired), Falls Village, Conn.
Nov. 18, 1927	DAVIS, EVELYN M., Partner, Woodward, Ryan, Sharp & Davis, Consulting Actuaries, 26 Broadway, Room 708, New York 6, N. Y.
May 25, 1956	DAY, ELDEN W., (Retired), 36 Darwin Avenue, Hastings-on-Hudson, N. Y. 10706

Admitted	
Nov. 18, 1960	DICKERSON, O. D., Associate Professor, Florida State University, Tallahassee, Fla.
Nov. 16, 1951	DOREMUS, FREDERICK W., (Retired), 120 So. Harrison Street, East Orange, N. J. 07018
Nov. 17, 1920	DORWEILER, PAUL, (Retired), 51 Wethersfield Avenue, Hartford 14, Conn.
Nov. 22, 1957	DROBISCH, MILES R., Assistant Actuary, California Inspection Rating Bureau, 1453 Mission Street, San Francisco 3, Calif.
Nov. 14, 1958	DROPKIN, LESTER B., Actuary, California Inspection Rating Bureau, 1453 Mission Street, San Francisco 3, Calif.
Nov. 24, 1933	EDWARDS, JOHN, Consulting Actuary, 91 Arundel Avenue, Toronto 6, Ontario, Canada
Nov. 19, 1959	EIDE, K. ARNE, Statistical Bureau, Actuarial Div., Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.
Nov. 15, 1940	ELLIOTT, GEORGE B., General Manager, Pennsylvania Compensation Rating Bureau, 315 Chestnut Street, Philadelphia 6, Pa.
Nov. 17, 1922	ELSTON, JAMES S., (Retired), 1640 Palmer Avenue, Winter Park, Fla.
Nov. 15, 1935	EPPINK, WALTER T., 1st Vice President, Treasurer & Actuary, Merchants Mutual Insurance Company, 268 Main Street, Buffalo, N. Y. 14205
Nov. 14, 1958	ESPIE, ROBERT G., Vice President and Assistant Comptroller, Aetna Life Affiliated Companies, 151 Farmington Avenue, Hartford 15, Conn.
Nov. 18, 1955	FAIRBANKS, ALFRED V., Associate Actuary, Monarch Life Insurance Company, 1250 State Street, Springfield, Mass.
†	FALLOW, EVERETT S., (Retired), 28 Sunset Terrace, West Hartford, Conn.
Nov. 15, 1940	FARLEY, JARVIS, Secretary, Treasurer and Actuary, Massachusetts Indemnity and Life Insurance Company, 654 Beacon Street, Boston 15, Mass.
†	FARRER, HENRY, (Retired), R. D. #3, Box 322, Fleetwood, Pa. 19522
Nov. 18, 1960	FAUST, J. EDWARD, Consulting Actuary, R. R. #1, Zionsville, Ind.
May 25, 1956	FINNEGAN, JOSEPH H., Manager, Actuarial Bureau, National Board of Fire Underwriters, 85 John Street, New York 38, N. Y.
Nov. 16, 1961	FITZGIBBON, WALTER J., JR., Assistant Actuary, Aetna Casualty and Surety Company & Standard Fire Insurance Company, 151 Farmington Avenue, Hartford, Conn. 06115
Nov. 15, 1935	FITZHUGH, GILBERT W., President, Metropolitan Life Insurance Company, One Madison Avenue, New York 10, N. Y.
Nov. 18, 1955	FOSTER, ROBERT B., Associate Actuary, The Travelers Insurance Company, 700 Main Street, Hartford, Conn. 06115
Nov. 18, 1955	FOWLER, THOMAS W., Actuary, North American Reinsurance Corp., 161 E. 42nd Street, New York 17, N. Y.
Nov. 18, 1927	FREDERICKSON, C. H., Consulting Actuary, 3434 Eglinton Ave. E., Scarboro, Ontario, Canada.
Nov. 22, 1934	FULLER, GARDNER V., (Retired), Conover, Wis.
Nov. 22, 1957	GILLAM, WILLIAM S., Director of Research, National Bureau of Casualty Underwriters, 125 Maiden Lane, New York 38, N. Y.
Nov. 20, 1924	GINSBURGH, HAROLD J., 14 Crestview Road, Belmont 78, Mass.
Nov. 21, 1930	GLENN, JOSEPH B., Actuarial Consultant, Department of Defense, 6110 Valley Road, Washington, D. C. 20034

Admitted	
Nov. 13, 1931	GODDARD, RUSSELL P., Actuary, Bowles, Andrews & Towne, Inc., 200 Park Avenue, New York, N. Y. 10017
†	GOODWIN, EDWARD S., (Retired), Investment Counselor, 96 Garvan Street, East Hartford 8, Conn.
Nov. 19, 1926	GRAHAM, CHARLES M., Fire and Casualty Actuary, Florida Insurance Department, State Capitol, Tallahassee, Fla.
Nov. 19, 1953	GRAVES, CLYDE H., Actuary, Mutual Insurance Rating Bureau & Assistant Manager, Mutual Insurance Advisory Association, 733 Third Avenue, New York 17, N. Y.
†	GREENE, WINFIELD W., President, W. W. Greene, Inc., 32 Cliff Street, New York, N. Y. 10038
Nov. 19, 1953	HALEY, JAMES B., JR., Coates, Herfurth & England, Consulting Actuaries, Crocker Bldg., San Francisco, Calif.
Nov. 16, 1956	HART, W. VAN BUREN, JR., Actuary, Aetna Insurance Company, 55 Elm Street, Hartford 15, Conn.
Nov. 17, 1950	HARWAYNE, FRANK, Chief Actuary, New York State Insurance Department, 123 William Street, New York 38, N. Y.
Nov. 19, 1926	HAUGH, CHARLES J., (Retired), 25 LeMay Street, West Hartford, Conn. 06107
Nov. 17, 1950	HAZAM, WILLIAM J., Vice President and Actuary, American Mutual Liability Insurance Company, Wakefield, Mass.
Nov. 16, 1951	HEWITT, CHARLES C., JR., Actuary, Allstate Insurance Company, 7447 Skokie Blvd., Skokie, Ill.
Nov. 16, 1961	HOBBS, EDWARD J., Associate Actuary, Insurance Company of North America, 1600 Arch Street, Philadelphia 1, Pa.
Nov. 22, 1934	HOOKER, RUSSELL O., Russell O. Hooker, & Associates, Consulting Actuaries, 266 Pearl Street, Hartford 3, Conn.
Nov. 17, 1950	HOPE, FRANCIS J., Assistant Secretary, Hartford Accident and Indemnity Company, 690 Asylum Avenue, Hartford 15, Conn.
Nov. 18, 1932	HUEBNER, SOLOMON S., President Emeritus, American College of Life Underwriters, 270 Bryn Mawr Avenue, Bryn Mawr, Pa.
Nov. 14, 1947	HUGHEY, M. STANLEY, Executive Vice President, Lumbermens Mutual Casualty Company, 4750 N. Sheridan Road, Chicago, Ill. 60640
Nov. 19, 1959	HUNT, FREDERIC J., JR., Associate Actuary, Insurance Company of North America, 1600 Arch Street, Philadelphia 1, Pa.
†	HUNTER, ARTHUR, (Retired), 124 Lloyd Road, Montclair, N. J.
Nov. 18, 1955	HURLEY, ROBERT L., Actuary, Fire Insurance Research and Actuarial Association, 125 Maiden Lane, New York, N. Y. 10038
Nov. 19, 1954	JOHE, RICHARD L., Vice President and Actuary, United States Fidelity and Guaranty Company, Calvert & Redwood Streets, Baltimore 3, Md.
Nov. 14, 1941	JOHNSON, ROGER A., Actuary, The Associated Hospital Service of Philadelphia, 112 S. 16th Street, Philadelphia 2, Pa.
Nov. 16, 1939	JONES, HAROLD M., Group Statistician, John Hancock Mutual Life Insurance Company, 200 Berkeley Street, Boston 17, Mass.
Nov. 16, 1956	KALLOP, ROY H., Actuary, National Council on Compensation Insurance, 200 E. 42nd Street, New York 17, N. Y.
Nov. 22, 1957	KATES, PHILLIP B., Executive Vice President, Southern Fire & Casualty Company, P. O. Box 240, Knoxville 1, Tenn.
Nov. 19, 1926	KELTON, WILLIAM H., (Retired), 122 Arundel Avenue, West Hartford 7, Conn.
Nov. 19, 1959	KLAASSEN, ELDON J., Associate Actuary, Continental National Insurance Group, 310 S. Michigan Avenue, Chicago, Ill. 60604

Admitted	
Nov. 14, 1941	KOLE, MORRIS B., Director of Planning and Data Processing, The State Insurance Fund, 199 Church Street, New York, N. Y. 10007
Nov. 24, 1953	KORMES, MARK, President, Actuarial Associates Incorporated, 285 Madison Avenue, New York 17, N. Y.
Nov. 19, 1953	KUENKLER, ARTHUR S., Executive Vice President, Security-Connecticut Insurance Group, 175 Whitney Avenue, New Haven, Conn.
Nov. 18, 1949	LACROIX, HAROLD F., Second Vice President, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
May 5, 1961	LATIMER, MURRAY W., Murray W. Latimer Industrial Relations Consultants, 1625 K Street, N. W., Washington, D. C. 20006
Nov. 17, 1950	LESLIE, WILLIAM, JR., General Manager, National Bureau of Casualty Underwriters, 125 Maiden Lane, New York 38, N. Y.
Nov. 16, 1961	LINDEN, JOHN R., Assistant Actuary, Aetna Casualty and Surety Company, 151 Farmington Avenue, Hartford, Conn. 06115
Nov. 20, 1924	LINDER, JOSEPH, Consulting Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York 38, N. Y.
Nov. 16, 1956	LINO, RICHARD, Actuary, National Bureau of Casualty Underwriters, 125 Maiden Lane, New York 38, N. Y.
Nov. 18, 1955	LISCORD, PAUL S., Actuary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 17, 1950	LIVINGSTON, GILBERT R., Casualty Actuary, Connecticut Insurance Department, State Office Bldg., Hartford 15, Conn.
Nov. 16, 1951	LONGLEY-COOK, LAURENCE H., Vice President and Actuary, Insurance Company of North America, 1600 Arch Street, Philadelphia 1, Pa.
Nov. 13, 1936	LYONS, DANIEL J., Senior Vice President, Guardian Life Insurance Company, Park Avenue South at 17th Street, New York 3, N. Y.
Nov. 1, 1963	MACGINNITIE, W. JAMES, Assistant Actuary, Continental National Insurance Group, 310 S. Michigan Avenue, Chicago, Ill. 60604
Nov. 19, 1954	MACKEEN, HAROLD W., Assistant Actuary, The Travelers Insurance Company, 700 Main Street, Hartford, Conn. 06115
Nov. 14, 1958	MAGRATH, JOSEPH J., Secretary, Federal Insurance Company, 90 John Street, New York 38, N. Y.
Nov. 22, 1957	MAKGILL, STEPHEN S., Assistant Actuary, The Travelers Insurance Company, 700 Main Street, Hartford, Conn. 06115
Nov. 23, 1928	MARSHALL, RALPH M., (Retired), Catts Corner, Worton, Kent County, Md.
Nov. 18, 1927	MASTERSON, NORTON E., Vice President and Actuary, Hardware Mutual Casualty Company & Hardware Dealers Mutual Fire Insurance Company, 200 Strongs Avenue, Stevens Point, Wis.
Nov. 19, 1926	MATTHEWS, ARTHUR N., Second Vice President and Actuary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
May 19, 1915	MAYCRINK, EMMA C., 32 Chittenden Avenue, Crestwood, N. Y.
Nov. 14, 1958	MAYERSON, ALLEN L., Commissioner of Insurance, State of Michigan, Lewis Cass Bldg., Lansing, Mich.
Nov. 1, 1963	MCCLURE, RICHARD D., Assistant Vice President, American Mutual Liability Insurance Company, Wakefield, Mass. 01881
Nov. 15, 1935	MCCONNELL, MATTHEW H., Superintendent, Compensation & Liability Dept., General Accident Fire and Life Assurance Corporation Ltd., 414 Walnut Street, Philadelphia, Pa. 19106
Nov. 18, 1960	MCGUINNESS, JOHN S., Budget Director, Glens Falls Insurance Company, 291 Glen Street, Glens Falls, N. Y. 12803
Nov. 15, 1962	MCNAMARA, DANIEL J., Secretary, National Bureau of Casualty Underwriters, 125 Maiden Lane, New York 38, N. Y.

Admitted	
Nov. 15, 1962	MEENAGHAN, JAMES J., Assistant Actuary, National Bureau of Casualty Underwriters, 125 Maiden Lane, New York 38, N. Y.
Nov. 18, 1955	MENZEL, HENRY W., Actuary, New York Compensation Insurance Rating Board, 200 E. 42nd Street, New York 17, N. Y.
†	MICHELBACHER, GUSTAV F., (Retired), 15201 Quito Road, Saratoga, Calif.
Nov. 17, 1938	MILLER, JOHN H., Vice President and Senior Actuary, Monarch Life Insurance Company, Springfield, Mass. 01101
Nov. 1, 1963	MILLER, NICHOLAS F., JR., Aetna Casualty and Surety Company, 151 Farmington Avenue, Hartford, Conn. 06115
†	MILLIGAN, SAMUEL, (Retired), 15 W. 55th Street, New York, N. Y. 10019
Nov. 18, 1937	MILLS, JOHN A., (Retired), Point Placid, Reeds Spring, Mo.
Nov. 22, 1957	MILLS, RICHARD J., Statistical Dept., Lumbermens Mutual Casualty Company, Mutual Insurance Bldg., Chicago, Ill. 60640
Nov. 15, 1962	MORISON, GEORGE D., Actuarial Assistant, Actuarial Department, Aetna Casualty & Surety Company and Standard Fire Insurance Company, 151 Farmington Avenue, Hartford 15, Conn.
Nov. 16, 1961	MOSELEY, JACK, Associate Actuary, United States Fidelity and Guaranty Company, Calvert and Redwood Streets, Baltimore, Md. 21203
Nov. 17, 1920	MUELLER, LOUIS H., 2845 Lake Street, San Francisco 21, Calif.
Nov. 16, 1950	MUETTERTIES, JOHN H., Associate Actuary, Hardware Mutual Casualty Company & Hardware Dealers Mutual Fire Insurance Company, 200 Strongs Avenue, Stevens Point, Wis.
Nov. 17, 1950	MUNTERICH, GEORGE C., Assistant Secretary, Hartford Fire Insurance Company, Hartford Accident and Indemnity Company & Citizens Insurance Company of New Jersey, 690 Asylum Avenue, Hartford 15, Conn.
May 28, 1920	MURPHY, RAY D., (Retired), 28 Godfrey Road, Upper Montclair, N. J.
Nov. 19, 1954	MURRIN, THOMAS E., Vice President and Actuary, Fireman's Fund American Insurance Companies, 3333 California Street, San Francisco, Calif. 94120
Nov. 19, 1959	MYERS, ROBERT J., Chief Actuary, Department of Health, Education and Welfare, Social Security Administration, Washington 25, D. C.
Nov. 1, 1963	NELSON, S. TYLER, Casualty Division Manager and Actuary, American Agricultural Insurance Company, Room 1000 Merchandise Mart Plaza, Chicago, Ill. 60654
Nov. 14, 1958	NILES, CHARLES L., JR., Actuary, General Accident Group, General Bldg., 414 Walnut Street, Philadelphia 5, Pa.
Nov. 15, 1935	OBERHAUS, THOMAS M., Vice President, Woodward and Fondiller, Inc., 420 Madison Avenue, New York 17, N. Y.
†	ORR, ROBERT K., (Retired), 757 S. Johnson Avenue, Lakeland, Fla.
Nov. 22, 1957	OTTESON, PAUL M., Vice President and Actuary, Federated Mutual Implement and Hardware Insurance Company, 129 E. Broadway, Owatonna, Minn. 55060
Nov. 21, 1919	OUTWATER, OLIVE E., (Retired), 2404 Loring Street, San Diego, Calif. 92109
Nov. 15, 1962	PARLIN, R. W., Research Associate, University of Minnesota, Laboratory of Physiological Hygiene, Stadium Gate 27, Minneapolis, Minn. 55455
Nov. 18, 1960	PENNYCOOK, ROD B., Health Insurance Secretary, The Great-West Life Assurance Company, 60 Osborne Street, N., Winnipeg 1, Manitoba, Canada.

