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NOTICE

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PROCEEDINGS

May 26-27, 1958

AUTO B.I. LIABILITY RATES — USE OF 10/20 EXPERIENCE IN THE ESTABLISHMENT OF TERRITORIAL RELATIVITIES

BY

MARTIN BONDY

THE CURRENT SITUATION

Since the passage of the Safety Responsibility Law in New York State, an ever increasing proportion of the motorists have purchased 10/20 limits of coverage. Now, with the advent of compulsory insurance, 10/20 is a universal minimum.

In spite of this, the Automobile Liability Manual sets 5/10 as the basic limits and, what is as important, quotes rates for 5/10 coverage, a virtual fiction under the present circumstances.

THE PROBLEM OF RATEMAKING

In recognition of the fact that 5/10 rates are no longer true "basic" rates for New York, for the past two private passenger rate revisions, 10/20 experience has been used in establishing the over-all rate level. The problem dealt with in this study is, as indicated by the title, the determination of the possible consequences involved in using 10/20 experience in setting up territorial relativities. The question raised is whether significant distortions are likely to occur if this experience is used at the territorial level.

TWO TYPES OF EFFECTS PRODUCED

We may begin by observing that the results obtained through the use of 10/20 experience may differ from those derived from 5/10 experience in two ways. In the first place, one territory may actually be subject to more excess limits claims than the average. This may be due to road conditions, claim consciousness or any of the causes to which high claim cost is usually attributed. The use of 10/20 experience would increase the rates for this territory in relation to the others not subject to such claims in the same degree. This would seem to inject a desirable refinement into the ratemaking process. It would, to an even greater extent than is the case today, distribute equitably among the territories the cost of doing business.

The second possible source of difference between the two bases would be that due to chance fluctuations. Since excess limits claims are of an infrequent or "catastrophic" nature, it might be argued that the predictability of their occurrence or non-occurrence would not warrant the assignment of a high degree of credibility to this experience. In other words, it would seem on the surface that on the basis of this experience one might attribute to a territory certain characteristics which do not truly pertain to that territory, but which have appeared by chance.

In order to decide whether or not the benefits of using this excess limits experience outweigh the disadvantages, it is necessary to determine the magnitude of the distortions which are likely to be produced by these chance occurrences.

ASSUMPTIONS

In order to evaluate the distortions which may occur in the system under study, certain *reasonable* assumptions must be made concerning the frequency and effect of excess limits claims. The bases for these assumptions will be analyzed at a subsequent stage under the heading "Basis of Assumptions."

1. In view of the magnitude of the exposures and the small probability of occurrence of an excess limits claim, the distribution employed will be taken from a table of Poisson Probabilities. The notation to be used is

$$P_m\ (X) = \text{Probability of X claims occurring given that the mean is m.}$$

2. The probability of occurrence of an excess limits claim (over 5/10) is, on the average, 3% of the probability of occurrence of a claim (without regard to size).

3. The amount to be included in the 10/20 experience will be the first $10,000 of each claim irrespective of any accident limit. Moreover, the amount presently included in the 5/10 experience is the first $5,000 of each claim regardless of any accident limit. Each excess limits claim (over 5/10) will produce an additional $4,500 at 10/20 limits.

OBJECT OF CALCULATIONS

The calculations performed are designed to determine the range within which the formula pure premium can be expected to fall 90% of the time if 10/20 experience is used. Under either rating system, the 5/10 indications are considered correct. That is, whether we use 5/10 or 10/20 experience, the 5/10 pure premium will be the same. The only difference is that instead of a flat loading for the increment between 5/10 and 10/20, the actual experience will be used.

THE "AVERAGE" TERRITORY

Referring to the table appended to this survey, we note the following information:

a)	Number of Territories (combination equals 1 territory)	= 35
b)	Total number of claims (3 years)	= 160M
c)	Total exposure (3 years)	= 4,545M
d)	Average Pure Premium (10/20)	$35

From these figures, we derive the following:

e)	Average number of claims per territory	4,500
f)	Average exposure per territory	130M
g)	Average number of excess limits claims per territory (see assumption 2)	135

At this point, we can begin our calculations. We are interested in the range in which the pure premium can be expected to fall 90% of the time if 10/20 experience is used. The number of claims in this range is determined by solving for k in the following equation:

$$\sum_{135-k}^{135+k} P_{135}(X) = .90$$

$$k \sim 20$$

This means that 90% of the time, the effect on the pure premium will be

$$\pm \frac{20\ (\$4{,}500)}{130M} = \pm \$.75^*$$

That is, if the "true" pure premium is $35.00, the formula pure premium based on 10/20 will be somewhere in the interval $35.00 ± $.75 in 90 per cent of the cases.

A natural question presents itself now. The observer may ask wherein the benefit lies of using a value somewhere between $34.25 and $35.75, when under our present setup we use the exact value $35.00. The answer is this. $35.00 is a perfect answer if, and only if, the territory in question has an excess limits claim frequency which is exactly average. This is so because when we use a flat loading for the increment between 5/10 and 10/20, we are assuming that all territories are the same (or average). What happens, however, in the case where the territory has a "true" excess limits claim frequency different from the average? In this case, we would still be using $35.00 as our 10/20 pure premium (under the existing system). Yet, since this figure is based on an assumption of *average* experience between 5/10 and 10/20, it is manifestly incorrect.

*To the nearest 25 cents.

What would happen if 10/20 experience were used to establish our rates? We shall now examine the cases where the excess limits claim frequency is half the average or twice the average.

EXCESS LIMITS CLAIM FREQUENCY OF HALF THE AVERAGE

Suppose a territory were average in every respect except that its inherent excess limits claim frequency were .015 times its total claim frequency. This means that it would tend to produce 68 excess limits claims. The number actually produced would not be 68 in most cases; but 90 per cent of the time, it would be in the range 68 ± k where k is defined by the following equation:

$$\sum_{68-k}^{68+k} P_{68}(X_i) = .90$$

$$k \sim 13$$

In about 90 per cent of the cases, the pure premium would fall in the area ± \$.50 around the "true" value. In this situation, the "true" value would be \$32.75. This figure is arrived at as follows:

(1) Ratio of 10/20 pure premium to 5/10 pure premium indicated by latest experience (fully developed) = 1.155

(2) Excess limits pure premium (average)
\$35.00 — (\$35.00 ÷ 1.155) = 4.70

(3) Excess limits pure premium based on frequency of half the average = 2.35

(4) 10/20 pure premium
(\$35.00 ÷ 1.155) + 2.35 (rounded) = 32.75

Therefore, the pure premium would fall in the interval \$32.75 ± \$.50 in 90 per cent of the cases. It should be borne in mind that if 5/10 experience were used, the pure premium would be \$35.00. This is considerably outside the range shown above.

EXCESS LIMITS CLAIM FREQUENCY OF TWICE THE AVERAGE

The case where the inherent frequency is double the average will clearly indicate a greater spread of probable pure premium values. This is so because in the Poisson-Type distribution the variance equals the mean. Here our true number of excess limits claims is 270. The range is determined by solving for k in

$$\sum_{270-k}^{270+k} P_{270}(X_i) = .90$$

There are no Poisson tables available for m=270. However, where m is large, the Normal Curve provides an exceedingly close approximation. A table of Normal Curve Areas reveals that 90 per cent of the cases fall within a range of 1.65, about the mean. Therefore,

$$k \sim 1.65\,\sigma \sim 27$$

In this instance, in 90 per cent of the cases the pure premium will lie within $1.00 of the mean. Proceeding as in the previous section, we find that the pure premium will lie in the interval $39.75 ± $1.00. Here again it should be kept in mind that the present methods will provide a pure premium of $35.00.

AN EXTREME CASE

A bit of thought will reveal that there are certain types of territories where the 90% range of pure premium is apt to be wider than in most other cases. I have selected one of these for illustrative purposes. It is Monticello, which has a high claim frequency and very little exposure. A table is appended which shows the 90% range for each New York territory (or combination) based on an average excess limits claim frequency.