12   FELLOWS

Admitted	
Nov. 22, 1957	PERKINS, WILLIAM J., Assistant Group Actuary, The London Life Insurance Company, London, Ontario, Canada.
Nov. 14, 1941	PETERS, STEFAN, Consultant, Arthur D. Little, Inc., 35 Acorn Park, Cambridge, Mass.
Nov. 21, 1952	PETZ, EARL F., Assistant Secretary, Lumbermens Mutual Casualty Company, 4750 N. Sheridan Road, Chicago, Ill. 60640
Nov. 19, 1959	PHILLIPS, HERBERT J., JR., Assistant Actuary, Employers' Liability Assurance Corporation, Ltd., 110 Milk Street, Boston 7, Mass.
Nov. 24, 1933	PICKETT, SAMUEL C., (Retired), 126 Macktown Road, Windsor, Conn.
Nov. 22, 1957	PINNEY, ALLEN D., Assistant Secretary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 17, 1922	PINNEY, SYDNEY D., 290 Wolcott Hill Road, Wethersfield 9, Conn.
Nov. 19, 1959	POLLACK, ROBERT, Associate Actuary, American Mutual Liability Insurance Company, Wakefield, Mass. 01881
Nov. 13, 1931	PRUITT, DUDLEY M., Executive Secretary, Middle Atlantic Region, American Friends Service Committee, 1500 Race Street, Philadelphia 2, Pa.
Nov. 18, 1955	RESONY, ALLIE V., Assistant Secretary, Hartford Accident & Indemnity Company, 690 Asylum Avenue, Hartford 15, Conn.
Nov. 18, 1949	RESONY, JOHN A., Secretary, Group Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 16, 1951	RICE, HOMER D., (Retired), 1731 Morningside Drive, Mount Dora, P. O. Box 1017, Fla. 32757
Nov. 1, 1963	RICHARDS, HARRY R., Chief Supervisor, The Travelers Insurance Company, 700 Main Street, Hartford, Conn. 06115
Nov. 1, 1963	RIDDLESWORTH, WILLIAM A., Actuarial Assistant, Aetna Casualty and Surety Company and Standard Fire, 151 Farmington Avenue, Hartford, Conn. 06115
May 24, 1921	RIEGEL, ROBERT, Professor Emeritus of Statistics and Insurance, State University of New York at Buffalo, 3435 Main Street, Buffalo, N. Y. 14214
Nov. 14, 1958	ROBERTS, LEWIS H., Actuary, Woodward & Fondiller, 420 Madison Avenue, New York 17, N. Y.
Nov. 14, 1947	RODERMUND, MATTHEW, Vice President-Actuary, Munich Reinsurance Company, 410 Park Avenue, New York 22, N. Y.
Nov. 14, 1947	ROSENBERG, NORMAN, Executive Assistant, Farmers Insurance Group, 4680 Wilshire Boulevard, Los Angeles 54, Calif.
Nov. 14, 1947	ROWELL, JOHN H., Assistant Vice President, Marsh & McLennan, Inc., 231 S. LaSalle Street, Chicago, Ill. 60604
Nov. 17, 1938	RUCHLIS, ELSIE, Actuarial Supervisor, National Bureau of Casualty Underwriters, 125 Maiden Lane, New York 38, N. Y.
Nov. 14, 1947	SALZMANN, RUTH E., Associate Actuary, Insurance Company of North America, 1600 Arch Street, Philadelphia, Pa. 19101
Nov. 1, 1963	SARASON, HARRY M., Managing Actuary, Woodward and Fondiller, Inc., 3625 W. 6th Street, Los Angeles, Calif. 90005
Nov. 19, 1948	SCHLOSS, HAROLD W., Secretary and Actuary, Royal-Globe Insurance Companies, 150 William Street, New York 38, N. Y.
Nov. 18, 1937	SHAPIRO, GEORGE I., 934 E. 9th Street, Brooklyn 30, N. Y.
Nov. 13, 1931	SILVERMAN, DAVID, Consulting Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York 38, N. Y.
Nov. 19, 1954	SIMON, LEROY J., Actuary, Insurance Company of North America, 1600 Arch Street, Philadelphia 1, Pa.
Nov. 18, 1960	SIMONEAU, PAUL W., Assistant Actuary, Aetna Casualty and Surety Company & Standard Fire Insurance Company, 151 Farmington Avenue, Hartford 15, Conn.

Admitted	
Nov. 19, 1929	SKELDING, ALBERT Z., Secretary-Treasurer, Casualty Actuarial Society, 200 E. 42nd Street, New York 17, N. Y.
Nov. 19, 1929	SKILLINGS, E. SHAW, (Retired), 831 Ingleside Place, Evanston, Ill.
Nov. 18, 1932	SMICK, J. J., Partner, Smick & Steinhaus, Consulting Actuaries, 135 E. 42nd Street, New York 17, N. Y.
Nov. 14, 1958	SMITH, EDWARD M., Associate Actuary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 15, 1940	SMITH, SEYMOUR E., Vice President and Actuary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 15, 1962	STANKUS, LEO M., Product Development Director, Allstate Insurance Company, 7447 Skokie Boulevard, Skokie, Ill. 60078
Nov. 24, 1933	ST. JOHN, JOHN B., Consulting Actuary, Box 57, Penllyn, Pa.
Nov. 18, 1927	STONE, EDWARD C., Chairman of the Board, American Employers' Insurance Company, 40 Central Street, Boston 9, Mass.
Nov. 19, 1959	SYKES, ZENAS M., Actuary, Social Security Administration, United States Department of Health, Education and Welfare, Washington 25, D. C.
May 25, 1956	TAPLEY, DAVID A., Senior Vice President, Wolverine Insurance Company, Wolverine-Federal Bldg., Battle Creek, Mich. 49016
Nov. 14, 1958	TARBELL, LUTHER L., Associate Actuary, The Travelers Insurance Company, 700 Main Street, Hartford, Conn. 06115
Nov. 16, 1956	THOMAS, JAMES W., Assistant Actuary, The Travelers Insurance Company, 700 Main Street, Hartford, Conn. 06115
†	THOMPSON, JOHN S., Newark Athletic Club, Newark 2, N. J.
Nov. 19, 1953	TRIST, JOHN A. W., Insurance Company of North America, 1600 Arch Street, Philadelphia, Pa. 19101
Nov. 15, 1962	TRUDEAU, DONALD E., Assistant Actuary, The Travelers Insurance Company, 700 Main Street, Hartford, Conn. 06115
Nov. 14, 1947	UHTHOFF, DUNBAR R., Vice President and Actuary, Employers' Mutual Liability Insurance Company of Wisconsin and Employers' Mutual Fire Insurance Company, 407 Grant Street, Wausau, Wisconsin
Nov. 23, 1928	VALERIUS, NELS M., Associate Actuary, Aetna Casualty and Surety Company & Standard Fire Insurance Company, 151 Farmington Avenue, Hartford 15, Conn.
Nov. 21, 1949	VAN TUYL, HIRAM O., (Retired), 17 Coolidge Avenue, White Plains, N. Y.
Nov. 16, 1951	VINCENT, LEWIS A., General Manager, National Board of Fire Underwriters, 85 John Street, New York 38, N. Y.
Nov. 17, 1920	WAITE, ALAN W., 16 Penwood Road, Bloomfield, Conn.
Nov. 19, 1962	WALSH, ALBERT J., Assistant Vice President, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, Mass. 02117
Nov. 14, 1947	WIEDER, JOHN W., JR., Actuary, Aetna Casualty and Surety Company & Standard Fire Insurance Company, 151 Farmington Avenue, Hartford 15, Conn.
Nov. 18, 1960	WILCKEN, CARL L., Actuary, Canadian Underwriters' Association, Statistical Division, 12 Upjohn Road, Don Mills, Ontario, Canada
Nov. 1, 1963	WILLIAMS, DEWEY G., Assistant Secretary, Texas Employers Insurance Association, P. O. Box 2759, Dallas, Texas 75221
Nov. 15, 1935	WILLIAMS, HARRY V., Vice President, Hartford Insurance Group, 690 Asylum Avenue, Hartford, Conn. 06115
Nov. 22, 1957	WILLIAMS, P. ADGER, Actuary, The Travelers Insurance Company, 700 Main Street, Hartford, Conn. 06115

Admitted	
Nov. 14, 1941	WILLIAMSON, W. RULON, Research Actuary, 3400 Fairhill Drive, Washington 23, D. C.
Nov. 18, 1960	WILLSEY, LYNN W., Assistant Secretary, Group Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 16, 1961	WILSON, JAMES C., Vice President & Actuary, Security General Insurance Company and Security Fire and Indemnity Company, 639 W. Fifth Street, Box 3099, Winston-Salem, N. C.
Nov. 13, 1931	WITTICK, HERBERT E., Vice President and General Manager, Pilot Insurance Company, 1315 Yonge Street, Toronto 7, Ontario, Canada.
Nov. 18, 1949	WOLFRUM, RICHARD J., Actuary, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 17, Mass.
Nov. 16, 1951	WOODALL, JOHN P., Manager, South-Eastern Underwriters Association, P. O. Box 5048. Atlanta, Ga. 30302
Nov. 14, 1958	WRIGHT, BYRON, Actuary, Department of Banking and Insurance, State of New Jersey, State House Annex, Trenton 25. N. J.
Nov. 19, 1953	YOUNT. HUBERT W., (Retired), 54 Waban Avenue, Waban, Mass. 02168

Admitted	
Nov. 15, 1918	ACKERMAN, SAUL B., 405 Lexington Avenue, New York 17, N. Y.
Nov. 16, 1939	AIN, SAMUEL N., Consulting Actuary, 120 Broadway, New York 5, N. Y.
Nov. 16, 1961	ALDRICH, WILLIAM C., Secretary, National Council on Compensation Insurance, 200 E. 42 Street, New York 17, N. Y.
Nov. 22, 1957	ALEXANDER, LEE M., Actuarial Assistant, American Mutual Liability Insurance Company, Wakefield, Mass. 01881
Apr. 5, 1928	ALLEN, AUSTIN F., (Retired), 4815 Royal Lane, Dallas, Texas 75229
Nov. 15, 1962	AMLIE, W. P., Actuarial Assistant, Employers' Liability Assurance Company, 110 Milk Street, Boston, Mass. 02107
Nov. 18, 1955	ANDREWS, EDWARD C., Associate Actuary, The Travelers Insurance Company, 700 Main Street, Hartford, Conn. 06115
Nov. 15, 1918	ANKERS, ROBERT E., (Retired), 414 E. Broad Street, Falls Church, Va.
Nov. 21, 1930	ARCHIBALD, A. EDWARD, Vice President, Investors Diversified Services, Inc., Minneapolis 2, Minn.
Nov. 19, 1959	BANNISTER, DAN W., Vice President, Security Insurance Company, 175 Whitney Avenue, New Haven, Conn.
Nov. 24, 1933	BARRON, JAMES C., Comptroller, American Mercury Insurance Company, 2251 Wisconsin Avenue, N.W., Washington 7, D. C.
Nov. 23, 1928	BATEMAN, ARTHUR E., Pine Grove Rest Home, Marlboro, Mass.
Nov. 15, 1940	BATHO, BRUCE W., Executive Vice President-Administration, Life Insurance Company of Georgia, 573 West Peachtree Street, N.E., Atlanta, Ga. 30308
Nov. 16, 1956	BERG, ROY A., JR., Assistant Actuary, Old Republic Life Insurance Company, 307 N. Michigan Avenue, Chicago 1, Ill.
Nov. 19, 1959	BERKMAN, JOAN M., Assistant Actuary, National Bureau of Casualty Underwriters, 125 Maiden Lane, New York 38, N. Y.
Nov. 14, 1958	BERNAT, LEO A., Consultant, Minnesota Research Associates, 503 15th Avenue, S.E., No. 2, Minneapolis 14, Minn.
Nov. 18, 1925	BITTEL, W. HAROLD, Chief Actuary, Department of Banking and Insurance, State of New Jersey, Trenton 25, N. J.
Nov. 14, 1958	BLUMENFELD, M. EUGENE, Actuary-Group A & H, Standard Life & Accident Insurance Company, P. O. Box 1097, Oklahoma City, Okla. 73101
Nov. 22, 1934	BOMSE, EDWARD L., Manager-C&L, Casualty Underwriting Planning Department, Royal-Globe Insurance Companies, 150 William Street, New York, N. Y. 10038
Nov. 22, 1957	BRAGG, JOHN M., Vice President and Actuary, Life Insurance Company of Georgia, 573 W. Peachtree Street, N.E., Atlanta 8, Ga.
Nov. 15, 1962	BUFFINTON, PHILIP G., Vice President, State Farm Fire and Casualty Company, 112 E. Washington Street, Bloomington, Ill.
Nov. 20, 1924	BUGBEE, JAMES M., Vice-President, Maryland Casualty Company, P. O. Box 1228, Baltimore, Md. 21203
Mar. 31, 1920	BURT, MARGARET A., Office of George B. Buck, Consulting Actuary, 60 Worth Street, New York 13, N. Y.
Nov. 19, 1959	BUTLER, RICHARD H., Secretary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 15, 1962	CARSON, DAVID E. A., Assistant Actuary, Hartford Insurance Group, 690 Asylum Avenue, Hartford, Conn. 06115
Nov. 17, 1922	CAVANAUGH, LEO D., Consultant-Life Insurance Management, 55 E. Washington Street, Chicago 2, Ill.

Admitted	
Nov. 18, 1927	CHEN, S. T., Consulting Actuary, The Wing On Life Assurance Company, Ltd., Wing On Life Bldg., 22 Des Voeux Road, Central, Hong Kong.
Nov. 16, 1961	CHERLIN, GEORGE, Actuary, National Health and Welfare Retirement Association, Inc., 800 Second Avenue, New York 17, N. Y.
Nov. 22, 1957	CHURCH, HARRY M., Coates, Herfurth & England, Consulting Actuaries, 325 North Lake, Pasadena, Calif.
Nov. 1, 1963	CIMA, AUGUSTIN, Allstate Insurance Company, 7447 Skokie Boulevard, Skokie, Ill.
Nov. 18, 1955	COATES, WILLIAM D., Assistant Actuary, Combined Group Department, Insurance Company of North America, 1600 Arch Street, Philadelphia, Pa. 19101
Nov. 19, 1953	CONTE, JOSEPH P., Vice President, Secretary and Actuary, Columbian Mutual Life Insurance Company, 305 Main Street, Binghamton, N. Y. 13902
Nov. 19, 1959	**COPESTAKES, ARTHUR D., Assistant Vice President, American Mutual Liability Insurance Company, Wakefield, Mass.**
Nov. 19, 1959	CRAIG, ROBERT A., Associate Actuary, Connecticut Insurance Department, State Office Building, Hartford, Conn. 06115
May 21, 1963	CRANDALL, WILLIAM H., Special Agent, Insurance Company of North America, 734 Ellicott Square Bldg., Buffalo, N. Y. 14203
Nov. 24, 1933	CRAWFORD, WILLIAM H., Vice President and Treasurer, Industrial Indemnity Company, 155 Sansome Street, San Francisco 4, Calif.
Nov. 19, 1953	CROFTS, GEOFFREY, Actuarial Training Director, Occidental Life Insurance Company of California, Box 2101, Terminal Annex, Los Angeles 54, Calif.
Nov. 15, 1962	CURRY, ALAN C., Actuary, State Farm Mutual Automobile Insurance Company, 112 E. Washington Street, Bloomington, Ill. 61701
Nov. 1, 1963	DAHME, ORVAL E., Assistant Actuary, State Farm Mutual Automobile Insurance Company, 112 E. Washington Street, Bloomington, Ill. 61701
Nov. 21, 1952	DANIEL, C. M., Applied Science Representative, International Business Machines Corporation, 2116 Grand, Des Moines 12, Iowa
Nov. 18, 1925	DAVIS, MALVIN E., Executive Vice President, Metropolitan Life Insurance Company, One Madison Avenue, New York, N. Y. 10010
Nov. 18, 1960	DeMELIO, JOSEPH J., Assistant Secretary and Actuary, Home Insurance Company, 59 Maiden Lane, New York, N. Y. 10008
Nov. 16, 1956	DORF, STANLEY A., Associate Actuary, New York State Insurance Department, 123 William Street, New York 38, N. Y.
Nov. 14, 1941	DOWLING, WILLIAM F., President, Nymco Agency, Inc., 150 Fifth Avenue, New York 11, N. Y.
Nov. 1, 1963	DURKIN, JAMES H., Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York, N. Y. 10038
Nov. 14, 1958	DuROSE, STANLEY C., JR., Assistant Deputy Commissioner, Wisconsin Insurance Department, 127 South, State Capitol, Madison 2, Wis.
Nov. 19, 1954	EATON, KARL F., Controller, Guarantee Mutual Life Company, 8721 Indian Hills Drive, Omaha 14, Neb.
June 5, 1925	EGER, FRANK A., (Retired), 1119 Prospect Ridge Blvd., Haddon Heights, N. J. 08035
Nov. 16, 1961	EHLERT, DARRELL W., Associate Actuary, Allstate Insurance Company, 7447 Skokie Blvd., Skokie, Ill.
Nov. 15, 1962	EVEN, CHARLES A., JR., Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 22, 1957	FELDMAN, MARTIN F., Associate Actuary, New York State Insurance Department, 123 William Street, New York 38, N. Y.
Nov. 16, 1961	FERDEN, STEIN, Undelstadlia S, Asker, Norway
Nov. 15, 1962	FINKEL, DANIEL, Senior Statistician, The State Insurance Fund, 199 Church Street, New York 7, N. Y.

Admitted	
Nov. 16, 1956	FLACK, PAUL R., Actuarial Assistant, General Accident Fire and Life Assurance Corporation, Ltd., 414 Walnut Street, Philadelphia, Pa.
Nov. 16, 1923	FLEMING, FRANK A., (Retired), c/o Mutual Insurance Rating Bureau, 733 Third Avenue, New York 17, N. Y.
Nov. 21, 1952	FRANKLIN, NATHAN M., Actuary, The Surety Association of America, 110 William Street, New York, N. Y. 10038
Nov. 19, 1954	GAINES, NATHANIEL, Associate Actuary, Office of George B. Buck, Consulting Actuary, 60 Worth Street, New York, N. Y. 10013
Nov. 15, 1962	GERUNDO, LOUIS P., JR., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 18, 1932	GETMAN, RICHARD A., Assistant Actuary, Life Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 17, 1922	GIBSON, JOSEPH P., JR., (Retired), 2970 Lorain Road, San Marino, Calif. 91108
Nov. 16, 1923	GILDEA, JAMES F., (Retired), 236 Nott Street, Wethersfield, Conn.
Nov. 1, 1963	GILL, JAMES F., Actuary, National Association of Independent Insurers, 30 W. Monroe Street, Inland Steel Building, Chicago, Ill.
Nov. 18, 1960	GILLESPIE, JAMES E., Actuarial Assistant, Continental National Insurance Group, 310 S. Michigan Avenue, Chicago, Ill. 60604
Nov. 14, 1947	GINGERY, STANLEY, Vice President & Associate Actuary, The Prudential Insurance Company of America, Prudential Plaza, Newark 1, N. J.
Nov. 19, 1959	GOLD, MELVIN L., Consulting Actuary, 29 Lakeview Drive, West Orange, N. J.
Nov. 16, 1961	GOULD, DONALD E., Senior Statistician, The State Insurance Fund, 199 Church Street, New York 7, N. Y.
Nov. 18, 1927	GREEN, WALTER C., Consulting Actuary, Walter C. Green and Associates, 1405 S. Main Street, Salt Lake City, Utah.
Nov. 16, 1961	GREENE, THOMAS A., Assistant Secretary, American Re-Insurance Company, 99 John Street, New York 38, N. Y.
Nov. 15, 1940	GROSSMAN, ELI A., Senior Vice President, The Great Eastern Life Insurance Company, 10 Dorrance Street, Providence, R. I. 02903
Nov. 15, 1935	GUERTIN, ALFRED N., Actuary, American Life Convention, 230 N. Michigan Avenue, Chicago 1, Ill.
Nov. 16, 1939	HAGEN, OLAF E., Senior Assistant Actuarial Supervisor, Metropolitan Life Insurance Company, One Madison Avenue, New York, N. Y. 10010
Nov. 17, 1922	HALL, HARTWELL L., (Retired), 34 Lincoln Avenue, West Hartford 7, Conn.
Nov. 13, 1936	HAM, HUGH P., President and General Manager, The Western Assurance Company, 40 Scott Street, Toronto 1, Ontario, Canada
Nov. 1, 1963	HAMMER, SIDNEY M., Assistant Actuary, The Home Insurance Company, 59 Maiden Lane, New York, N. Y. 10008
Nov. 19, 1953	HARACK, JOHN, Actuary, Health Service, Inc., and Medical Indemnity of America, Inc., 200 N. Michigan Avenue, Chicago 1, Ill.
Mar. 24, 1932	HARRIS, SCOTT, Executive Vice President, Joseph Froggatt & Company, Inc., 74 Trinity Place, New York 6, N. Y.
Mar. 25, 1924	HART, WARD VAN B., 49 Robbins Drive, Wethersfield 9, Conn.
Nov. 21, 1919	HAYDON, GEORGE F., Manager Emeritus, Wisconsin Compensation Rating Bureau, 623 N. 2nd Street, Milwaukee 3, Wis.
Nov. 19, 1953	HEAD, GLENN O., Executive Vice President, First Investors Life Insurance Company, 120 Wall Street, New York 5, N. Y.
Nov. 19, 1959	HICKMAN, JAMES C., Associate Professor, Department of Mathematics, State University of Iowa, Iowa City, Iowa 52240
Nov. 15, 1962	HILLHOUSE, JERRY A., Associate Actuary, State Farm Mutual Automobile Insurance Company, 112 E. Washington Street, Bloomington, Ill. 61701
Nov. 17, 1927	HIPP, GRADY H., (Retired), 216 Pine Forest Drive, Greenville, S. C.

Admitted	
Nov. 16, 1961	HOROWITZ, MILTON, Principal Actuary, The State Insurance Fund, 199 Church Street, New York 7, N. Y.
Nov. 19, 1929	JACOBS, CARL N., Chairman of the Board, Hardware Mutual Casualty Company, Hardware Dealers Mutual Fire Insurance Company & Sentry Life Insurance Company, 200 Strongs Avenue, Stevens Point, Wis.
Nov. 18, 1921	JENSEN, EDWARD S., Assistant Vice President, Occidental Life Insurance Company of Calif., Occidental Center, Los Angeles, Calif. 90054
Nov. 15, 1962	JENSEN, JAMES P., Actuarial Assistant, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 17, Mass.
Nov. 21, 1930	JONES, H. LLOYD, (Retired), 9 Midland Gardens, Bronxville, N. Y.
Nov. 21, 1919	JONES, LORING D., (Retired), 64 Raymond Avenue, Rockville Centre, L. I., N. Y.
Nov. 21, 1952	JONES, NATHAN F., Associate Actuary, The Prudential Insurance Company of America, Prudential Plaza, Newark 1, N. J.
Nov. 19, 1959	KROEKER, JOHN, Senior Actuary, Department of Insurance, 770 Heron Road, Ottawa 8, Ontario, Canada
Nov. 16, 1961	LANGE, JEFFREY T., National Bureau of Casualty Underwriters, 125 Maiden Lane, New York 38, N. Y.
Nov. 19, 1959	LEIGHT, ARTHUR S., Actuarial Associate, Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.
Nov. 14, 1947	LUFKIN, ROBERT W., Manager of Home Office, Craftsman Life Insurance Company, 851 Boylston Street, Boston, Mass. 02116
Nov. 18, 1925	MALMUTH, JACOB J., Chief—Rating Bureau, New York State Insurance Department, 123 William Street, New York 38, N. Y.
Nov. 16, 1961	MARGOLIS, DONALD R., Actuarial Assistant, Insurance Company of North America, 1600 Arch Street, Philadelphia 1, Pa.
Mar. 24, 1927	MARSH, CHARLES V-R., (Retired), 125-56 Avenue South, St. Petersburg, Fla.
Nov. 16, 1956	MATHWICK, LLOYD F., Assistant Manager, Group Department, Employers Mutuals of Wausau, 407 Grant Street, Wausau, Wis. 54402
Nov. 13, 1936	MAYER, WILLIAM H., JR., Manager, Group Contract Bureau, Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.
May 26, 1955	MCDONALD, MILTON G., Chief Actuary, Massachusetts Insurance Department, 100 Nashua Street, Boston, Mass. 02114
Nov. 16, 1961	MCINTOSH, KENNETH L., Manager, Louisiana Rating & Fire Prevention Bureau, P. O. Box 60730, New Orleans 60, La.
Nov. 16, 1961	MCLEAN, GEORGE E., Actuary, Massachusetts Hospital Service, Inc., 133 Federal Street, Boston 6, Mass.
Nov. 18, 1931	MILLER, HENRY C., Comptroller, California State Compensation Insurance Fund, 525 Golden Gate Avenue, San Francisco 1, Calif.
Nov. 18, 1937	MINOR, EDUARD H., Associate Actuary, Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.
Nov. 18, 1960	MOHNBLATT, ARNOLD S., Actuarial Assistant, Consolidated Mutual Insurance Company, 345 Adams Street, Brooklyn 1, N. Y.
Nov. 17, 1922	MONTGOMERY, JOHN C., (Retired), 165 Westervelt Avenue, Tenafly, N. J.
May 25, 1923	MOORE, JOSEPH P., 115 St. Catherine Road, Outremont, Quebec, Canada
Nov. 16, 1961	MOSS, ROBERT GRAHAM, Actuary and Assistant Vice President, Marsh & McLennan, Inc., 515 Olive Street, St. Louis, Mo. 63101
Nov. 22, 1957	MUIR, JOSEPH M., General Manager, Mutual Insurance Advisory Association & Mutual Insurance Rating Bureau, 733 Third Avenue, New York 17, N. Y.