MONTICELLO

a)	Number of claims (3 years)	= 875
b)	Total exposure (3 years)	= 15M
c)	Pure Premium	= $57
d)	Credibility	= 80%
e)	Number of excess limits claims (see assumption 2)	= 26

The number of claims in the 90% range is k in the following equation:

$$\sum_{26-k}^{26+k} P_{26}(X_i) = .90$$

when k = 8 we have

$$\sum_{18}^{34} P_{26}(X_i) = .91$$

That is, in 91 per cent of the cases, the formula pure premium will lie in the interval $57.00 ± $2.00. This, it will be recalled, is based upon the assumption that Monticello has average excess limits potential. The appended table will reveal that this is the extreme case for New York State. The remaining territories are confined, for the most part, to fluctuations of $1.00 or less. Moreover, these table entries

describe the error only when a territory has average excess limits potential. When a territory is not "average" in this respect, the use of 10/20 experience tends to produce a superior result since the pure premium range centers about the "true" value.

BASES OF ASSUMPTIONS

1. The use of a Poisson Distribution to describe the occurrence of Auto Bodily Injury Claims has substantial precedent. The principal feature which enables one to employ this approximation in the case of Auto Bodily Injury Claims—a very small probability of occurrence—is present to an even greater extent in the case of excess limits claims.

2. The 1950 call for Size of Claim Data revealed the following Auto Bodily Injury Liability claim distribution for calendar year 1949 (Private Passenger Cars).

	New York	*Countrywide excl. New York*
Total # claims paid	59,076	145,374
# Excess limits claims	637	1,802
Ratio	.01	.01

This proportion (.01) has undoubtedly risen somewhat with the increasing average claim cost. The latter item has gone up by more than 20 per cent since the time of the call. The use of 3 per cent appears conservative.

3. Insurance Department records indicate that according to a preliminary survey made in 1952, the additional cost resulting from considering the first $10,000 per claim rather than the first $5,000 was about $3,500 per claim. Since the average claim cost has increased since that time, $4,500 seems a more likely figure today.

An approximate check exists on the combination of assumptions 2 and 3. As stated earlier, the 10/20 pure premium has been about 1.155 times the 5/10 pure premium for recent years. Since the average 10/20 pure premium has been about $35.00, the increment is seen to be about $4.70.

If we take an excess limits claim frequency of .03, we derive the following:

Number of claims = 160,000*

Number of excess limits claims
.03 × 160,000 = 4,800

The effect of these claims on the pure premium is*

$$\frac{4{,}800 \times \$4{,}500}{4{,}545{,}000} = \$4.75$$

* See page 3—the "Average" Territory.

This demonstrates that these two assumptions, in combination, are reasonable. An error in one of these assumptions tends to be offset by a compensating error in the other and the effect on the argument is negligible.

CONCLUSIONS

The results of employing 10/20 experience rather than 5/10 are that, in general, rather than using a fixed loading as an estimate of the excess limits loss potential for all territories, which is correct for the strictly average territory and incorrect for all others, we use a quantity which differs by territory. This quantity tends to be correct for each territory but in any event is within a narrow band of values centered about the "true" value in a considerable majority of the cases. I have indicated in this paper the range of values within which the formula pure premium can be expected to fall 90 per cent of the time

In summary, it appears that the present system of relying on the 5/10 experience is based on one of two assumptions:

a) Territories are all alike as respects excess limits claim potential.
b) Differences in excess limits claim potential are not susceptible of measurement.

It is my opinion that the first assumption is incorrect. The second assumption has, up to this time, caused ratemakers to tread cautiously in using excess limits experience. I trust that the preceding exposition may enable them to pursue more exact rates with somewhat less trepidation.

TABLE A

Territory	*Exposure 1952-1954 (000)*	*Number of Claims 1952-1954*	*Credibility (Based on # claims)*	*Range of Formula Pure Prem. Deviation (prob = .90)*	*Formula Pure Prem. 10/20*	*Deviation as a % of Formula pp*
Monticello	15	875	.8	$2.00	$57	4%
Queens	58	3,385	1.0	1.25	53	2
Saratoga Springs	18	784	.8	1.50	48	3
Queens Sub.	562	30,047	1.0	.50	47	1
Albany	107	4,512	1.0	.75	..	..
Troy	42	1,865	1.0	1.25	..	..
Sub-Total	149	6,377	1.0	.75	44	2
Glens Falls	23	856	.8	1.25	40	3
Schenectady	92	3,271	1.0	.75	40	2
Gloversville	21	765	.8	1.25	40	3
Nassau	550	22,663	1.0	.25	39	1
Utica	53	2,152	1.0	1.00	..	..
Rome	18	652	.7	1.25	..	..
Sub-Total	71	2,804	1.0	1.00	38	3
Suffolk	209	6,863	1.0	.50	38	1
Buffalo	341	12,935	1.0	.50	37	1
Amsterdam	16	585	.7	1.50	41	4
Rensselaer Co.	20	670	.7	1.00	37	3
Putnam Co.	18	573	.7	1.00	37	3
Oswego	20	798	.8	1.50	36	4
Syracuse	134	5,082	1.0	75	34	2
Fort Plain & Herkimer	33	1,022	.9	1.00	34	3
N.Y.C. Suburban	314	10,411	1.0	.50	33	2
Rochester	233	7,319	1.0	.50	32	2
Ossining	64	1,711	1.0	.75	31	2
Buffalo Sub. & N. F. Sub.	71	2,066	1.0	.75	..	..
Niagara Falls	78	2,198	1.0	.75	..	..
Sub-Total	149	4,264	1.0	.50	30	2
Kingston	45	1,383	1.0	1.00	..	..
Newburgh	32	878	.9	1.00	..	..
Sub-Total	77	2,261	1.0	.75	30	3
Staten Island	61	2,019	1.0	1.00	29	3
Elmira	33	856	.8	.75	31	2
Syracuse Sub.	33	937	.9	1.00	29	3
Northern Counties	216	5,753	1.0	.50	29	2
Catskill & Col. Co.	44	1,043	.9	.75	28	3
Dutchess Co. Rem.	37	953	.9	1.00	..	..
Poughkeepsie	40	1,033	.9	1.00	..	..
Sub-Total	77	1,986	1.0	.75	28	3
Rockland County	47	1,338	1.0	1.00	28	4
Terr. 54	72	1,821	1.0	.75	..	..
Genesee	24	634	.7	1.00	..	..
Rochester Sub.	11	269	.4	.75	..	..
Sub-Total	107	2,724	1.0	.75	27	3
Middletown	51	1,410	1.0	1.00	26	4
Central Cos.	227	5,589	1.0	.50	..	..
Terr. 57	90	2,208	1.0	.75	..	..
Auburn	21	542	.7	1.00	..	..
Cortland-Ithaca	33	861	.8	.75	..	..
Binghamton	76	1,554	1.0	.75	..	..
Sub-Total	447	10,754	1.0	.25	25	1
Watertown	22	567	.7	.75	25	3
Western Cos.	189	4,007	1.0	.50	..	..
Jamestown	31	679	.7	.75	..	..
Sub-Total	220	4,686	1.0	.50	23	2
Total	4,545	160,394				

THE EMPLOYMENT OF PROPERTY AND CASUALTY ACTUARIES

BY

L. H. LONGLEY-COOK

The shortage of mathematicians and the attractions of science and industry have combined for many years to limit severely the number of young men who can be persuaded to enter the actuarial profession and, as a result, there is a very real shortage of able qualified actuaries. In Property and Casualty insurance, the regulatory and competitive problems arising out of the McCarran act and the introduction of multiple line underwriting have led to a notable need for actuarial advice, and at the same time have subjected rate making to political and opportunist pressure. Unqualified persons are indeed finding it profitable to call themselves "actuary".

The 1958 Year Book of the Casualty Actuarial Society reveals that there are 186 Fellows of the Society but this figure gives a false impression of the number of qualified actuaries actually engaged in Property and Casualty insurance. The Year Book shows that at the end of 1957, after excluding Fellows of the Society of Actuaries, those employed by life insurance companies and those retired, 6 Fellows of the Casualty Actuarial Society were in state employment, 23 were employed by rating and advisory bureaus and 78 by Fire and Casualty insurance companies. A further 15 Fellows were consultants or were employed in industry, as investment counselors, and in other capacities.

Of the 6 actuaries in state employment, only 4 were on the staff of the Insurance Departments of the 48 states of the Union, which can hardly be said to provide a satisfactory staff for proper rate supervision. It may be noted that there were 6 qualified actuaries on the staff of Insurance Departments 8 years ago.