Admitted	
Nov. 1, 1963	MUNIZ, ROBERT M., National Bureau of Casualty Underwriters, 125 Malden Lane, New York, N. Y. 10038
Nov. 1, 1963	NELSON, DALE A., Senior Actuarial Assistant, State Farm Mutual Automobile Insurance Company, 112 E. Washington Street, Bloomington, Ill. 61701
Nov. 16, 1961	NELSON, ROLAND E., Associate Actuary, State Farm Life and Accident Assurance Company, 112 E. Washington Street, Bloomington, Ill.
Oct. 27, 1916	NEWELL, WILLIAM, (Retired), 1225 Park Avenue, New York 28, N. Y.
Nov. 18, 1925	NICHOLSON, EARL H., Actuary and Deputy Insurance Commissioner, Nevada Insurance Department, State Office Bldg., Carson City, Nevada 89701
Nov. 16, 1961	OIEN, R. GUSTAVE, Actuary, Mutual Service Life Insurance Company, 1919 University Avenue, St. Paul, Minn. 55104
May 23, 1919	OTTO, WALTER E., Chairman of the Board, Michigan Mutual Liability Company, 28 W. Adams Avenue, Detroit 26, Mich.
Nov 19, 1926	OVERHOLSER, DONALD M., Actuary for Pension Funds, George B. Buck, 60 Worth Street, New York, N. Y. 10013
Nov. 16, 1961	PEEL, JERALD P., Actuary, Security Mutual Casualty Company, 309 West Jackson Blvd., Chicago 6, Ill.
Nov. 20, 1924	PENNOCK, RICHARD M., (Retired), 12 E. Lodges Lane, Bala-Cynwyd, Pa.
Nov. 14, 1947	PERRY, ROBERT C., Executive Vice President, State Farm Life Insurance Company, 112 E. Washington Street, Bloomington, Ill.
Nov. 19, 1929	PHILLIPS, JOHN H., (Retired), 915 Steuben Street, Wausau, Wis.
Nov. 17, 1920	PIKE, MORRIS, (Retired), 531 East 20th Street, New York, N. Y.
Nov. 17, 1922	POORMAN, WILLIAM F., President, Central Life Assurance Company, Box 1555, Des Moines, Iowa.
Nov. 15, 1962	PORTERMAIN, NEILL W., Actuarial Assistant, Mutual Service Casualty Insurance Company, 1919 University Avenue, St. Paul, Minn. 55104
Nov. 13, 1936	POTOFSKY, SYLVIA, Senior Actuary, The State Insurance Fund, 199 Church Street, New York 7, N. Y.
Nov. 15, 1918	RAYWID, JOSEPH, Vice President, Woodward & Fondiller, Inc., 322 W. 72nd Street, New York, N. Y.
Nov. 18, 1960	RICCARDO, JOSEPH F., JR., General Accounts Department, Aetna Casualty & Surety Company and Standard Fire Insurance Company, 151 Farmington Avenue, Hartford, Conn. 06115
Nov. 19, 1932	RICHARDSON, HARRY F., (Retired), Seven Oaks, Bozman. Md.
Nov. 19, 1953	RICHMOND, OWEN D., Controller, Business Men's Assurance Company, One Penn Valley Park, Kansas City, Mo. 64141
Nov. 18, 1960	RIPANDELLI, JOHN S., Consulting Actuary, Lewis State Bank Building, Tallahasee, Fla. 32301
Nov. 18, 1932	ROBERTS, JAMES, A., Group Statistician, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 15, 1962	ROOD, HENRY F., Senior Vice President, Lincoln National Life Insurance Company, 1301-27 South Harrison Street, Fort Wayne, Indiana.
Nov. 18, 1960	ROTH, RICHARD J., President, TRC Service Corporation, 250 Constitution Plaza, Hartford, Conn. 06103
Nov. 19, 1959	ROYER, ALAN F., Actuary, Insurance Dept., Commonwealth of Pennsylvania, North Office Bldg., State Capitol, Harrisburg, Pa.
Nov. 1, 1963	RYAN, KEVIN M., Actuarial Division, Aetna Casualty & Surety Company and Standard Fire Insurance Company, 151 Farmington Avenue, Hartford, Conn. 06115

Admitted	
Nov. 14, 1958	SARNOFF, PAUL E., Assistant Actuary, The Prudential Insurance Company of America, Prudential Plaza, Newark, N. J. 07101
Nov. 16, 1923	SAWYER, ARTHUR. (Retired). 13751 St. Andrews Drive, Leisure World, Apt. 1-I, Seal Beach, Calif.
Nov. 14, 1947	SCAMMON, LAWRENCE W., Manager. Massachusetts Automobile Rating & Accident Prevention Bureau, Massachusetts Workmen's Compensation Rating & Inspection Bureau, & Massachusetts Motor Vehicle Assigned Risk Plan, 89 Broad Street, Boston, Mass.
Nov. 1, 1963	SCHEEL, PAUL J., Actuarial Assistant, U. S. Fidelity & Guaranty Company, Calvert and Redwood Streets, Baltimore, Md. 21203
Nov. 16, 1961	SCHEIBL, JEROME A., Actuary, Wisconsin Insurance Department, State Capitol, Madison, Wis. 53702
Nov. 14, 1958	SCHLENZ, JOHN W., Senior Vice President and Actuary, Federal Life and Casualty Company, Wolverine-Federal Tower, Battle Creek, Mich.
Nov. 22, 1957	SCHNEIKER, HENRY C., Assistant Actuary, The Home Insurance Company, 59 Maiden Lane, New York 38, N. Y.
Nov. 19, 1954	SCHULMAN, JUSTIN, Mathematician, Computer Sciences, Engineers Hill, Plainview, L. I., N. Y.
Nov. 14, 1947	SCHWARTZ, MAX J., Chief Accident & Health Rating Section, N. Y. State Insurance Department, 324 State Street, Albany, N. Y. 12210
Nov. 20, 1930	SEVILLA, EXEQUIEL S., President, Manager and Actuary, National Life Insurance Company of the Philippines, Regina Bldg., P.O. Box 2056, Manila, Philippines.
Nov. 22, 1957	SHAVER, C. OTIS, Actuary, Nationwide Mutual Fire Insurance Company, 246 N. High Street, Columbus 16, Ohio.
Nov. 20, 1924	SHEPPARD, NORRIS E., Professor of Mathematics, University of Toronto, Toronto 5, Canada.
Nov. 1, 1963	SINGER, PAUL E., Assistant Vice President, Continental National Insurance Group, 310 S. Michigan Avenue, Chicago, Ill. 60604
Nov. 15, 1962	SMITH, EDWARD R., Assistant Actuary, Hartford Insurance Group, 690 Asylum Avenue, Hartford, Conn. 06115
Nov. 19, 1926	SOMERVILLE, WILLIAM F., (Retired), 1258 St. Louis Avenue, Excelsior Springs, Mo.
Nov. 18, 1925	SOMMER, ARMAND, Vice President, Continental Casualty Company, 310 S. Michigan Ave., Floor 19-W, Chicago, Ill. 60604
Nov. 15, 1918	SPENCER, HAROLD S., (Retired), 8 Chelsea Lane, West Hartford, Conn.
Nov. 1, 1963	STALEY, HARLOW B., Vice President and Director of Administration, Farm Bureau Mutual Insurance Company, 10th and Grand Streets, Des Moines, Iowa. 50307
Nov. 19, 1959	STEINHAUS, HENRY W., Partner, Smick and Steinhaus, Consulting Actuaries, 135 E. 42nd Street, New York 17, N. Y.
Nov. 20, 1924	STELLWAGEN, HERBERT P., Director, Insurance Company of North America, 1600 Arch Street, Philadelphia, Pa. 19101
Nov. 16, 1956	STERN, PHILIPP K., Actuary, Mutual Insurance Rating Bureau, 733 Third Avenue, New York 17, N. Y.
Nov. 19, 1959	STEVENS, WALDO A., Actuary, Massachusetts Automobile Rating and Accident Prevention Bureau & Massachusetts Workmen's Compensation Rating and Inspection Bureau, 89 Broad Street, Boston, Mass.
Nov. 16, 1923	STOKE, KENDRICK, (Retired), 11052 McKinney, Detroit, Mich. 48224
Nov. 19, 1959	STRUG, EMIL J., Assistant Actuary, Massachusetts Hospital Service, Inc., 133 Federal Street, Boston 6, Mass.

Admitted	
Nov. 21, 1930	SULLIVAN, WALTER F., Actuary, California State Compensation Insurance Fund, 525 Golden Gate Avenue, San Francisco 1, Calif.
Nov. 15, 1962	SWITZER, VERNON J., Associate Actuary, State Farm Mutual Automobile Insurance Company, 112 E. Washington Street, Bloomington, Ill. 61701
Nov. 1, 1963	THOMPSON, PHILIP R., Statistician, Federated Mutual Implement and Hardware Insurance Company, 129 E. Broadway, Owatonna, Minn. 55060
Nov. 21, 1919	TRENCH, FREDERICK H., Treasurer, Utica Mutual Insurance Company, P.O. Box 530, Utica 1, N. Y.
Nov. 20, 1924	UHL, M. ELIZABETH, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
Nov. 14, 1958	VAN CLEAVE, MARVIN E., Chief, Rate Div., Wisconsin Insurance Department, 113 South, State Capitol, Madison 2, Wis.
Nov. 15, 1962	VERHAGE, PAUL A., Actuarial Analyst, Hardware Mutual Casualty & Hardware Dealers Mutual Fire Insurance Company, 200 Strongs Avenue, Stevens Point, Wis.
Nov. 19, 1959	WEBER, DONALD C., Fellow, Institute of Statistics, North Carolina State College, P. O. Box 5457, Raleigh, N. C. 27606
Nov. 18, 1932	WEINSTEIN, MAX S., Actuary, New York State Employees' Retirement System, 90 S. Swan Street, Albany 1, N. Y.
Nov. 18, 1925	WELLMAN, ALEX C., Senior Vice President, Protective Life Insurance Company, P. O. Box 2571, Birmingham, Ala. 35202
Nov. 21, 1930	WELLS, WALTER I., Second Vice President, State Mutual Life Assurance Company of America, 440 Lincoln Street, Worcester, Mass.
Nov. 18, 1927	WHITBREAD, F. G., Assistant Vice President, Lincoln National Life Insurance Company, 1301-27 S. Harrison Street, Fort Wayne, Ind.
Nov. 19, 1948	WHITE, AUBREY, Vice President and Chief Actuary, Ostheimer and Company, Inc., 1510 Chestnut St., Philadelphia 2, Pa.
Nov. 16, 1939	WITTLAKE, J. CLARKE, Vice President, Business Men's Assurance Company, B M A Tower, Kansas City, Mo. 64108
Oct. 22, 1915	WOOD, DONALD M., Partner, Childs & Wood, 175 W. Jackson Boulevard, Chicago 4, Ill.
Nov. 18, 1937	WOOD, DONALD M., JR., Partner, Childs & Wood, 175 W. Jackson Boulevard, Chicago 4, Ill.
Nov. 18, 1927	WOOD, MILTON J., Vice President and Actuary, Life, Accident & Group Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 17, 1950	WOODDY, JOHN C., Actuary, North American Reassurance Company, 161 E. 42nd Street, New York 17, N. Y.
Nov. 22, 1934	WOODWARD, BARBARA H., Assistant Secretary and Regional General Counsel, The Reuben H. Donnelley Corporation, 466 Lexington Avenue, New York 17, N. Y.
Nov. 16, 1956	WOODWORTH, JAMES H., Assistant Secretary, Hartford Accident & Indemnity Company, 690 Asylum Avenue, Hartford 15, Conn.
Nov. 18, 1925	WOOLERY, JAMES M., Senior Vice President-Actuary, Occidental Life Insurance Company of North Carolina, Cameron Village, Raleigh, N. C. 27605
May 5, 1961	YOUNG, ROBERT G., Actuary, Michigan Mutual Liability Company, 28 West Adams Avenue, Detroit, Mich. 48226
Nov. 1, 1963	ZORY, P. B., Actuarial Department, National Bureau of Casualty Underwriters, 125 Maiden Lane, New York, N. Y. 10038

STUDENTS

This list includes CAS students, not yet Associates, who have received credit within the last 3 years through the May 1963 examinations for one or more parts of the Associateship examinations. Unless indicated by the symbol "F" the indicated parts credited are for the Associateship examinations.

ABBY, WILLIAM P., U. S. Fidelity & Guaranty Co., Baltimore 3, Md. (I, II, IIIa)

ADELSTEIN, VICTOR A., 70 Layman Road, West Hartford, Conn. (I)

ALLEN, PARK W., II, Bowdoin College, Brunswick, Me. (IIa)

AMBROSE, JOSEPH A., Insurance Company of North America, Philadelphia 1, Pa. (I, IIb)

AMINOV, MICHAEL M., Mutual Insurance Advisory Association, 733 3rd Avenue, New York 17, N. Y. (I)

BACHER, WILLIAM C., Employers Mutuals of Wausau, Wausau, Wisconsin (I)

BACHMAN, DAVID F., Lumbermens Mutual Casualty Co., Chicago 40, Illinois (I)

BAINE, MORTON B., 128 Avenue N, Brooklyn 30, N. Y. (I, II, IIIa)

BANDES, STEPHEN, Mutual Insurance Rating Bureau, New York, N. Y. (IIa)

BARTIK, ROBERT F., 743 Countryside Highway, Mundelein, Ill. (I, II, IIIb)

BATISTA, SAMUEL, Puerto Rico Insurance Dept., Santurce, P. R. (I, IIb, IIIa)

BAUR, JAMES G., U. S. Fidelity & Guaranty Co., Baltimore 3, Md. (I, II)

BEARDSLEY, CHARLES M., Security Life & Trust Co., Winston-Salem, N. C. (I, II, III)

BELL, ALLAN A., Aetna Casualty & Surety Co., Hartford 15, Conn. (I, II, III)

BELL, HERBERT, Peerless Insurance Co., New York 38, N. Y. (IIa, III, IF)

BLAHA, JAMES M., JR., Continental Casualty Co., Chicago 4, Ill. (I, IIa)

BLAND, WILLIAM H., The Travelers Insurance Co., Hartford 15, Conn. (IIa, IIIa, IV)

BOCHICHIO, LOUIS R., 414 S. 4th Street, Brooklyn 11, N. Y. (IIa)

BRADFORD, JOHN A., Continental Casualty Co., Chicago 4, Ill. (I. IIa, III)

BRENNAN, JOSEPH F. X., JR., The Home Insurance Co., New York 8, N. Y. (IV)

BREWER, RICHARD T., National Bureau of Casualty Underwriters, New York 38, N. Y. (III, IV)

BRIAN, ROBERT A., Travelers Insurance Co., Hartford 15, Conn. (I, IIa, III)

BROWN, WILLIAM W., JR., Liberty Mutual Insurance Co., Boston 17, Mass. (I, IIa, III, IV)

BURKE, JOSEPH P., 873 N. LaSalle Street, Chicago, Ill. (I)

BURNS, WILLIAM O., State Farm Life Insurance Co., Bloomington, Ill. (I, II, III)

CAPSALIS, JOHN, 28-07 Ditmars Blvd., Astoria 5, N. Y. (III)

CARLSON, EDWIN A., 3 Ames Street, Cambridge 39, Mass. (I, II, III)

CASSEL, DOYT L., 79 Redar Drive, Schererville, Ind. (I, II)

CENTER, ALDEN C., American Mutual Liability Insurance Co., Wakefield, Mass. (IIIb)

CHANG, YUAN, Travelers Insurance Co., Hartford 15, Conn., (I, II, III)

CHAO, BEATRICE, 105-25 67th Avenue, Forest Hills 75, N. Y. (I, IIIa)

CHERINS, ROBERT H., 142 E. 96th Street, Brooklyn 12, N. Y. (IIIb)

CHORPITA, FRED M., National Council on Compensation Insurance, New York 17, N. Y. (I, IIb)

CLEARY, JAMES P., Aetna Casualty & Surety Co., Hartford 15, Conn. (IIa)

COOK, CHARLES F., 2010 Fairland Avenue, Bethlehem, Pa. (II, III)

CORCORAN, JAMES C., American Motorists Insurance Co., Chicago 40, Ill. (III, IV, IF)

COVITZ, BURTON, American Mutual Liability Insurance Co., Wakefield, Mass. (I, IIb)

CRAIN, JASON, 1232 Union Commerce Bldg., Cleveland, Ohio (IIIb, IV)

DAVIS, REX C., Hardware Mutual Casualty Co., Stevens Point, Wis (I, II, IIIa)

DeBolt, ROBERT E., State Automobile Mutual Insurance Co., Columbus 16, Ohio (I)

DOMINQUEZ, SALVADOR, National Bureau of Casualty Underwriters, New York 38, N. Y. (I)

DOTCHIN, LESLIE W., JR., 41 Woodland Street, Wethersfield 9, Conn. (I)

DOUGLAS, DEBORAH, Great American Insurance Co., New York 38, N. Y. (I)

DUNHAM, GORDON B., Continental Casualty Co., Chicago 4, Ill. (I, II, IIIa)

DUNNING, DONALD L., Zurich Insurance Co., Chicago 6, Ill. (I, IIa)

DUNNING, MARDELLE R., 608-C N. Broadway, Lombard, Ill. (I, IIb)

DWYER, JOHN T., Continental Casualty Co., Chicago 4, Ill. (I, IIb, III)

EDWARDS, RANDOLPH J., U. S. Fidelity & Guaranty Co., Baltimore 3, Md. (IIa, IIIa)

ELIASON, EDWARD B., 43 Bedford Avenue, Hamden 17, Conn. (II)

EYERS, ROBERT G., Hardware Mutual Casualty Co., Stevens Point, Wis. (I, II, IIIa)

FABER, JAMES A., Travelers Insurance Co., Hartford 15, Conn. (IIa, IV)

FARNAM, WALTER E., Rocky Hill Road, North Scituate, R. I. (I)

FERRARI, JOHN R., 4105 Spruce Street (B-6), Philadelphia 4, Pa. (IIIb)

FLAHERTY, DANIEL J., National Council on Compensation Insurance, New York 17, N. Y. (I)

FORD, HARVEY, Liberty Mutual Insurance Co., New Castle, Pa. (I)

FORKER, DAVID C., Travelers Insurance Co., Hartford 15, Conn. (I, II, III)

FOWLER, DAVID B., 24 Westerly Terrace, East Hartford, Conn. (I, IIb)

FRANKOVICH, ERNEST, National Association of Independent Insurers, Chicago 3, Ill. (I)

FRIEDBERG, THOMAS H., Continental Casualty Co., Chicago 4, Illinois (II)

FULTON, CLYDE B., JR., Gracey Road, Canton, Conn. (I)

GALSON, S. P., National Bureau of Casualty Underwriters, New York 38, N. Y. (III)

GENEBACH, LOWELL B., JR., 60 Central Street, Battle Creek, Mich. (IIa)

GIBSON, JOHN A., III, Travelers Insurance Co., Hartford 15, Conn. (I, III, IV)

GLASS, ANNE, 935 Melrose Avenue, Philadelphia 26, Pa. (I)

GOLDBERG, SARAH, New York State Insurance Dept., New York 38, N. Y. (I, III)

GOLDMAN, ROBERT, 1534 Stevens Street, Philadelphia, Pa. (I, IIa)

GREGORY, R. SCOTT, Rt. 1 Box 501, Vashon, Washington (I)

GROENEVELD, RICHARD A., Liberty Mutual Insurance Co., Boston, Mass. (I)

GUARINI, LEONARD, 193-15 Williamson Avenue, Queens 34, N. Y. (I)

HACHEMEISTER, CHARLES A., 497 E. 43 Street, Brooklyn 3, N. Y. (I, II)

HANSEN, HANS C., 451 W. Mifflin, Madison, Wis. (I)

HANSON, H. DONALD, Continental Casualty Co., Chicago 4, Ill. (I, II, IIIa)

HARTMAN, DAVID G., 930 Wesley Avenue, Evanston, Ill. (I)

HARTMAN, GERALD R., 4 Shedwick Place, Philadelphia 4, Pa. (IIIb, IV)

HARTMANN, KENNETH R., Continental Casualty Co., Chicago 4, Ill. (I)

HERMAN, F. LEE, State Farm Mutual Automobile Ins. Co., Bloomington, Ill. (II, III, IV, FII)

HIGGINS, JACK T., Employers Casualty Co., Dallas, Texas (I, II)

HILL, JOHN S., 2 Byrd Street, Rye, N. Y. (I, II)

HINDES, WALTER E., The Fund Insurance Cos., San Francisco, Calif. (I, IIIa)

HOLT, WILLIAM T., Travelers Insurance Co., Hartford 15, Conn. (I, IIIa)

HONEBEIN, CARLTON W., National Bureau of Casualty Underwriters, New York 38, N. Y. (I, IIa, III, IV)

HORNER, ARNOLD G., 26 Brentwood Drive, McKees Rocks, Pa. (I)

HUETTNER, CYRIL J., Hardware Mutuals Sentry Life, Stevens Point, Wis. (IIIb)

HULL, LARRY G., 35 Forest Drive, Newington, Conn. (I)

HUNTER, JOHN R., JR., Atlantic Mutual Insurance Co., New York 5, N. Y. (I, II, IIIa)

IRWIN, RODNEY L., Nationwide Mutual Insurance Co., Columbus 16, Ohio (I, IIb)

JONES, LINDA M., 2225 Lenox Road, N. E., Apt. S, Atlanta, Ga. (IIb)

KAMINOFF, HARVEY, Great American Insurance Co., New York 38, N. Y. (IIa, IIIa)

KAUR, ALAN F., American Mutual Liability Insurance Co., Wakefield, Mass. (IIIa)

KEMBLE, JAMES W., Farm Bureau Insurance Cos., Des Moines 8, Iowa (I, II, III)

KENNEDY, ROY H., U. S. Fidelity & Guaranty Co., Baltimore 3, Md. (I, III)

KENNEDY, THOMAS A., 616 West 165 Street, New York 32, N. Y. (I, II)

KEYS, ROBERT W., 222 Grant, Park Forest, Ill. (IV)

KHURY, COSTANDY K., State Farm Mutual Automobile Ins. Co., Bloomington, Ill. (I, II, IIIa, IV)

KILBOURNE, FREDERICK W., 4627 Jessica Drive, Los Angeles 65, Calif. (I, IIa, IIIb)

KIM, BYONG W., Crop-Hail Ins. Actuarial Assn., Chicago 6, Ill. (I, IIb)

LANGE, JULIAN E., 1476 Orchard Terrace, Hillside 5, New Jersey (I, IIb)

LARSON, ROBERT M., Nebraska Department of Insurance, Lincoln, Nebraska (I)

LASTOVICA, NORMAN J., Liberty Mutual Insurance Co., Boston 17, Mass. (IIIa)

LAURENZANO, MICHAEL S., 72 Ocean Court, Brooklyn 35, N. Y. (I)

LESLIE, WILLIAM H., 6 Whipple Avenue, Cranston, R. I. (I, II)

LEVIN, JOSEPH W., State Farm Fire & Casualty Co., Bloomington, Ill. (I, IIa)

LEVIS, JAMES J., Lumbermens Mutual Casualty Co., Chicago 40, Ill. (IV)

LINQUANTI, AUGUST J., 3260 Perry Avenue, Bronx 67, N. Y. (I, IIa, IIIa)

LOFGREN, PAUL G., Liberty Mutual Insurance Co., Boston 17, Mass. (IIIb, IV)

LORMAN, WALTER E., III, Federated Mutual Implement & Hardware Ins. Co., Owatonna, Minn. (IIb, III, IV)

LOWE, ROBERT F., Fireman's Fund Insurance Co., San Francisco 20, Calif. (I, IIb, IIIa)

McBIRNEY, BRUCE H., 629 S. Spring Street, Los Angeles 14, Calif. (IIa, IV, IF)

McCLINTOCK, JOHN S., Travelers Insurance Co., Hartford 15, Conn., (I, II, III)

McDONALD, CHARLES, Texas Employers' Insurance Assn., Dallas 21, Texas (II, III, IV)

McLINDEN, LYNN, Princeton University, Princeton, New Jersey (I)

MASTERSON, WILLIAM E., JR., Wesleyan University, Middletown, Conn. (I, II)

MATTHEWS, JOHN L., The Employers' Group of Insurance Cos., Boston 7, Mass. (I)

MERTES, ROBERT A., 5235 Pensacola, Chicago, Ill. (I, IIa)

MILLER, DANA E., National Bureau of Casualty Underwriters, New York 38, N. Y. (I)

MILLER, PAUL V., Employers Reinsurance Corp., Kansas City, Mo. (III, IV, IF)

MILSOP, ALLAN C., 285 Maple Road, Springfield, Mass. (I)

MOKROS, BERTRAM F., Allstate Insurance Co., Menlo Park, Calif. (I, II, III)

MULVIHILL, FRANCIS X., Continental Casualty Co., Chicago 4, Ill. (I, IIa)

MUNRO, RICHARD E., State Farm Mutual Automobile Ins. Co., Bloomington, Ill. (IIIa)

MURRAY, EDWARD R., 5927 Ridge Avenue, Berkeley, Ill. (I, II, IIIb)

NAFFZIGER, JOSEPH V., State Farm Mutual Automobile Ins. Co., Bloomington, Ill. (I, IIIb, IV)

NAGEL, J. RICHARD, Maryland Casualty Co., Baltimore 3, Md. (IIb, III, IV)

NELSON, HOMER, Great American of Dallas, Dallas 1, Texas (I, II, III)

NELSON, JOHN K., State Farm Mutual Automobile Ins. Co., Bloomington, Ill. (I, IIb)

NEWMAN, STEVE H., Smick & Steinhaus, New York 17, N. Y. (I)

PANDULLO, NICHOLAS J., 79 Starbuck Street, Staten Island 4, N. Y. (IIIb)

PARMER, JONATHAN B., Princeton University, Princeton, New Jersey (I, IIa)

PATRICELLI, ALFONZO, 1813 N. Keystone, Chicago, Ill. (I, IIb)

PERREAULT, STEPHEN L., Trinity College, Hartford, Conn. (I, IIa)

PETERSIEL, ALFRED S., Mutual Insurance Advisory Assn., New York, N. Y. (I, IIb)

PETERSON, NILS A., 1408 W. 94 Street, Chicago 20, Ill. (I)

PIERSOL, DONALD E., Travelers Insurance Co., Hartford 15, Conn. (IIb, III, IV, IF)

PILLSBURY, DONALD D., National Bureau of Casualty Underwriters, New York 38, N. Y. (IIIa)

PITTARI, LOUIS V., 58 Elizabeth Street, New York 13, N. Y. (IV)

PRICE, EDITH E., Kemper Insurance, Chicago, Ill. (I, IIa)

PRIGER, RAYMOND, 1 Daley Place, Lynbrook, Long Island (IIIb)

PUSTAVER, JOHN A., JR., Kemper Insurance, Chicago, Ill. (I)

QUINLAN, JOHN A., Hartford Accident & Indemnity Co., Hartford 15, Conn. (I, IIa, IIIa)

RABBAT, MICHAEL A., The Seville, New York 16, N. Y. (I, II)

RAID, GARY A., State Farm Insurance Cos., Bloomington, Ill. (I, II, IIIa)

RATNASWAMY, RAJARATNAM, Mutual Service Insurance Cos., St. Paul 4, Minn. (II, III, IV)

REILLY, FRANCIS V., 2073 E. 9th Street, Brooklyn 1, N. Y. (I, IIa, III, IV)

RICHARDSON, JAMES F., 106 College Avenue, New Brunswick, New Jersey (I, II)

RICHARDSON, WALKER S., Liberty Mutual Insurance Co., Boston 17, Mass. (IIa, III, IV, IF)

RICHMOND, GERALD, American Mutual Liability Ins. Co., Wakefield, Mass. (I, II)

ROGERS, DANIEL J., Continental Casualty Co., Chicago 4, Ill. (I, II, III, IF)

ROMIG, GEORGE M., Marsh & McLennan, Inc., Pittsburgh, Pa. (I)

ROSE, JAMES C., U. S. Fidelity & Guaranty Co., Baltimore 3, Md. (I, IIa, III)

ROSEL, RICHARD G., Mutual Service Casualty Insurance Co., St. Paul 4, Minn. (IIIb, IV)

ROTHENBERG, LEON, American Mutual Liability Ins. Co., Wakefield, Mass. (I, IIa)

RUBIN, ROBERT H., Continental Casualty Co., Chicago 4, Ill. (I, II, III, FII)

SCHEID, JAMES E., Hartford Accident & Indemnity Co., Hartford 15, Conn. (I, II, III)

SCHULER, ROBERT, Hospital Service Assn. of Western Pennsylvania, Pittsburgh, Pa. (I, IIa, III)

SCOTT, BRIAN E., Aetna Casualty & Surety Co., Hartford 15, Conn. (IIa, III)

SCOTT, JAMES E., JR., Great American Reserve Ins. Co., Dallas, Texas (I)

SENA, JAMES A., 2770 Sarita Place, Cincinnati 8, Ohio (I, IIa)

SHERRILL, THOMAS C., 3039 Vista Brook Drive, Decatur, Ga. (I, II, IIIa)

SNOW, BRADFORD O., 393 Lloyd Avenue, Providence 6, R. I. (IIb)

STAPLEY, KENYON R., Allstate Insurance Co., Skokie, Ill. (III)

STREETT, THOMAS B., JR., U. S. Fidelity & Guaranty Co., Baltimore 3, Md. (IIIa)

STURGEON, PURSER K., Lumbermens Mutual Casualty Co., Chicago 40, Ill. (I, IIa)

SWANSON, CONSTANCE M., 185 Lake Street, Westwood, New Jersey (I)

TAYLOR, DOUGLAS G., 8 Robin Road, Longmeadow 6, Mass. (I)

THOLEN, JOHN P., 130-53 220th Street, Springfield Gardens 13, N. Y. (IIa, IIIa)

THOMAS, PATRICK E., State Farm Mutual Automobile Ins. Co., Bloomington, Ill. (IV)

TOREN, CHESTER J., Zurich Insurance Co., Chicago 6, Ill. (I, II, III)

TORGRIMSON, DARVIN A., Employers Mutuals of Wausau, Wausau, Wis. (I, IIb, III)

TREES, JOHN S., Allstate Insurance Co., Skokie, Ill. (I, II, IIIa)

TUCKER, THOMAS F., Continental Casualty Co., Chicago 4, Ill. (II, III, IV, FI, FII, FIII, FIV)

UHLENHOP, HENRY L., JR., 104 Magnolia Drive, Bloomington, Illinois, (IIIb, IV)

UNFERTH, ROBERT D., 201 S. Gilbert Avenue, LaGrange, Ill. (I)

WALLACE, ALAN B., Trinity College, Hartford 6, Conn. (I)