The 23 actuaries employed by rating and advisory bureaus compares with 13 similarly employed 8 years ago, but part of this increase is accounted for by the inclusion of 5 senior fire rating bureau officials who were elected Fellows of the Society as a result of the expansion of the examination syllabus in 1951 to include Property insurance. There is, however, little indication that the fire bureaus are encouraging their young employees to become members of the Society or are seeking qualified actuarial advice.

The analysis of the qualified actuaries employed by fire and casualty company groups is interesting:

No. of qualified actuaries employed	*No. of Company Groups*	
	Dec. 1957	*Dec. 1949*
10 or more	1	—
5 to 9	3	2
3 or 4	3	3
2	7	7
1	23	17

A total of 78 actuaries are employed in 37 companies compared with 55 actuaries in 29 companies 8 years ago.

Of course, all the actuaries employed by an insurance company are not necessarily engaged in actuarial work: some are executives, some are underwriters and some are employed in other non-actuarial capacities.

If we use as the criterion of a large insurance group, those groups whose premium writings for 1957 exceed $100,000,000, there are 20 large stock groups, 5 mutuals and 1 exchange. The average number of actuaries per group are: stock just over 1½, mutuals 3½ and exchange 1.

The following analysis of the 20 large stock company groups is of interest:

No. of actuaries per company	*Mode of operation*	*Number of companies' groups*	*Operating Ratio 1957*
1 or less	Direct Writing	2	99.8
1 or less	Agency	13	105.0
2 or more	Agency	5	102.4
		20	

Anyone who deduces from the above figures that a stock agency company can reduce its operating ratio by a couple of points by employing two or more actuaries is no actuary, but the figures may indicate that the type of management which appreciates the value of actuarial advice was, on the average, the better operated company in 1957.

I trust that some of the information in this brief paper will be of assistance in the continuing problem of recruiting young actuaries. An additional statistic which may help in this cause is that, of the Fellows of the Casualty Actuarial Society employed by insurance companies, who have been qualified for at least 5 years, 45% have the rank of Vice President or equivalent.

PROCEEDINGS

NOVEMBER 13-14, 1958

THE SEAT OF WISDOM

PRESIDENTIAL ADDRESS BY DUDLEY M. PRUITT

> "Appearances to the mind are of four kinds. Things either are what they appear to be; or they neither are, nor appear to be; or they are, and do not appear to be; or they are not, and yet appear to be. Rightly to aim in all these cases is the wise man's task."
>
> Epictetus: *Discourses.*

Ever since my first shy attendance at a meeting of the Casualty Actuarial Society, back in the days when George Moore was president and I, a very young associate, slipped into my chair feeling much like a mouse in the company of lions, I have wondered why presidents give addresses and who ever reads them after they are given. I have recently discovered that they give addresses because the by-laws require them to, and that the addresses are read avidly by all subsequent presidents clutching for inspirational straws. This reading is an interesting and educational experience, developing in the reader a useful sense of proportion with regard to current pressing problems. Each year brings new emphases, and it is the privilege of the president, like the politician that he is not, to point with pride and view with alarm. In looking back at our last meeting I detect two areas of current professional concern: the one a concern for professional status, standards of acceptance and accrediting, and what to do about incompetent competition; the other a concern for professional ethics, standards of conduct and behavior, and what to do about improper practices. Our Society is not alone in these concerns. The Society of Actuaries has recently adopted a code of conduct, and officers of both that Society and the Conference of Actuaries in Public Practice have in the last few months been in touch with me regarding possible legislation to have proper accrediting for actuaries who certify to certain required actuarial calculations.

Perhaps both these concerns spring in part from a shortage of supply. As our industry has grown more complex the need for qualified actuaries has increased and, in the absence of effective inhibitions, the tendency can be to supply this demand with persons unqualified

by training, temperament, or moral fiber. We have a special committee, headed by past president Masterson, working on the matter of standards of professional conduct. It is expected that their report will be ready for your consideration before our next meeting. The Society of Actuaries has also established a committee to investigate the question of certification or licensing of actuaries. I am sure that we will want to look into this matter also and I am recommending to the Council that we too establish such a committee.

Certainly, however, this insatiable need on the part of employers for casualty and fire actuaries, though keenly felt in some quarters, is not universally recognized by company managements. Whereas most state insurance departments will have some staff member named "the actuary", however unqualified, the carriers by and large see no need to name any staff member "actuary," whether qualified or not. Mr. Longley-Cook, in his paper "The Employment of Property and Casualty Actuaries" presented last May, discovers that only 78 of our fellows are employed by Fire and Casualty companies. A little research of my own brings out the fact that only 41 associates are currently employed by Fire and Casualty companies, and, allowing for organizations employing more than one actuary, we have only 43 companies or groups employing fellows or associates of our Society. Best's Key Ratings lists 915 stock fire, marine, and casualty companies and 296 mutual fire, marine, and casualty companies licensed in other than their home states. If we eliminate more than one company to a group we have about 850 fire, marine, and casualty managements. Perhaps one hundred of these have felt the constraint either to employ a member of our Society or to call some nonmember their actuary, in spite of the fact that all a company needs to do to have an actuary is to call him one. Clearly most managements have failed to see what possible use an actuary could be to them.

Past President Masterson called his last presidential address: "The Actuary's Niche." Being somewhat suspicious of the word "niche" I looked it up in Webster. Webster's first definition is: "A recess in a wall, especially one for a bust." I am sure that many of my underwriting friends are quite convinced that that is an appropriate definition for the space occupied by the actuary. Unfortunately, some of them are serious. It is my purpose today to add a postscript to Mr. Masterson's very useful suggestions regarding the functions our Society members should be performing.

I have a friend who is an underwriter, an old timer, a confirmed pessimist as all old time underwriters are, fear-ridden by the catastrophe that *may* happen, and completely unsympathetic with my shortcomings as an actuary. He has, also, been frank enough on occasion to suggest that I didn't understand his problems. Since he is a kind and friendly man he has not hesitated to answer my many naive questions about his work. How does he determine what is and what is not an acceptable risk? How much is an adequate spread of a given class? When and how much reinsurance does he place under

specific conditions? When is a portfolio properly seasoned? He answers my questions promptly and with assurance, for after all he is one of the deans of the business and was rejecting risks when I was still a coder.

"Everybody knows," he says, "that toothpick factories are bad risks. Didn't you ever hear of the big toothpick loss of 1907?" Or,

"Harmony Corners has always been a bad town." Or,

"I've got to protect the treaty, haven't I?"

Sometimes he loses patience with my stupidly insistent questioning and answers with pride and finality,

"Every underwriter worth his salt learns how to underwrite by the seat of his pants."

And there you have it! The secret is out! The seat of wisdom is located at last. I am reminded of the story told by Kenneth P. Williams in *Lincoln Finds a General.* It seems that General John Pope, in keeping with his character as a vigorous man of action, stated that he maintained his headquarters in the saddle, to which some irreverent Confederates remarked that he was a strange man to put his headquarters where his hindquarters belonged. But there is merit to this seat-of-the-pants method of underwriting. In the early days of flying the pilot who failed to develop a certain fundamental delicacy of perception usually concluded his career quickly and dramatically. Those pioneer, barnstorming, bailing wire, days developed some famous national fliers, old timers who could fly a packing crate to Timbuktu without instruments. Since then industrious and inventive engineers have developed instruments for every navigational need and flyers have been emancipated from the seats of their pants. Unfortunately, in navigating among insurance risks, the underwriter is still not emancipated from reliance on his sixth sense. The instruments to guide him have not been invented; he is on his own, and, if he fails to develop that fundamental delicacy of perception, his career can end quickly, though perhaps not so dramatically.

It is here, I submit, that the company actuary can fill more than a recess in the wall designed for a bust. He can and should be the energetic engineer devising underwriting instruments. Webster defines "actuary" as "an expert who calculates insurance risks and premiums." It seems to me that we have concentrated on the calculation of the premium and forgotten our first duty of calculating the risk. We have left it to the underwriter to judge the risk—feel it, he might say—without the guidance we should be able to devise for him. Mr. Masterson rightly said that an actuary should be one who can think logically and quantitatively. It is our duty to discover and display relationships, and it is in a clear and easy reading of these relationships that the underwriter may expect to substitute scientific assurance for hunch and hope.