WALTON, HOWARD L., 418 W. Ruscomb Street, Philadelphia, Pa. (I, IIb)

WEBB, BERNARD L., Hardware Mutuals, Stevens Point, Wis. (II, III, IV, FI)

WEIN, PAUL S., 1030 Boynton Avenue, Bronx 72, N. Y. (IIIa)

WELCH, JOHN P., 21 Wildwood Avenue, Pitman, New Jersey (I, IIb)

WILDE, EARL J., JR., Hospital Service Assn. of New Orleans, New Orleans 13, La. (IIa)

WILLIAMS, WILLIAM T., JR., 400 N. Stanwick Rd., Moorestown, New Jersey (I, II, III)

WOODRUM, LUTHER J., Continental Casualty Co., Chicago 4, Ill. (I)

YOUNG, RICHARD H., Consolidated Mutual Insurance Co., Brooklyn 1, N. Y. (IIa)

Elected	President	Vice-Presidents	
1914-1915	*Isaac M. Rubinow	*Albert H. Mowbray	*Benedict D. Flynn
1916-1917	*James D. Craig	*Joseph H. Woodward	*Harwood E. Ryan
1918	*Joseph H. Woodward	*Benedict D. Flynn	*George D. Moore
1919	*Benedict D. Flynn	*George D. Moore	*William Leslie
1920	*Albert H. Mowbray	*William Leslie	*Leon S. Senior
1921	*Albert H. Mowbray	*Leon S. Senior	*Harwood E. Ryan
1922	*Harwood E. Ryan	Gustav F. Michelbacher	*Edmund E. Cammack
1923	*William Leslie	Gustav F. Michelbacher	*Edmund E. Cammack
1924-1925	Gustav F. Michelbacher	*Sanford B. Perkins	Ralph H. Blanchard
1926-1927	*Sanford B. Perkins	*George D. Moore	*Thomas F. Tarbell
1928-1929	*George D. Moore	Sydney D. Pinney	Paul Dorweiler
1930-1931	*Thomas F. Tarbell	*Roy A. Wheeler	Winfield W. Greene
1932-1933	Paul Dorweiler	*William F. Roeber	*Leon S. Senior
1934-1935	Winfield W. Greene	Ralph H. Blanchard	Charles J. Haugh
1936-1937	*Leon S. Senior	Sydney D. Pinney	*Francis S. Perryman
1938-1939	*Francis S. Perryman	Harmon T. Barber	*William J. Constable
1940	Sydney D. Pinney	Harold J. Ginsburgh	James M. Cahill
1941	Ralph H. Blanchard	Harold J. Ginsburgh	James M. Cahill
1942	Ralph H. Blanchard	Albert Z. Skelding	Charles J. Haugh
1943-1944	Harold J. Ginsburgh	Albert Z. Skelding	Charles J. Haugh
1945-1946	Charles J. Haugh	James M. Cahill	Harry V. Williams
1947-1948	James M. Cahill	Harmon T. Barber	Russell P. Goddard
1949-1950	Harmon T. Barber	Thomas O. Carlson	Norton E. Masterson
1951-1952	Thomas O. Carlson	Joseph Linder	Seymour E. Smith
1953-1954	Seymour E. Smith	Dudley M. Pruitt	John A. Mills
1955-1956	Norton E. Masterson	*Clarence A. Kulp	Arthur N. Matthews
1957-1958	Dudley M. Pruitt	John W. Carleton	William Leslie, Jr.
1959-1960	William Leslie, Jr.	Ernest T. Berkeley	Laurence H. Longley-Cook
1961-1962	L. H. Longley-Cook	Thomas E. Murrin	Richard J. Wolfrum
1963	Thomas E. Murrin	Harold E. Curry	William J. Hazam

Secretary-Treasurer
1914-1917...*C. E. Scattergood
1918-1953........*R. Fondiller
1954-1963.......A. Z. Skelding

Editor†
1914 ....W. W. Greene
1915-1917........*R. Fondiller
1918............W. W. Greene
1919-1921....G. F. Michelbacher
1922-1923.......O. E. Outwater
1924-1932.....*R. J. McManus
1933-1943.......*C. W. Hobbs
1944-1954......E. C. Maycrink
1955-1958..........E. S. Allen
1959-1960.......R. P. Goddard
1961-1963.......H. W. Schloss

General Chairman
Examination Committee
1949-1951.......R. A. Johnson
1952-1956....J. W. Wieder, Jr.
1957-1961 ....W. J. Hazam
1962-1963........N. J. Bennett

Librarian†
1914............W. W. Greene
1915.............*R. Fondiller
1916-1921.........L. I. Dublin
1922-1924........*E. R. Hardy
1925-1936...........W. Breiby
1937-1947.......T. O. Carlson
1948-1950..........*S. M. Ross
1951-1957.....G. R. Livingston
1958-1963.............R. Lino

*Deceased. †The offices of Editor and Librarian were not separated until 1916.

The (†) denotes charter members at date of organization, November 7, 1914.

Admitted			Died
Nov.	19, 1948	Arthur L. Bailey	Aug. 12, 1954
May	23, 1924	William B. Bailey	Jan. 10, 1952
	†	Roland Benjamin	July 2, 1949
May	24, 1921	Edward J. Bond	Nov. 12, 1941
May	19, 1915	Thomas Bradshaw	Nov. 10, 1939
June	5, 1925	William Brosmith	Aug. 22, 1937
	†	George B. Buck, Sr.	Apr. 12, 1961
	†	William A. Budlong	June 4, 1934
Nov.	18, 1932	Charles H. Burhans	June 15, 1942
Apr.	20, 1917	William H. Burhop	Oct. 11, 1963
Feb.	19, 1915	F. Highlands Burns	Mar. 30, 1935
	†	Edmund E. Cammack	Dec. 17, 1958
	†	Raymond V. Carpenter	Mar. 11, 1947
Feb.	19, 1915	Gorden Case	Feb. 4, 1920
Oct.	27, 1916	Edmund S. Cogswell	Apr. 25, 1957
Nov.	23, 1928	Walter P. Comstock	May 11, 1951
Nov.	22, 1934	William J. Constable	Apr. 19, 1959
	†	Charles T. Conway	July 23, 1921
	†	John A. Copeland	June 12, 1953
	†	Walter G. Cowles	May 30, 1942
	†	James D. Craig	May 27, 1940
	†	James McIntosh Craig	Jan. 20, 1922
May	26, 1916	Frederick S. Crum	Sept. 2, 1921
	†	Alfred Burnett Dawson	June 21, 1931
	†	Miles Menander Dawson	Mar. 27, 1942
	†	Elmer H. Dearth	Mar. 26, 1947
	†	Eckford C. DeKay	July 31, 1951
May	19, 1915	Samuel Deutschberger	Jan. 18, 1929
	†	Ezekiel Hinton Downey	July 9, 1922
May	19, 1915	Earl O. Dunlap	July 5, 1944
	†	David Parks Fackler	Oct. 30, 1924
	†	Edward B. Fackler	Jan. 8, 1952
Feb.	19, 1915	Claude W. Fellows	July 15, 1938
	†	Benedict D. Flynn	Aug. 22, 1944
Feb.	19, 1915	Richard Fondiller	Apr. 29, 1962
	†	Charles S. Forbes	Oct. 2, 1943
May	26, 1916	Lee K. Frankel	July 25, 1931
	†	Charles H. Franklin	May 1951
Feb.	25, 1916	Joseph Froggatt	Sept. 28, 1940
	†	Harry Furze	Dec. 26, 1945
Feb.	19, 1915	Fred S. Garrison	Nov. 14, 1949
	†	Theodore E. Gaty	Aug. 22, 1925
May	19, 1915	James W. Glover	July 15, 1941
Oct.	22, 1915	George Graham	Apr. 15, 1937
Oct.	22, 1915	Thompson B. Graham	July 24, 1946
	†	William J. Graham	Feb. 11, 1963

Admitted		Died
May 25, 1923	William A. Granville	Feb. 4, 1943
†	William H. Gould	Oct. 28, 1936
†	Robert Cowen Lees Hamilton	Nov. 15, 1941
†	H. Pierson Hammond	Apr. 10, 1963
Oct. 27, 1916	Edward R. Hardy	June 29, 1951
Oct. 22, 1915	Leonard W. Hatch	Nov. 23, 1958
Nov. 21, 1919	Robert Henderson	Feb. 16, 1942
†	Robert J. Hillas	May 17, 1940
Nov. 15, 1918	Frank Webster Hinsdale	Mar. 18, 1932
May 23, 1924	Clarence W. Hobbs	July 21, 1944
Nov. 19, 1926	Charles E. Hodges	Jan. 22, 1937
Oct. 22, 1915	Lemuel G. Hodgkins	Dec. 26, 1951
†	Frederick L. Hoffman	Feb. 23, 1946
Oct. 22, 1915	Charles H. Holland	Dec. 28, 1951
Nov. 21, 1919	Carl Hookstadt	Mar. 10, 1924
†	Charles Hughes	Aug. 27, 1948
Nov. 19, 1929	Robert S. Hull	Nov. 30, 1947
†	Burritt A. Hunt	Sept. 3, 1943
Nov. 28, 1921	William Anderson Hutcheson	Nov. 19, 1942
Feb. 25, 1916	Charles William Jackson	Sept. 21, 1959
Nov. 19, 1929	Henry Hollister Jackson	May 27, 1955
May 19, 1915	William C. Johnson	Oct. 7, 1943
Nov. 23, 1928	F. Robertson Jones	Dec. 26, 1941
Nov. 18, 1921	Thomas P. Kearney	Feb. 11, 1928
Nov. 19, 1926	Gregory Cook Kelly	Sept. 11, 1948
Oct. 22, 1915	Virgil Morrison Kime	Oct. 15, 1918
†	Edwin W. Kopf	Aug. 3, 1933
Nov. 23, 1928	Clarence Arthur Kulp	Aug. 20, 1957
Feb. 17, 1915	John M. Laird	June 20, 1942
Nov. 13, 1931	Stewart M. LaMont	Aug. 22, 1960
Feb. 19, 1915	Abb Landis	Dec. 9, 1937
Nov. 24, 1933	John Robert Lange	Apr. 12, 1957
Nov. 17, 1922	Arnette Roy Lawrence	Dec. 1, 1942
†	James R. Leal, Sr.	Dec. 26, 1957
†	William Leslie	Dec. 12, 1962
Nov. 18, 1921	James Fulton Little	Aug. 11, 1938
Nov. 23, 1928	Edward C. Lunt	Jan. 13, 1941
Feb. 19, 1915	Harry Lubin	Dec. 20, 1920
†	William N. Magoun	Dec. 11, 1954
Nov. 16, 1923	D. Ralph McClurg	Apr. 27, 1947
May 23, 1919	Alfred McDougald	July 28, 1944
Oct. 31, 1917	Robert J. McManus	Aug. 15, 1960
Feb. 15, 1915	Franklin B. Mead	Nov. 29, 1933
Apr. 20, 1917	Marcus Meltzer	Mar. 27, 1931
†	David W. Miller	Jan. 18, 1936
†	James F. Mitchell	Feb. 9, 1941

Admitted		*Died*
†	Henry Moir	June 8, 1937
Nov. 18, 1921	Victor Montgomery	May 2, 1960
Feb. 19, 1915	William J. Montgomery	Aug. 20, 1915
Nov. 19, 1926	William L. Mooney	Oct. 21, 1948
†	George D. Moore	Mar. 11, 1959
May 19, 1915	Edward Bontecou Morris	Dec. 19, 1929
†	Albert H. Mowbray	Jan. 7, 1949
†	Frank Mullaney	Jan. 22, 1953
†	Lewis A. Nicholas	Apr. 21, 1940
†	Edward Olifiers	May 13, 1962
†	Stanley L. Otis	Oct. 12, 1937
Nov. 13, 1926	Bertrand A. Page	July 30, 1941
Nov. 18, 1921	Sanford B. Perkins	Sept. 16, 1945
Nov. 15, 1918	William Thomas Perry	Oct. 25, 1940
Nov. 21, 1930	Francis S. Perryman	Nov. 30, 1959
†	Edward B. Phelps	July 24, 1915
Nov. 19, 1926	Jesse S. Phillips	Nov. 6, 1054
†	Charles Grant Reiter	July 30, 1937
†	Charles H. Remington	Mar. 21, 1938
May 23, 1919	Frederick Richardson	July 22, 1955
Nov. 19, 1926	Otto C. Richter	Feb. 17, 1962
Nov. 16, 1923	William F. Roeber	Mar. 21, 1960
Nov. 17, 1943	Samuel M. Ross	July 24, 1951
†	Isaac M. Rubinow	Sept. 1, 1936
†	Harwood Eldridge Ryan	Nov. 2, 1930
†	Arthur F. Saxton	Feb. 26, 1927
†	Emil Scheitlin	May 2, 1946
†	Leon S. Senior	Feb. 3, 1940
Nov. 24, 1933	Robert V. Sinnott	Dec. 15, 1952
Apr. 20, 1917	Charles Gordon Smith	June 22, 1938
Feb. 19, 1915	John T. Stone	May 9, 1920
Feb. 25, 1916	Wendell Melville Strong	Mar. 30, 1942
Oct. 22, 1915	William R. Strong	Jan. 10, 1946
†	Robert J. Sullivan	July 19, 1934
Nov. 17, 1920	Thomas F. Tarbell	July 2, 1958
Nov. 22, 1934	Walter H. Thompson	May 25, 1935
Nov. 18, 1921	Guido Toja	Feb. 28, 1933
†	John L. Train	June 12, 1958
Nov. 17, 1922	Antonio Thomas Traversi	Apr. 20, 1961
Nov. 19, 1948	Paul A. Turner	Jan. 30, 1961
Nov. 15, 1935	Harry V. Waite	Aug. 14, 1951
Nov. 18, 1925	Lloyd A. H. Warren	Sept. 30, 1949
May 23, 1919	Archibald A. Welch	May 8, 1945
Nov. 19, 1926	Roy A. Wheeler	Aug. 26, 1932
†	Albert W. Whitney	July 27, 1943
†	Lee J. Wolfe	Apr. 28, 1949
†	S. Herbert Wolfe	Dec. 31, 1927
May 24, 1921	Arthur B. Wood	June 14, 1952
†	Joseph H. Woodward	May 15, 1928
†	William Young	Oct. 23, 1927