For example, let us consider here four typical seat-of-the-pants words: *seasoning, spread, capacity,* and *retention.* How clear are we

and our friends the underwriters as to the meaning and operation of these functions?

Everyone knows that an underwriter finds a seasoned business better than an unseasoned business, except in accident and health where too much unadulterated seasoning spells geriatric decay. Business which a company has had for a period of time has been culled gradually of the loss-producers through the sharp axe of cancellation. A well seasoned business, if it exists, is a joy to any underwriter. I was, however, somewhat surprised to read the following in an industry report dealing with the rating of a popular form of property insurance:

> "In reviewing the treatment of credibility recommended by the Actuarial Subcommittee, the Rating Subcommittee noted that recommended credibility factors were related exclusively to premium volume, and after further study concluded that a given premium volume garnered over a few months would have less credibility than a body of experience which had matured over a period of years. Accordingly the Rating Subcommittee adopted the following Table of Seasoning Factors which modify the credibility table and thereby reflect the time element factor."

At this point I began to wonder if I really knew what seasoning meant. While seasoning may be a valuable process in the experience of some individual companies I had not thought that it was applicable in the experience of an entire industry. Presumably for the industry one company's cancellation becomes another's new business, and, without the unilateral culling effect of cancellations, seasoning would seem to have no meaning. By the straight laws of chance why should one expect that "a given premium volume garnered over a few months would have less credibility than a body of experience which had matured over a period of years?" This seemed like saying that the toss of 1000 dice all at one time would have less credibility than the toss of 1000 dice one die at a time. But here we have the actuarial subcommittee apparently forgetting something which the rating subcommittee feels to be of such controlling importance that they proceed to modify the credibility table tremendously and arbitrarily. The quotation above says something about "further study." I sense there a euphemism for the "seat of the pants."

The span of time, however, does have some effect on the experience in such property coverages as are subject to natural catastrophes. Windstorms hit with painful irregularity, and their effect upon the experience is so great that a time span seems essential. Whether the device should be called a table of seasoning factors and whether it should modify the credibility table I leave for others to discuss. The point I want to make here is that some truly actuarial study and guidance on the use of seasoning seems called for.

There is also a school of thought, though a minor one, that holds to the theory that risks just naturally improve as they stay with the

same carrier longer. When there is some flexibility of risk rating with experience modifications possible this school has a point, but for some the theory seems brewed from a magic formula with little meat and mostly seasoning. Our duty then is clear; every insurance man believes in seasoning, but not every one understands how it works, and few probably have any very concise concept of the quantitative relationships between the time element and other factors at risk.

I suppose the fear of inadequate spread has caused companies to refuse to accept, or to reinsure away, more good and profitable business than any other single excuse. And it is, of course, one of the many reasons for the existence of London Lloyds that they will take the single isolated risk where credibility is nil and the hazard is great. I have the utmost sympathy for an American underwriter who refuses to commit his company when he feels uncertain of the rate, or incompetent to judge the hazard, or unable to render the peculiar service an isolated risk requires. But far, far too often, it seems to me, a risk is declined because it would be the only one of its class on the books of the company, even though the rate is known to be adequate and there is no problem of service. The reason given is lack of spread.

I have a theory that at times an underwriting policy can be determined by the choice of statistical plan. To the extent that the statistician combines risks into one grouping for the reporting of experience, those risks are happily joined in their contribution to spread; to the extent that he reports them separately, they are avoided as undesirable individuals. In my more cynical moments I allow myself to believe that the fear of lack of spread is really the fear of the boss's carpet and of that unhappy 200% loss ratio for soap salesmen which would have been but 25% if soap salesmen had been combined statistically with detergent and deodorant dealers. I would have imagined—and I have argued futilely to this point—that a spread of risks is achieved best by their heterogeneous rather than by their homogeneous natures. What we want are some risks that turn good when others turn bad; we want some running away from the precipice when others are heading for it; we don't want them all like disciplined soldiers marching, eyes right, in precise goose step to and over the brink.

Spread has a very proper place in our business, it is understood instinctively by many underwriters, and again it is confused by some with uniformity and the shadow of security. Here is an area where the industry would be enriched by some good logical study, some quantitative evaluations, a few simple guides and a defense that may be used when an underwriter must stand unhappily on the boss's carpet.

Capacity and retention are relatives, being, so to speak, father and son words, though at times I have wondered about the virtue of the father and the legitimacy of the son. How does one determine a carrier's capacity, whether for a large single risk or for an over-all vol-

ume of business? Have we any absolute standards for judging good behavior in this area, or are we simply afraid of what the neighbors might think. One very highly esteemed insurance editor has given us the rules of "two for one" and "one for one." These rules have the sweet sound of authority and a fine mathematical ring about them. To the editor's credit let it be said that he has granted many exceptions under special circumstances; nevertheless, for want of better measures of capacity the relationships are watched eagerly by editors, competitors, and other nosy neighbors. They are excused as reasonable rules of thumb, but, at the risk of a confused anatomy, I submit that they are still seat-of-the-pants navigation and, though they have probably saved many companies from a greedy downfall, they have also inhibited some from a healthy growth.

Many states have laws to the effect that no company may carry a net line in excess of some fixed percentage, often 10%, of the surplus to policyholders. This seems a worthy safeguard but why a fixed percentage under all conditions? I recall one company having the rule invoked on a burglary line where it insured in one policy a soft drink company for too many millions of dollars worth of sugar stored in many hundreds of warehouses scattered over the entire United States. Sugar is rather bulky stuff. Imagine how enterprising the burglars would have to be to steal all that sugar from all those warehouses in order to produce a total loss. On the other hand a carrier, though insane, would be within the law were it to insure against fire ten adjacent lumber yards each for a net amount of ten percent of its policyholders' surplus.

Clearly both degree of risk and amount at risk bear on capacity as anyone who has made up a line guide for fire underwriting understands. There are many other relationships too that have to be considered and some clear logic and sound research on this subject is needed by the industry. We should have something better than "two for one" and ten percent.

Retention is the child of capacity, or is it? It has seemed to me that there are four basic reasons for reinsurance:

1. To smooth out the peaks and valleys of experience,
2. To protect against the catastrophic shock loss,
3. To provide surplus relief, where overexpansion is a danger, and
4. To cut down the size of a line to digestible proportions.

These four reasons all appear to be functions of capacity, and one might imagine that carriers with like surplus positions would in general manage their reinsurance programs with similar retentions. But, of course, they don't. The programs are as varied as the caution or the courage of the managements that establish them. Even within the same company the basic pattern of retentions varies among the various lines of business. Usually, but not always, the larger departments retain the larger risks, though the money to pay the losses for

all departments comes from the same surplus. What makes a dollar more tightly squeezed in, say, the inland marine line than in the automobile? Here again, I suspect that statistical plans play an important part in underwriting policy. How the experience is reported can influence the size of the retention. A $50,000 loss is a much more serious matter against a $100,000 premium than against a $1,000,000, and no department, especially not a small one, wants to be seen with its catastrophes showing. It is all very well to say that management should lift out the abnormal loss in taking stock of underwriting performance, but can it be trusted to do so when the profits have disappeared?

What is the truth about surplus line reinsurance? Actuaries in general have seen little virtue in it, yet it persists because, in part at least, property underwriters with a traditional training know no way to operate without it. It does have other functions, too, but I suspect that all those other functions can be performed with perhaps less cumber in some other way. The demands of training and tradition cannot be ignored, and sometimes managements have felt the need for measures of deception, or perhaps I should call them measures of illusion since no one apparently is deceived by them. The home office pool, a device with form but no substance, may be a reinsurance anomaly, but it is at times psychologically useful. The alternative is a clear and logical understanding of loss patterns and their relation to risk. To express these relationships and to foster this understanding is work for actuaries—work for which I am sure progressive underwriters will be truly grateful.

It is interesting to note in passing that considerable theoretical work has been done by Western European actuaries on the problems of capacity and retention, as is evidenced by several of the property and casualty papers submitted to the XVth International Congress of Actuaries. Unfortunately, most of this European work is too theoretical for guidance to company managements or even to United States actuaries.

There are many other areas of risk study where we might develop useful aids to underwriters. For instance in the field of individual risk selection the underwriter must, of necessity, rely almost exclusively on his past experience and common sense. This usually does very well, but there are times when, without some careful correlations between risk characteristics and loss results, common sense and experience can lead to mistaken conclusions. Some thirty years ago I made what modern hucksters would call a "study in depth" to find out why our auto experience was better in the Pennsylvania coal mining communities than on the Philadelphia Main Line. The company I was with at the time was particularly proud of its list of socially elite Main Line policyholders. Today it is common sense to know that the Zamskys and the Zabiskis are more conservative in their driving habits than the vanAsterbilts, or at least they keep their children un-

der better control. But thirty years ago common sense pointed the other way and common sense was uncommonly wrong.

Our fellow actuaries in life insurance have for years been practicing what I am preaching and are now being amply rewarded for it. I find the following quotation from *Risk Appraisal* by Harry W. Dingman very apt to my point:

> "In earliest insurance days directors and officers of lodges and companies did the selecting entirely on the basis of individual judgment. They were the first lay underwriters. Medical men put system in underwriting in 1824 and held sway for a century thereafter. Then lay underwriters came in ascendancy again. Actuaries with ability and opportunity to analyze and interpret past underwriting experience, are, today, acquiring responsibility in most companies for selection rules and practice that will determine future underwriting experience."

There is significant work to be done both by individual actuaries for their own companies and, one can hope, by our pooled efforts. As an industry we have at times had difficulty in getting voluntary cooperation for research because it costs time and money, though, when useful work is done, we all gain materially. As an industry we entered into the size-of-risk study reluctantly, but I am certain that the results have been quite useful to us all. In this connection I quote again from Harry W. Dingman's *Risk Appraisal:*

> "All important in the history of risk appraisal was the study of merged data of multiple companies. Individual companies have limited material and may have underwriting pecularities. It is important to examine groups that are large enough for averages to be representative. British companies had made several joint surveys in the 19th century, but on limited basis with analysis by limited personnel. The 20th century has already produced some highly important studies based on pooled data of large companies."

Have we here a challenge to our very ably-manned Research Committee?

Too often today the rest of the business looks on the actuaries as professional soothsayers, practicing strange rites and incantations, who, after gazing at the mathematical entrails of a freshly killed expense factor and measuring the thickness of coat of a wooly-bear loss ratio, will come up with the prophecy that we shall have a severe insurance winter. Of course, they know we can't really predict the future, but they are inclined to feel that we are taking our pay under false pretenses when unfortunate eventualities occur that we have not been able to foretell or forestall. I am reminded of an episode in my favorite comic strip "Peanuts." Poor frustrated Charlie Brown is looking through a pair of binoculars when Lucy comes up and asks, "Binoculars, huh? Can you see into the future with them?"

"Of course not!" says Charlie turning on her in disgust.

"What good are binoculars," says Lucy trotting off, "if you can't see into the future."

I like to think that we are trusted with the binoculars of our industry and that we can be extremely useful in guiding its course if we use the binoculars wisely. But let us be at all times thoroughly honest and never give the impression that we think we have esoteric powers. Basically our job as actuaries is to study the past, developing from such study useful relationships which have some hope of holding for the future. Mr. Masterson very properly pointed out in his presidential address of a year ago that "the intelligent use of judgment is an actuarial obligation and responsibility of the highest order." If, however, we are to be recognized as wise and useful, our judgment must be in the selection of sound techniques and in the light of past relationships. It is not for us to turn judgment into conjecture or self-interested bias. We might well adopt the motto of the Society of Actuaries which reads: "The work of science is to substitute facts for appearances and demonstrations for impressions."

Let us not lend our professional skill and integrity to the pulling of rabbits out of hats as we claim the inalienable right to an exercise of judgment. Win Greene once for fun defined for us an actuary as one who can draw a straight line from an unwarranted assumption to a foregone conclusion. The reason that is funny is because it contains a tiny drop of truth in an ocean of exaggeration. Yes, we can draw that line and sometimes the temptation, almost the compulsion it seems, is there to do so. Happily the standards of professional conduct being worked out by the special committee of the Society will help us all, both in stiffening the backbone and in giving us a refuge.

Finally, when we have solved all the pressing problems of the industry, when we have substituted measurements and quantitative relationships for hunch and hope, all the while keeping our conduct free and above reproach, we shall at last have no concern for status. Eight hundred and fifty insurance managements will discover their insatiable need for us. But—one final bit of fatherly advice—we shall never achieve this glorious future unless we retain, or acquire if we do not now have it, a certain fundamental delicacy of perception which must accompany any inexact science—and ours is definitely inexact. We must in common with our friends the underwriters be able in a pinch to fly by the seat of our pants.

THE ADVANTAGES OF CALENDAR-ACCIDENT YEAR EXPERIENCE AND THE NEED FOR APPROPRIATE TREND AND PROJECTION FACTORS IN THE DETERMINATION OF AUTOMOBILE LIABILITY RATES

BY
PAUL BENBROOK

The basic principles for automobile liability insurance rate making have been well presented by Mr. Philipp K. Stern in his paper "Current Rate Making Procedures in Automobile Liability Insurance."* The principles and procedures as presented by him are applicable to the utilization of both calendar-accident year and policy year statistics. The purpose of this paper is to outline the advantages to be realized by using calendar-accident year experience instead of policy year experience and to discuss the reasons why trend and projection factors are essential if rate levels are to be proper during the period they are to apply.

At the outset, a distinction needs to be made between policy year and calendar-accident year experience. Experience compiled on a policy year basis compares earned premiums and exposures with incurred losses for all policies written to become effective within a calendar year. For example, policies written on January 1, 1956, are fully earned by the end of the calendar year, but all other policies written in 1956 are not fully earned until the corresponding date in 1957; this makes policies written on December 31, 1956, not fully earned until December 31, 1957. Likewise, losses occurring on policies written to be effective in 1956 must be allocated to policy year 1956 whether the loss occurs in 1956 or 1957. Therefore, the experience is not fully earned until 24 months after the beginning of a given policy year.

Calendar-accident year experience, hereafter referred to as accident year, compares earned premiums and exposures with losses incurred during a calendar or fiscal year period. That is, the accident year 1956 would include all losses occurring between January 1, 1956, and December 31, 1956, (or the fiscal year dates) and would be related to the premiums and exposures earned during the same period of time. Thus, accident year experience is fully earned in 12 months regardless of the effective date of the underlying policies.

The essential difference between these two methods of compiling data is that policy year considers the experience of a specific group of policies that become effective within a given calendar year, while accident year considers a specific group of losses that arise out of accidents that occur during a given 12-month period. Thus, policy year places emphasis on "exposures" and accident year places emphasis on "losses."

Automobile statistics compiled on the policy year basis were quite satisfactory as long as there were no marked changes in loss costs or

* Proceedings of the Casualty Actuarial Society, Vol. XLIII, pp. 112-165.

claim frequencies. However, underwriting losses that occurred subsequent to World War II and the inflationary forces that developed after the Korean outbreak in June of 1950 made it apparent that the automobile liability statistical plan should be revised to show trends more sharply and to reduce the interval between the experience period and the effective date of the rates. In an attempt to find an answer to this problem the Automobile Bodily Injury and Property Damage Liability Statistical Plan of the National Bureau of Casualty Underwriters and Mutual Insurance Rating Bureau was amended effective January 1, 1953, requiring data to be reported so that earned premiums, exposures and losses could be compiled on both a policy and an accident year basis. Under both methods the statistics are reported in exactly the same detail by class and by territory. During 1956 and 1957 these rating organizations tested accident year and policy year statistics for private passenger cars non-fleet to determine the accuracy and credibility of the accident year method. These tests showed that the accident year method was entirely sound and produced more timely and responsive data for rate review purposes, so accident year statistics are now being utilized in the determination of private passenger rates.