Admitted		Died
May 23, 1924	Milton Acker	Aug. 16, 1956
Oct. 22, 1915	Don A. Baxter	Feb. 10, 1920
Nov. 17, 1920	Nellas C. Black	Dec. 24, 1962
Nov. 15, 1940	John M. Blackhall	Nov. 14, 1957
Nov. 15, 1918	Helmuth G. Brunnquell	June 3, 1958
Oct. 22, 1915	Louis Buffler	July 19, 1963
May 25, 1923	Harilaus E. Economidy	Apr. 13, 1948
Nov. 20, 1924	John Froberg	Oct. 11, 1949
Nov. 19, 1929	Maurice L. Furnivall	June 16, 1962
Nov. 22, 1934	John J. Gately	Nov. 3, 1943
Nov. 14, 1947	Harold J. George	Apr. 1, 1952
Nov. 19, 1929	Harold R. Gordon	July 8, 1948 .
Nov. 18, 1921	Robert E. Haggard	July 26, 1958
Nov. 20, 1924	Leslie LeVant Hall	Mar. 8, 1931
Oct. 31, 1917	Edward T. Jackson	May 8, 1939
Nov. 17, 1922	Rosswel A. McIver	Apr. 1, 1959
Nov. 21, 1919	Rolland V. Mothersill	July 25, 1949
Nov. 19, 1929	Fritz Muller	Apr. 27, 1945
Nov. 23, 1928	Karl Newhall	Oct. 24, 1944
Nov. 15, 1918	John L. Sibley	Mar. 10, 1957
Nov. 18, 1921	Arthur G. Smith	May 2, 1956
Nov. 18, 1927	Alexander A. Speers	June 25, 1941
Mar. 23, 1921	Arthur E. Thompson	Jan. 17, 1944
Nov. 21, 1919	Walter G. Voogt	May 8, 1937
May 23, 1919	Charles S. Warren	May 1, 1952
Nov. 18, 1925	James H. Washburn	Aug. 19, 1946
Nov. 17, 1920	James J. Watson	Feb. 23, 1937
Nov. 18, 1921	Eugene R. Welch	Jan. 17, 1945
Nov. 16, 1951	Michael T. Wermel	Feb. 6, 1962
Mar. 21, 1929	Charles A. Wheeler	July 2, 1956
Nov. 15, 1918	Albert Edward Wilkinson	June 11, 1930
Oct. 22, 1915	Charles E. Woodman	Dec. 16, 1955

SCHEDULE OF MEMBERSHIP, NOVEMBER 1, 1963

	Fellows	Associates	Total
Membership, November 15, 1962.......	207	177	384
Additions:			
By Election	...	...	...
By Reinstatement	...	1	1
By Examination	8	14	22
	215	192	407
Deductions:			
By Death	3	2	5
By Withdrawal	...	1	1
By Transfer from Associate to Fellow	...	8	8
	212	181	393

ARTICLE I.—*Name.*

This organization shall be called the CASUALTY ACTUARIAL SOCIETY.

ARTICLE II.—*Object.*

The object of the Society shall be the promotion of actuarial and statistical science as applied to the problems of insurance, other than life insurance, by means of personal intercourse, the presentation and discussion of appropriate papers, the collection of a library and such other means as may be found desirable.

The Society shall take no partisan attitude, by resolution or otherwise, upon any question relating to insurance.

ARTICLE III.—*Membership.*

The membership of the Society shall be composed of two classes, Fellows and Associates. Fellows only shall be eligible to office or have the right to vote.

The Fellows of the Society shall be the present Fellows and those who may be duly admitted to Fellowship as hereinafter provided. The Associates shall be the present Associates and those who may be duly admitted to Associateship as hereinafter provided.

Any person may, upon nomination to the Council by two Fellows of the Society and approval by the Council of such nomination with not more than two negative votes, become enrolled as an Associate of the Society, provided that he shall pass such examination as the Council may prescribe.

Any person who shall have qualified for Associateship may become a Fellow on passing such final examination as the Council may prescribe. Otherwise, no one shall be admitted as a member unless recommended by a duly called meeting of the Council with not more than two negative votes in a secret ballot, followed by at least a three-fourths secret ballot of the Fellows present and voting at a meeting of the Society.

ARTICLE IV.—*Officers and Council.*

The officers of the Society shall be a President, two Vice-Presidents, a Secretary-Treasurer, an Editor, a Librarian, and a General Chairman of the Examination Committee. The Council shall be composed of the active officers, nine other Fellows and, during the four years following the expiration of their terms of office, the ex-Presidents and ex-Vice-Presidents. The Council shall fill vacancies occasioned by death or resignation of any officer or other member of the Council, such appointees to serve until the next annual meeting of the Society.

ARTICLE V.—*Election of Officers and Council.*

The President, Vice-Presidents, and the Secretary-Treasurer shall be elected by a majority ballot at the annual meeting for the term of one year and three members of the Council shall, in a similar manner, be annually elected to serve

for three years. The President and Vice-Presidents shall not be eligible for the same office for more than two consecutive years nor shall any retiring member of the Council be eligible for re-election at the same meeting.

The Editor, the Librarian and the General Chairman of the Examination Committee shall be elected annually by the Council at the Council meeting preceding the annual meeting of the Society. They shall be subject to confirmation by majority ballot of the Society at the annual meeting.

The terms of the officers shall begin at the close of the meeting at which they are elected except that the retiring Editor shall retain the powers and duties of office so long as may be necessary to complete the then current issue of *Proceedings*.

ARTICLE VI.—*Duties of Officers and Council.*

The duties of the officers shall be such as usually appertain to their respective offices or may be specified in the by-laws. The duties of the Council shall be to pass upon candidates for membership, to decide upon papers offered for reading at the meetings, to supervise the examination of candidates and prescribe fees therefor, to call meetings, and in general, through the appointment of committees and otherwise, to manage the affairs of the Society.

ARTICLE VII.—*Meetings.*

There shall be an annual meeting of the Society on such date in the month of November as may be fixed by the Council in each year, but other meetings may be called by the Council from time to time and shall be called by the President at any time upon the written request of ten Fellows. At least two weeks notice of all meetings shall be given by the Secretary.

ARTICLE VIII.—*Quorum.*

Seven members of the Council shall constitute a quorum. Twenty Fellows of the Society shall constitute a quorum.

ARTICLE IX.—*Expulsion or Suspension of Members.*

Except for non-payment of dues, no member of the Society shall be expelled or suspended save upon action by the Council with not more than three negative votes followed by a three-fourths ballot of the Fellows present and voting at a meeting of the Society.

ARTICLE X.—*Amendments.*

This constitution may be amended by an affirmative vote of two-thirds of the Fellows present at any meeting held at least one month after notice of such proposed amendment shall have been sent to each Fellow by the Secretary.

(As Amended November 19, 1954)

Article I.— *Order of Business.*

At a meeting of the Society the following order of business shall be observed unless the Society votes otherwise for the time being:

1. Calling of the roll.
2. Address or remarks by the President.
3. Minutes of the last meeting.
4. Report by the Council on business transacted by it since the last meeting of the Society.
5. New Membership.
6. Reports of officers and committees.
7. Election of officers and Council (at annual meetings only).
8. Unfinished business.
9. New business.
10. Reading of papers.
11. Discussion of papers.

Article II.—*Council Meetings.*

Meetings of the Council shall be called whenever the President or three members of the Council so request, but not without sending notice to each member of the Council seven or more days before the time appointed. Such notice shall state the objects intended to be brought before the meeting, and should other matter be passed upon, any member of the Council shall have the right to re-open the question at the next meeting.

Article III.—*Duties of Officers.*

The President, or, in his absence, one of the Vice-Presidents, shall preside at meetings of the Society and of the Council. At the Society meetings the presiding officer shall vote only in case of a tie, but at the Council meetings he may vote in all cases.

The Secretary-Treasurer shall keep a full and accurate record of the proceedings at the meetings of the Society and of the Council, send out calls for the said meetings, and, with the approval of the President and Council, carry on the correspondence of the Society. Subject to the direction of the Council, he shall have immediate charge of the office and archives of the Society.

The Secretary-Treasurer shall also send out calls for annual dues and acknowledge receipt of same; pay all bills approved by the President for expenditures authorized by the Council of the Society; keep a detailed account of all receipts and expenditures, and present an abstract of the same at the annual meetings, after it has been audited by a committee appointed by the President.

The Editor shall, under the general supervision of the Council, have charge of all matters connected with editing and printing the Society's publications. The *Proceedings* shall contain only the proceedings of the meetings, original papers or reviews written by members, discussions on said papers and other matter expressly authorized by the Council.

The Librarian shall, under the general supervision of the Council, have charge of the books, pamphlets, manuscripts and other literary or scientific material collected by the Society.

The General Chairman of the Examination Committee, shall, under the general supervision of the Council, have charge of the examination system and of the examinations held by the Society for the admission to the grades of Associate and of Fellow.

ARTICLE IV.—*Dues.*

The Council shall fix the annual dues for Fellows and Associates. Effective November 19, 1954, the payment of dues will be waived in the case of any Fellow or Associate who attains the age of 70 years or who, having been a member for at least 20 years, attains the age of 65 years and notifies the Secretary-Treasurer in writing that he has retired from active work. Fellows and Associates who have become totally disabled while members may upon approval of the Council be exempted from the payment of dues during the period of disability.

It shall be the duty of the Secretary-Treasurer to notify by mail any Fellow or Associate whose dues may be six months in arrears, and to accompany such notice by a copy of this article. If such Fellow or Associate shall fail to pay his dues within three months from the date of mailing such notice, his name shall be stricken from the rolls, and he shall thereupon cease to be a Fellow or Associate of the Society. He may, however, be reinstated by vote of the Council upon payment of arrears in dues, which shall in no event exceed two years.

ARTICLE V.—*Designation by Initials.*

Fellows of the Society are authorized to append to their names the initials F.C.A.S.; and Associates are authorized to append to their names the initials A.C.A.S.

ARTICLE VI.—*Amendments.*

These by-laws may be amended by an affirmative vote of two-thirds of the Fellows present at any meeting held at least one month after notice of the proposed amendment shall have been sent to each Fellow by the Secretary.

In order to assist the Council of the Society in resolving questions that might be raised as to the professional conduct of members, and more importantly to guide members of the Society when they encounter questions of professional conduct, the following "Guides to Professional Conduct" have been prepared by order of the Council. The actuary has professional responsibilities to society at large, to his client or employer, and to his professional associates. As is true of codes of ethics generally, these guides deal with precepts and principles only. They are not precise rules and are subject to interpretations in relation to the variety of circumstances that occur in practice.

Any member wishing advice on the application of these guides to a particular set of facts is urged to present his case to the Council of the Society. The Council has the power to consider and take action with respect to questions that may be raised as to the professional conduct of members. Any disciplinary action by the Council must be in accord with Article IX of the Constitution.

The Council assumes that every member of the Society earnestly desires to serve his client or employer properly, to protect the public, and to maintain the prestige of the Society and its members. Accordingly, the Council sets forth the following principles by which, in its opinion. every member should be guided in his practice of the actuarial profession.

1. The member will promote a wider understanding of the significance of membership in the Society and will maintain the high standards of the Society by avoiding even the appearance of any questionable practice.

2. The member will conduct his professional competition on a high plane. He will avoid unjustifiable or improper criticism of others and will recognize that there is substantial room for honest differences of opinion on many matters.

3. The member will act in professional matters for each client or employer with scrupulous attention to the trust and confidence that the relationship implies and will have due regard for the confidential nature of his work.

4. The member will bear in mind that the actuary acts as an expert when he gives professional advice, and he will give such advice only when he is qualified to do so.

5. The member will not provide actuarial service for, or associate professionally with, any person or organization if he has reason to believe that the results of such service or association are likely to be used in a manner inimical to the public interest or the interests of the actuarial profession or to evade the law.

6. The member will submit unqualifiedly an actuarial calculation, certificate, or report only if he knows it to be based on sufficiently reliable data and on actuarial assumptions and methods that, in his judgment, are consistent with the sound principles expounded in the course of study of the Society, or in recognized texts, sources or precedents relevant to the subject at hand.

7. The member will recommend for the use of his client or employer, premium rates, rating plans, dividends or other related actuarial functions only if, in his opinion, they are based on adequate and appropriate assumptions and methods.

8. The member will not make or sponsor any actuarial calculation, certificate, statement, report, or comparison, or give any testimony or interview on such matters, which he has reason to believe is false, materially incomplete, or misleading.

9. Where appropriate for the objective use of a certificate or report, or in any event on the request of his employer or client, the member will include a statement of the principal actuarial assumptions and the general methods adopted for his computations.

10. The member will recognize his ethical responsibilities to the person or organization whose actions may be influenced by his professional opinions or findings. When it is not feasible for the member to render his opinions or findings direct to such person or organization, he will act in such manner as to leave no doubt that the member is the source of the opinions or findings and to indicate clearly the personal availability of the member to provide supplemental advice and explanation.

11. The member will not serve more than one client or employer where a conflict of his professional interest may be involved unless there be a full disclosure to all parties concerned, and such parties request and acquiesce in the engagement of his services.

12. The member will sign actuarial recommendations, certificates, and reports if he be acting as an employe, only over a title conferred by his employer if any title is used. Nevertheless, in any capacity, the member may append to his signature the designation: "Fellow of the Casualty Actuarial Society" or "FCAS," or "Associate of the Casualty Actuarial Society" or "ACAS," as the case may be. The member will not use as a signature title the designation "Member of the Casualty Actuarial Society". The member will use a designation dependent upon elective or appointive qualification within the Society such as "President," or "Member of the Council," only when he is acting in such capacity on behalf of the Society.

13. The member will recognize his personal responsibilities under these guides whether he acts as an individual or through a partnership or his employer.

November 20, 1959.

Method of Review. All papers and reviews of papers are reviewed by the Committee on Review of Papers, which is appointed by the President. The Committee consists of three members, plus, ex officio, the Editor of the *Proceedings.* Unanimous vote of the regular Committee is necessary for acceptance of a paper or a review, except that if there is only one vote for rejection, the paper or review will be reviewed by the Editor and accepted if he approves.

Scope and Standards.—1. Broad latitude will be allowed in the choice of a subject, provided it is a subject of interest to property and casualty actuaries. However, it must be clearly suitable for inclusion in the *Proceedings.*

2. The paper must contain original ideas or new material of reasonable value, unless it has a definite educational value for other reasons.

3. When a paper includes material that the Committee finds it is not qualified to review, the Committee will seek advice or opinion from other members of the Society or from recognized experts outside of the Society.

4. Disagreement by the Committee with opinions of the author or reviewer of a paper will not be a bar to acceptance of an otherwise suitable paper or review. Where, however, the Committee believes a paper or review to be fallacious in logic or misleading in matters of fact the Committee may reject it. Reviews of papers are expected to be free of criticism of a personal nature. Opportunity will be given to the authors of papers to respond to reviews. Authors' replies will also be reviewed by the Committee and will be treated in the same manner as reviews.

5. The paper or review should show care in preparation. A reasonable minimum standard will be required as to form, clarity, and literary quality. When a paper or review, otherwise acceptable, does not meet these standards, the Committee may return it to the author or reviewer and invite resubmission after editing or rewriting. The Committee may also make suggestions to the author as to possible improvements in an accepted paper.