ADVANTAGES OF ACCIDENT YEAR STATISTICS

Accident year experience is better than policy year experience for determining automobile liability rate levels in that it:

(1) reduces the lag between the experience period and the effective date of the rates;

(2) shows the trend in loss costs and frequencies more clearly and accurately;

(3) produces a more mature body of loss experience at each reporting date;

(4) makes it possible to give greater credibility to the latest year of the experience period;

(5) eliminates earned factors used to adjust policy year experience when reported as of 12 months;

(6) makes it possible to produce average paid claim costs and claim frequencies for calendar or fiscal year periods from the same basic loss cards used to compile accident year losses;

(7) permits the use of fiscal year experience periods ending other than December 31; and

(8) is more readily understood.

An analysis of each of these factors points up the advantages resulting from the use of accident year experience in determining automobile liability rates.

Reduction of Lag. Accident year experience is fully earned during the first 12 months of each accident year, yet it takes 24 months for the policy year experience to become similarly earned. Both methods require, however, that the losses be valued as of a date three months

subsequent to the termination date of the experience period so that the vast majority of incurred but not reported losses will be included in the first reporting. Since this requirement applies to both methods of reporting, accident year experience on a complete basis becomes available 12 months sooner than policy year experience on a complete basis. This reduction in the time lag between the experience period and the rate review date makes accident year data more indicative of current costs and more responsive to changing conditions.

Trend Indications. It is essential that year to year trends within the experience period be shown clearly and accurately if past experience is to be utilized to its fullest in the determination of rates to be applied in the future. Accident year experience shows pure premiums and claim frequencies for consecutive calendar or fiscal year periods; so that data for any given year can be compared with data for subsequent years, and any trend that develops is readily apparent. On the other hand, similar data on a policy year basis cover a period of two calendar years and do not reflect the true loss conditions for any given year. Since policy years overlap and each policy year represents the average for two calendar years, the data are of very little value for trend purposes because the averaging minimizes the peaks and the valleys. The following data for private passenger cars illustrate the advantage of the accident year over the policy year:

AUTOMOBILE LIABILITY — PRIVATE PASSENGER CARS*
Countrywide Experience Excluding Massachusetts

Coverage	Year	As Of	Claim Frequency Per 100 Cars Insured		Pure Premiums Basic Limits	
			Accident Year	Policy Year	Accident Year	Policy Year
Bodily Injury	1953	12 Mo.	2.6	2.8	20.17	21.09
	1953	24 Mo.	2.5	2.5	20.20	20.51
	1953	36 Mo.	2.4	2.4	20.01	19.26
	1954	12 Mo.	2.6	2.8	20.15	21.52
	1954	24 Mo.	2.5	2.6	20.06	21.10
	1955	12 Mo.	2.8	2.9	22.31	22.81
Property Damage	1953	12 Mo.	9.4	8.9	12.05	11.71
	1953	24 Mo.	9.2	9.1	11.64	11.53
	1954	12 Mo.	9.2	8.6	11.63	11.26
	1954	24 Mo.	9.0	9.0	11.19	11.56
	1955	12 Mo.	9.2	8.5	12.48	12.00

* For underlying figures see Exhibits I and II.

The accident year pure premiums show that the loss costs were relatively level during 1953 and 1954 and indicate more clearly the adverse experience developing in 1955 than do the policy year figures. The advantage of having experience for consecutive 12-month periods is obvious if trends are to be used to predict the loss experience that may be expected during the period the rates are to be in effect.

Maturity of Losses. Accident year experience not only affords a more current but a more mature body of loss experience since the losses at each reporting date reach a greater degree of statistical maturity than policy year losses. This is true because all losses resulting from accidents occurring within a calendar or fiscal year are assignable to the year in which the accident occurs, while policy year losses occurring over a 24-month period are assignable to the year in which the policy became effective. The following shows the per cent of the incurred losses that have been paid at various reporting dates for both the policy year and the accident year method of collecting data:

AUTOMOBILE LIABILITY — PRIVATE PASSENGER CARS
Texas Experience — 1954 Accident and Policy Years

Coverage	Basis Of Compiling The Statistics	Ratio of Paid to Incurred Losses Reported As Of			Outstanding As Of	
		12 Mos.	24 Mos.	36 Mos.	24 Mos.	36 Mos.
Bodily Injury	Accident Year	.366	.787	.917		.083
	Policy Year	.279	.629	.877		.123
Property Damage	Accident Year	.684	.948		.052	
	Policy Year	.607	.884		.116	

Note: Ratios are losses paid as of December 31 to losses incurred as of March 31.

These figures show that the ratio of paid to incurred losses at the first reporting was 36.6% for bodily injury and 68.4% for property damage under the accident year method as compared with 27.9% for bodily injury and 60.7% for property damage under the policy year method. There is also a substantial difference in favor of the accident year method at the other reporting dates. The greater maturity of the accident year losses at every reporting date, and particularly at the first reporting date, makes accident year experience much more reliable and indicative of the final costs than the policy year experience.

Greater Credibility. Being fully earned when first reported, the latest accident year of experience can be given more credibility or weight than is possible for the incomplete year on the policy year

basis. This makes the rate making process more responsive and indicative of current rate needs. At the present time, the basic experience utilized in the determination of private passenger rates is two accident years with the latest year receiving 70% weight and the previous year 30% weight. Under the policy year method each year receives a weight of 50% since the latest year is an incomplete policy year and has to be adjusted to an ultimate basis by the use of earned factors.*

Earned Factors. As the experience for an accident year is complete when reported, it is not necessary to apply earned factors to determine the earned exposures and premiums as is the case for a policy year experience reported as of 12 months. This not only eliminates the estimates involved in the earned factors but the doubling effect that such factors have on policy year experience in an inflationary period. For example, the ratios of pure premiums at 12 months to those developed at 36 months tend to decline as more adequate reserves and higher settlements are reflected in the later reports of policy year experience. However, the higher claim costs are also reflected in the experience of the year under review as of 12 months to which the earned factors will be applied and the depressed earned factor tends to produce higher pure premiums. In times of deflation, there will be a doubling in the opposite direction.

Calendar or Fiscal Year Average Paid Claim Cost and Claim Frequency. Another important feature of the accident year method of reporting is the different types of data that can be obtained from the same basic loss cards. Since a separate transaction card for each claim is required, average paid claim cost and claim frequency can be produced on a calendar or a fiscal year basis irrespective of the date that the accident occurred. Average paid claim costs are considered to be the most indicative for trend purposes since they show actual payments and are not affected by reserves or the year to year changes that occur in such reserves. While claims generally become more costly the longer they remain outstanding, paid losses accurately reflect the trend as well as current costs as to jury verdicts, surgical, medical, repair and replacement costs, and other items which have their effect on the final costs. Such calendar or fiscal year figures can be utilized to help bridge the gap between the experience period and the effective date of the rates because they can be maintained on practically a current basis. The fact that such data can be developed monthly, quarterly, semi-annually or annually makes it possible to have year to year comparisons at every stage of development and to reasonably predict the prospective loss experience to be expected during the period the rates are to apply.

* The Texas private passenger liability rates effective 8/1/58 utilized both policy and accident year figures with the latest year receiving 70% weight and the previous year 30%. In prior revisions the experience period included three policy years with the latest, first previous and second previous years receiving weights of 50%, 30% and 20%, respectively.

Fiscal Year. The accident year method of gathering statistics makes it possible to utilize fiscal year experience periods ending other than December 31 which is impractical on a policy year basis. This provides for an orderly review of rates throughout the entire year with approximately the same currentness as to the experience being reviewed since the annual review period for some states will extend from July 1 of one year through June 30 of the following year and for other states from January 1 through December 31 of the same year. It also makes it possible for automobile liability and physical damage revisions to be made concurrently as varying fiscal periods are used in the different states in reviewing physical damage rate needs.

More Readily Understood. Tabulations on accident year basis are more nearly in accord with general accounting practices and are more readily understood. Anything that tends to bring about a better understanding of our business and its attendant problems should be almost as beneficial as the other advantages to be realized by the new method of gathering statistical data.

The rate making organizations, recognizing these advantages, used accident year experience in 1958 for the first time in determining liability rates for private passenger cars non-fleet. For all other types of automobiles, policy year experience was used and will continue to be used until a satisfactory solution can be found for the classes that involve audited exposures.

NEED FOR TREND AND PROJECTION FACTORS

Accident year statistics materially reduce the time lag between the experience period and the effective date of the rates, but this is only a partial solution to the problem of inadequate rate levels that plague the industry. No system of gathering past experience can produce a reasonable rate level unless it is adjusted to reflect current costs and to provide for a reasonable prediction of the losses that may be expected during the period that the rates are to apply.

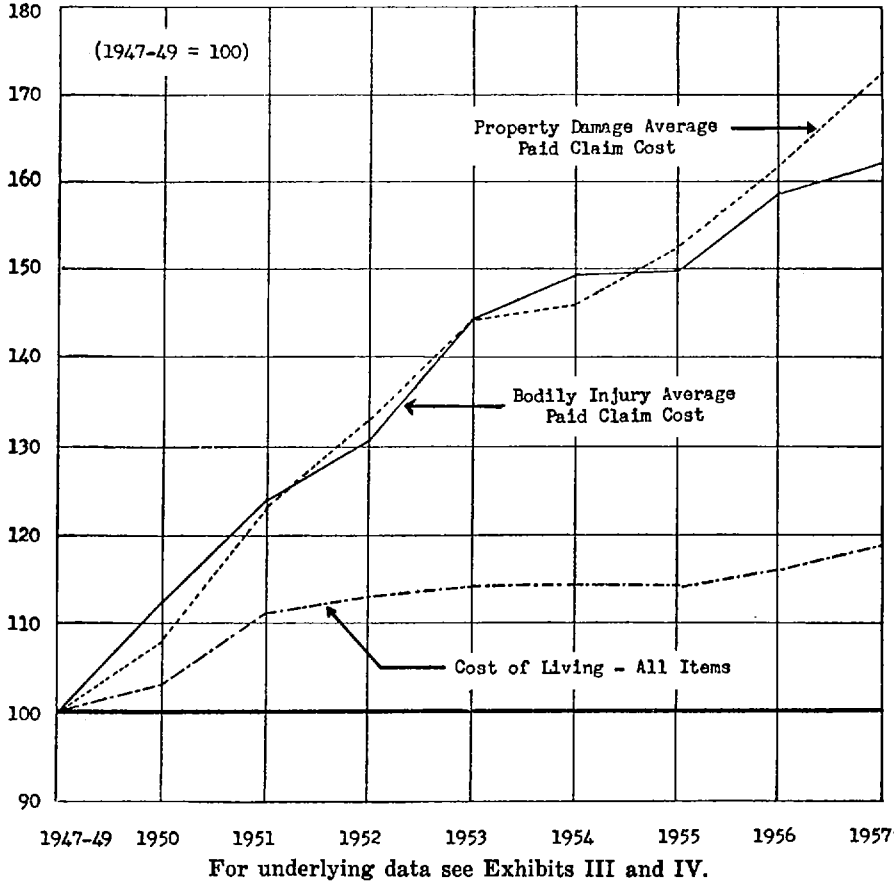
This country has been and is experiencing a long-term inflationary spiral. At today's market place the 1939 dollar will buy less than 48 cents in goods, and government economists state that it will be difficult to confine the average price rise in the future to 2 or 3 per cent a year. Inflation has not been an insurmountable problem to most businesses, as they have simply raised their prices and realized an immediate effect of such increases. Automobile rates, on the other hand, cannot be changed to reflect immediate cost increases because they are set for a relatively long period of time and any changes must be approved by regulatory authorities. Even when changes are made, the effect is not felt immediately since outstanding contracts are not affected until their expiration dates. Consequently, automobile rate levels have not kept pace with the rise in costs, and the underwriting losses since the end of World War II have been substantial.

For the automobile industry, this general inflation has resulted in increases in repair and replacement costs, in hospital rates, in sur-

geon and physician fees, and in nursing and other medical expenses, but the bodily injury and property damage liability losses have increased at a rate all out of proportion to the general increase in costs. The following chart comparing the cost of living index increases with the countrywide automobile liability average paid claim cost index increases shows this variation.

CONSUMERS' PRICE INDEX
(COST OF LIVING INDEX — ALL ITEMS)
AUTOMOBILE BODILY INJURY AND PROPERTY DAMAGE
AVERAGE PAID CLAIM COST INDEXES

Countrywide Experience Based on all Types of Cars — Total Limits



For underlying data see Exhibits III and IV.

* Year ending 9/30/57.

During the period that the cost of living index increased 19.3%, the countrywide automobile liability loss level index increased 62.3% for bodily injury and 72.4% for property damage. These excessive increases in liability losses are due to several factors. The chief factors are (1) the increased claim consciousness of the public, (2) the liberal jury awards, (3) the effect of such liberal awards on the settlement value of claims that do not go to trial, (4) the failure of juries to hue to the rules of negligence, and (5) the design and power of the present-day automobile which has increased the frequency and the severity of accidents. There is no reason to expect a decline in costs due to these factors because people are becoming more and more claim conscious, high jury verdicts are becoming commonplace, and the public likes the modern automobile's features which are extremely expensive to repair. The problem of expensive repairs will even become more acute as automobiles with the old style body design, divided windshield, etc., are replaced by automobiles with streamlined body construction, wrap-around windshields, dual headlights and taillights, ornamental rather than functional bumpers, fancy radiator grills, chrome trim, etc. This means, therefore, that past experience cannot be used as the sole indicator of future automobile liability rate needs.

Where futurity is involved, every successful business man takes into consideration future costs. In fact, there is no doubt that with the inflationary spiral of the last ten years and the attendant increases in labor and material costs, not a single building contractor would be in business today if he had not taken rising prices into account in bidding contracts for future performance. Since automobile insurance contracts provide for future performance and rates must be made to apply prospectively, it is not only logical but essential that consideration be given to all of the factors which can be expected to have a bearing on the loss experience during the period the rates are to apply. This can be accomplished by the use of trend and projection factors.

Trend and Projection Factors. Trend factors are used to adjust the basic accident or policy year experience to reflect the latest available loss costs, while projection factors are used to further adjust the experience to reflect the costs which are expected to apply during the time the rates are in effect.

Different formulas have been developed and used to determine appropriate trend and projection factors, and as the industry and the regulatory authorities continue to work with this problem, there is no doubt that better formulas for determining and utilizing these factors will be developed. As I am more familiar with the Texas system, I will briefly describe the way in which Texas has used these factors in the promulgation of private passenger automobile liability rates.

Beginning with the 1952 rate revision and for each year through 1957, the Texas State Board of Insurance used trend factors in an earnest attempt to make rates that would reflect the most current loss

experience, but the rate levels so produced proved to be inadequate. In the 1958 revision, both trend and projection factors were used to adjust past experience in promulgating automobile liability rates. The increase in average paid claim costs and claim frequencies as shown in Exhibit V — sheets 1 and 2, the increase in accidents as reported by the Texas Department of Public Safety and other economic factors convinced the Board that past experience, regardless of how recent, could not produce prospective rates that would be fair, reasonable and adequate in an inflationary economy. The following chart shows the increases that have occurred in the loss levels during calendar years 1955, 1956 and 1957.

AUTOMOBILE LIABILITY — PRIVATE PASSENGER CARS

Countrywide (excl. Mass.) Experience for Accident Years 1953, 1954 & 1955

National Bureau Members & Subscribers (a)

Coverage	Acc. Year	As of	Earned No. Cars	Earned Premium(b)	Liability			Medical Payments Incurred Losses(c)	Claim Freq. (d)	Pure Prem. (e)
					Incurred Losses (c)		No. of Claims			
					Basic Limits	Excess				
Bodily Injury	1953	12 Mo.	9,345,894	$380,526,625	$188,540,705	$28,949,012	243,128	$22,699,446	2.6	$20.17
	1953	24 Mo.	9,345,894	380,526,625	188,801,427	36,656,867	229,581	22,240,669	2.5	20.20
	1953	36 Mo.	9,345,894	380,526,625	187,045,783	35,431,334	226,976	22,060,042	2.4	20.01
	1954	12 Mo.	10,758,693	440,815,690	216,739,989	35,391,357	281,228	26,628,237	2.6	20.15
	1954	24 Mo.	10,758,693	440,815,690	215,873,029	41,931,162	266,071	25,936,812	2.5	20.06
	1955	12 Mo.	11,080,886	448,960,926	247,227,647	38,166,036	314,429	33,246,424	2.8	22.31
Property Damage	1953	12 Mo.	9,066,454	172,686,979	109,247,803	25,341	852,624		9.4	12.05
	1953	24 Mo.	9,066,454	172,686,979	105,502,106	13,200	838,371		9.2	11.64
	1954	12 Mo.	10,490,428	212,072,397	122,013,724	16,382	963,543		9.2	11.63
	1954	24 Mo.	10,490,428	212,072,397	117,437,316	18,228	942,257		9.0	11.19
	1955	12 Mo.	10,801,437	213,720,882	134,832,839	12,848	992,993		9.2	12.48

(a) Plus all companies that filed with N.B.C.U. in 18 states—1953 at 36 mos., 1954 at 24 mos., 1955 at 12 mos.
(b) Premiums included charges for excess limits (for B.I. they also included premiums for medical payments coverage).
(c) Including all loss adjustment expenses.
(d) Claim frequency is per 100 cars.
(e) Basic Limits.