6. Papers and reviews should be kept within the general limits of length indicated by past acceptances, ordinarily about twenty printed pages for papers and two or three pages for reviews.

Procedures and Regulations.—1. Papers may be submitted only by Fellows or Associates of the Casualty Actuarial Society, except that papers may be submitted by non-members of the Society upon invitation of the President. A member may collaborate in joint authorship with a non-member who possesses particular qualifications in respect to the subject of a paper.

2. Papers and reviews of papers should be submitted in quadruplicate to the Secretary-Treasurer of the Society. The Secretary-Treasurer is authorized to return to the author or reviewer copies of a paper or a review that in his opinion are not legible.

3. The name of the author should not appear on the copies of the paper submitted to the Secretary-Treasurer but should be included in the covering letter. However, names of the reviewers should be identified on the copy of the review.

4. In submitting a paper, the author must answer the following questions on a separate sheet:

    (a) Name of paper.

    (b) Has the paper been published elsewhere, in whole or in part, in identical or similar form?

    (c) Is the paper being simultaneously submitted elsewhere, or will it be so submitted before decision by the Committtee on Review of Papers?

    (d) In the case of co-authorship with a non-member, to what extent has the Society member contributed?

    (e) If the paper contains factual data from some organization, has the organization given the author permission to publish it?

5. Papers and reviews should be typed double-spaced on letter-size stationery, on one side of each sheet. Tables and footnotes may be single-spaced. Pages should be numbered. Footnotes should be numbered consecutively throughout the paper.

6. Major captions should be centered and typed in capitals; subcaptions should appear in the left-hand margin in italics (single underscore). In technical papers paragraphs may be numbered to simplify reference; in non-technical papers paragraphs should not be numbered.

7. So far as possible, tables should be arranged so that they can be printed on a single page of the *Proceedings* without undue reduction in size of type. Column headings must be clear and concise.

8. All mathematical formulas and symbols should be handwritten in ink rather than typewritten. They must be legible especially as to subscripts and superscripts. There must be no possibility of confusion between, for instance, dx and d_x; $\times$ (the sign for multiplication) and x; a and α (alpha). The exclamation point (!) should be used to indicate factorials in binomial expansions. Where necessary, instructions to the printer may be inserted in pencil on the manuscript. The Committee strongly recommends that authors of mathematical papers refer to the Style Manual of the American Institute of Physics for precise information on preparation of a manuscript. A copy of the Style Manual may be borrowed from the Editor of the *Proceedings* or it may be purchased from the Editor for one dollar. When life contingency symbols are applicable the International Actuarial Notation should be used. This code is described in the *Proceedings*, Vol. XXVI, page 123.

9. References to books and periodicals and to proceedings of professional societies, should be sufficiently complete to permit obtaining a copy of the source without additional research.

10. If the manuscript has been prepared carefully in accordance with the foregoing suggestions, there should be only a few minor corrections necessary. The paper as originally submitted should not be considered simply as a draft to which extensive alterations can be made.

11. Authors will be notified of the acceptance or rejection of their papers by the Secretary-Treasurer. If a paper is rejected, original and copies will be returned. The Committee does not promise a decision on a paper submitted fewer than forty-five days prior to the meeting for which the paper has been prepared. Reviews of a paper are to be submited to the author and the Secretary-Treasurer thirty days in advance of the meeting at which the paper is to be reviewed. A review of a paper will be considered to have been accepted by the Committee unless the reviewer is otherwise notified.

12. Authors of accepted papers are requested to notify the Secretary-Treasurer whether or not they can supply additional copies for use at meetings or for further distribution prior to publication. (Photographic reproduction is less expensive than printing and insures accuracy.)

13. After acceptance of a paper and before its reproduction, the author should have the following statement typed at the bottom of the first page: "Presented at the (date) meeting of the Casualty Actuarial Society at (city and state). Reproduction in whole or in part without acknowledgment to the Casualty Actuarial Society is specifically prohibited."

14. Except on recommendation of the Committee, no accepted paper will be read in its entirety at a meeting of the Society. The author will be expected to prepare for oral presentation a two or three minute abstract, stating the purposes of his paper and its conclusions.

15. The Editor of the *Proceedings*, in consultation with the author or reviewer, may edit the paper or review prior to publication.

December 12, 1962.

WOODWARD - FONDILLER PRIZE

This award made in commemoration of Joseph H. Woodward and Richard Fondiller is intended to stimulate original thinking and research and will be made to the best eligible paper each year submitted by an Associate or Fellow who has attained his designation within the last five years. To be eligible the paper must show evidence of ability for original research and the solution of advanced insurance problems. If no paper is considered eligible in a given year, the award shall not be made. Papers previously submitted to the Society or elsewhere, shall not be eligible.

The amount of the prize will be $200 and the papers will be judged by the Society's Committee on Review of Papers whose decision will be final.

The announcement of the award will be made at the November meeting each year, based on papers submitted to the Society at the previous November and May meetings.

RULES REGARDING EXAMINATIONS FOR ADMISSION
TO THE CASUALTY ACTUARIAL SOCIETY

1. Dates of Examinations.

Examinations for all parts will be held in May each year in such cities as will be convenient. In addition, Associateship Part I will also be held in November each year. The exact dates will be set by the Secretary-Treasurer.

2. Filing of Application.

Application for admission to examinations should be made on the Society's blank form, which may be obtained from the Secretary-Treasurer. The application must be accompanied by the appropriate examination fee, in check or money order payable to the Casualty Actuarial Society.

If a candidate has previously made application to write the Society's examinations, his application for the current examinations must be received by the Secretary-Treasurer before April 1 for the Spring examinations, or before October 1 for the Fall Associateship Part I examination. No applications received after these dates will be considered.

3. Associateship and Fellowship Examinations.

There are four parts of the examinations which the candidate must pass in order to become an Associate of the Casualty Actuarial Society. These consist of five actual examinations:

Part I	3	hours
Part II	3	hours
Part III Section (a)	1½	hours
Part III Section (b)	1½	hours
Part IV Sections (a) and (b)	3	hours

Part I of the Associateship examinations is a General Mathematics examination jointly sponsored with the Society of Actuaries. Credit for passing this examination will be given by both Societies regardless of the Society through which the candidate registers. One pass list showing the successful candidates (without identification as to the Society through which they register) will be published.

A candidate may write any one or more of the five examinations and will receive credit for those passed.

There are four examinations which a candidate must also pass to become a Fellow of the Casualty Actuarial Society. Each Fellowship Part consists of two sections, but is a single 3 hour examination. A candidate may present himself for one or more of the Fellowship examinations either if he has previously passed the Associateship examinations or if he concurrently presents himself for all unpassed Associateship examinations. Subject to the foregoing requirements, a candidate will be given credit for any examination which he may pass.

4. Fees.

The examination fee for the Associateship examination is $3.00 for a section, $6.00 for one complete part; subject to a minimum of $6.00 for each year in which the candidate presents himself. The examination fee for the Fellowship examination is $10.00 for each part. Examination fees are payable to the order of the Society and must be received by the Secretary-Treasurer before April 1 of the current year for the Spring examinations, or before October 1 for the Fall Associateship Part I examination.

5. Prize Awards

The Casualty Actuarial Society and the Society of Actuaries jointly will award one $200 and four $100 prizes to the five successful undergraduates ranking highest in the General Mathematics Examination. These prize awards will be granted twice each year, i.e., for both the Spring and Fall examinations.

6. Credit for Examination Parts under Former Syllabus.

A candidate who has passed, or been credited with, one or more of the Associateship or Fellowship examinations under the 1963 Syllabus will receive credit for the corresponding examinations of the 1964 Syllabus. Partial examinations will be given to those candidates requiring them in accordance with such credits.

A candidate who has passed or been credited with only one Section of Associateship Part II (either Section (a) or Section (b) under the 1963 Syllabus will be permitted to write the remaining Section in 1964 or 1965, upon application to the Secretary-Treasurer. The time allowed for writing the remaining Section will be $1\frac{1}{2}$ hours. Beginning with the 1966 examinations, no candidate will be permitted to write only a portion of Associateship Part II, and any prior credit for one Section of this examination will expire.

7. Waiver of Examinations for Associateship.

Waiver of the following Associateship examinations will be allowed for a candidate who has passed or been credited with the corresponding examinations of the Society of Actuaries:

Casualty Actuarial Society	Society of Actuaries
Part I	Part 1
Part II	Part 2
Part III (a)	Part 4

Candidates who take the Advanced Mathematics Test of the Graduate Record Examinations may apply for credit for the General Mathematics Examination, (Associateship Part I). Credit will be granted if the candidate's score on the Graduate Record Advanced Mathematics Test is equivalent, as determined by the Casualty Actuarial Society, to the passing score on the Society's General Mathematics Examination. To be eligible for such credit the candidate must take the Graduate Record Advanced Mathematics Test while a full time undergraduate or graduate student at a college or university, or if he ceases his full-time schooling in May or June he may take the Graduate Record Advanced Mathematics Test in the following July. An application to the Casualty Actuarial Society for credit may be completed either in advance of taking the Graduate Record Advanced Mathematics Test or within two years after taking it. The necessary application form may be secured from the Secretary-Treasurer of the Casualty Actuarial Society.

The council may waive, subject to such other requirements as it may prescribe, any examinations of the Casualty Actuarial Society which it deems equivalent to examinations required by another recognized actuarial organization which have been passed by an applicant while not a resident of the United States or Canada, or during his first year of temporary or permanent residence in the United States or Canada.

LIBRARY

All candidates registered for the examinations of the Casualty Actuarial Society and all members of the Casualty Actuarial Society have access to all the library facilities of the Insurance Society of New York and of the Casualty Actuarial Society. These two libraries, with combined operations, are located at 150 William Street, New York, New York 10038.

Registered candidates may have access to the library by receiving from the Society's Secretary-Treasurer the necessary credentials. Books and manuals may be withdrawn from the

library for a period of one month without charge. The Insurance Society is responsible for postage and insurance charges for sending books to out of town borrowers, and borrowers are responsible for the safe return of the books.

Address requests for books to:

LIBRARIAN
Insurance Society of New York
150 William Street
New York, New York 10038

SYLLABUS OF EXAMINATIONS

(Effective with 1964 Examinations)

ASSOCIATESHIP

Part	*Section*	*Subject*
I		General Mathematics.
II		Probability and Statistics.
III	(a)	Elementary Life Insurance Mathematics.
	(b)	General Principles of Insurance; Insurance Economics and Investments.
IV	(a)	Insurance Coverages and Policy Forms.
	(b)	General Principles of Ratemaking.

FELLOWSHIP

I	(a)	Insurance Law; Supervision, Regulation and Taxation.
	(b)	Statutory Insurances.
II	(a)	Premium, Loss and Expense Reserves.
	(b)	Insurance Accounting and Expense Analysis.
III	(a)	Individual Risk Rating.
	(b)	Problems in Underwriting and Administration.
IV	(a)	Insurance Statistics and Machine Methods.
	(b)	Advanced Problems in Ratemaking.

INTERNATIONAL CONGRESSES OF ACTUARIES

The first International Congress of Actuaries was held in 1895 in Brussels. Since that time numerous congresses have been held, and many actuaries from the United States and Canada have been benefited by attendance at the congresses and by the printed *Proceedings,* in which numerous valuable articles have appeared.

Continuity in the arrangement for periodic congresses and for the intervening support and management of the central office located in Brussels is achieved by the maintenance of a Permanent Committee of international membership.

Membership in the Permanent Committee on this continent is divided into two sections, a United States section and a Canadian section. Individual actuaries can support the work of the Permanent Committee by becoming members in their section. Inquiries regarding the Permanent Committee should be directed to Pearce Shepherd, Secretary for the United States Section, Prudential Insurance Company, Newark, New Jersey or to Ben T. Holmes, Chairman of the Canadian Section, Confederation Life Association, 321 Bloor Street, East, Toronto 5, Ontario.

According to the revised regulations adopted by the New York Congress in 1957, the objects of the Permanent Committee are:

1. To promote or to conduct work or research of interest to the science or practice of the Actuary. For this purpose sections formed by a number of members for study of special problems may be recognized. Each section will have its own regulations, previously approved by the Council; it will elect its Committee, except for the member appointed by the Council on the Committee.

2. To publish periodically a *Bulletin: (a)* bringing together technical, legislative, statistical, and juridical information relating to actuarial science; *(b)* reviewing publications and works which appear in various countries, bearing upon actuarial matters.

3. To co-operate with the Organizing Committees in preparing the work of International Congresses, and in the publication of their *Proceedings*.

The XVIth Congress was held in Brussels in 1960. At that meeting it was decided to hold future Congresses at four year intervals rather than three. The next Congress will be held in Great Britain in 1964.

With these purposes in mind the Permanent Committee wishes to enlist members as broadly as possible. The annual dues for membership are now 150 Belgian francs. Membership on the

Permanent Committee is one of the requirements for membership in a Congress.

ASTIN Section

ASTIN (Actuarial Studies in Non-Life Insurance) is the first section of the Permanent Committee to be formed under the Modification of the rules approved at the XVth International Congress in New York and is for the study of the application of modern statistical and mathematical methods in the field of non-life insurance. It has grown from the desire expressed by many members of the XIVth Congress held in Madrid to provide an effective interchange of ideas on an international basis.

It has as its object the promotion of actuarial research in general insurance and establishes contact between actuaries, groups of actuaries, and other suitably qualified persons interested in this field.

This section, from time to time, publishes papers on topics related to its objects and also publishes a *Bulletin* containing notes of general interest to members.

Meetings are held every four years, during the course of the International Congress of Actuaries. Between meetings colloquia are held on topics of interest to the Section and these are hosted by national actuarial bodies. The 1963 colloquium was held at Trieste, Italy, September 19-21, 1963, sponsored by Istituto Italiano degli Attuari. The 1965 colloquium will be held in Switzerland, sponsored by the Swiss Actuarial Society.

Membership fees, which are payable in the same manner as the annual dues for membership on the Permanent Committee, are 200 Belgian francs. Inquiries regarding membership in the ASTIN Section should be directed to Albert Z. Skelding, Secretary-Treasurer, Casualty Actuarial Society, 200 East 42nd Street, New York, N. Y. 10017.

FUTURE MEETINGS OF THE CASUALTY
ACTUARIAL SOCIETY

1964 Spring Meeting— May 18, 19, 20
                          Wentworth-By-The-Sea
                          Portsmouth, New Hampshire

1964 Annual Meeting— November 18, 19, 20
                          Plaza Hotel
                          New York, New York

1965 Spring Meeting— At present undecided

1965 Annual Meeting— Dates Unspecified
                          Chicago Area

1964 EXAMINATIONS
May 13, 14, 15