EXHIBIT I

AUTOMOBILE LIABILITY — PRIVATE PASSENGER CARS

Countrywide (excl. Mass.) Experience for Policy Years 1953, 1954 & 1955

National Bureau Members & Subscribers (a)

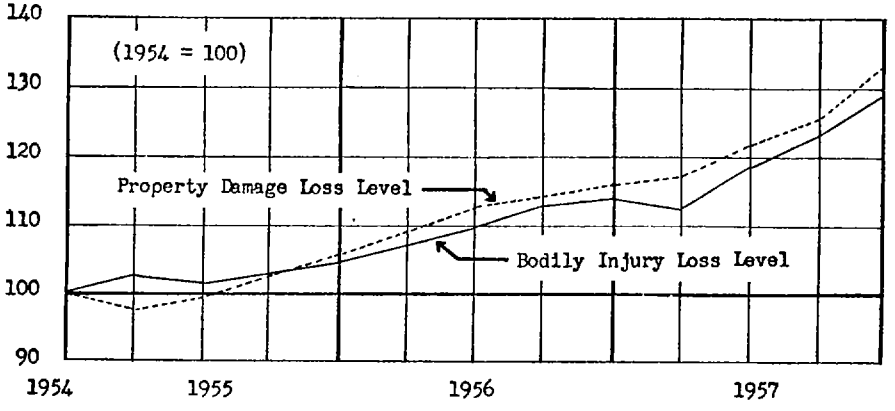
Coverage	Policy Year	As of	Earned No. Cars	Earned Premium(b)	Liability			Medical Payments Incurred Losses(c)	Claim Freq. (d)	Pure Prem. (e)
					Incurred Losses (c)		No. of Claims			
					Basic Limits	Excess				
Bodily Injury	1953	12 Mo.	5,056,707	$211,452,370	$106,627,228	$15,679,977	140,166	$12,778,149	2.8	$21.09
	1953	24 Mo.	9,528,222	404,207,460	195,402,038	37,032,102	240,789	22,824,020	2.5	20.51
	1953	36 Mo.	10,886,796	445,733,298	209,633,344	42,065,484	259,226	25,078,019	2.4	19.26
	1954	12 Mo.	5,193,872	217,801,262	111,797,855	17,463,643	145,881	13,487,589	2.8	21.52
	1954	24 Mo.	10,840,538	443,081,159	228,706,514	40,894,823	283,046	28,439,514	2.6	21.10
	1955	12 Mo.	6,313,155	257,038,373	144,003,723	20,785,997	184,151	19,769,288	2.9	22.81
Property Damage	1953	12 Mo.	5,257,731	106,807,610	61,547,256	25,272	468,667		8.9	11.71
	1953	24 Mo.	9,249,423	188,337,456	106,607,094	7,935	839,543		9.1	11.53
	1954	12 Mo.	5,344,559	113,065,917	60,202,072	12,286	458,500		8.6	11.26
	1954	24 Mo.	10,559,008	212,946,947	122,059,818	24,992	949,711		9.0	11.56
	1955	12 Mo.	6,594,736	128,278,253	79,158,412	3,311	563,832		8.5	12.00

(a) Plus all companies that filed with N.B.C.U. in 18 states—1953 at 36 mos., 1954 at 24 mos., 1955 at 12 mos.
(b) Premiums included charges for excess limits (for B.I. they also included premiums for medical payments coverage).
(c) Including all loss adjustment expenses.
(d) Claim frequency is per 100 cars.
(e) Basic Limits.

EXHIBIT II

AUTOMOBILE BODILY INJURY AND PROPERTY DAMAGE LOSS LEVEL INDEXES

Texas Private Passenger Experience — Total Limits



Note: Each quarter shows the loss level for the year ending on that date. For underlying figures see Exhibit V, Sheet 2.

The factors used in Texas to adjust the basic loss experience in determining private passenger automobile liability rates from 1952 through 1958 are as follows:

Rate Revision Effective	Bodily Injury		Property Damage	
	Trend Factors	Projection Factors	Trend Factors	Projection Factors
5/1/52	1.220		1.056	
5/1/53	1.053		1.109	
5/1/54	.993		1.036	
5/1/55	.993		.987	
5/1/56	1.024		1.016	
5/1/57	1.080		1.101	
8/1/58	1.129	1.046	1.141	1.081

Attention will now be given as to how the Texas Board arrived at the trend and projection factors used in determining liability rates for private passenger cars effective August 1, 1958. This was somewhat complicated in that the Board used both accident year and policy year figures. The basic experience used was accident years 1955 and 1956 including the first 6 months of 1957 for the companies reporting to the National Bureau of Casualty Underwriters and the Mutual Insurance Rating Bureau and policy years 1954, 1955 and 1956 as of December 31, 1956, for companies reporting to the National

Association of Independent Insurers. In addition to the detailed data by class and territory, calendar year average paid claim cost and claim frequency data were used for the years included in the experience period and for the calendar year ending December 31, 1957.

Exhibits VI and VII set out the calendar year average paid claim cost and claim frequency data used in determining the factors shown in column (5) of both of these exhibits. These factors were used to adjust the appropriate accident year and policy year data to reflect the loss level for the calendar year ending December 31, 1957. The net effect of these various factors produced an overall trend factor of 1.129 for bodily injury and 1.141 for property damage.

Exhibit VIII shows calendar year average paid claim cost data and the derived factors that were applied to both the accident year and the policy year experience to reflect prospective costs. This resulted in a projection factor of 1.046 for bodily injury and 1.081 for property damage. These factors are very conservative since no attempt was made to predict increases in claim frequencies which may be expected during the period the rates are to apply. They are for a period of 13 months since the Texas Board projected the loss experience to August 1, 1958, the effective date of the rates, rather than to August 1, 1959, the mid-point of the period during which the rates would be in effect. This projection period was based on the fact that the trend factors reflected the loss conditions existing at the middle rather than the end of the 1957 calendar year since claim costs and claim frequencies had increased gradually throughout the year. (See Exhibit V, Sheets 1 and 2.)

The Texas Board in promulgating automobile liability rates has realistically faced the problem by using both trend and projection factors in an attempt to make the rates adequate at the time they become effective. These rates will prove to be inadequate, however, if claim costs and claim frequencies continue to increase during the two-year period they will be in effect.

Prospective Consideration Authorized. While the wording differs somewhat, the statutes in all of the states provide that consideration *shall* be given to past and prospective experience except for the states of Kansas, Massachusetts, New Hampshire, North Carolina and Texas. The statutes in Kansas and Texas provide that due consideration *may* be given to past and prospective experience. The Massachusetts statute provides for the consideration of past and prospective experience except for compulsory motor vehicle liability. New Hampshire and North Carolina are the only states whose statutes make no reference to the use of either past or prospective experience in establishing automobile liability rates since they set out no standards to be considered in the determination of rates. Thus, for the most part, the state regulatory officials are not only authorized but instructed to take into consideration all factors that can be reasonably expected to have a bearing on the prospective experience during the period the rates are to apply.

The courts, too, have held that in the making of utility rates, which must be made prospectively, a reasonable prediction of future expenses is as important as an examination of the expenses incurred in the past. Since insurance rates must be made to apply prospectively also, it is not sufficient for the regulatory bodies to approve rates that would have been proper for some period in the past because the rates are not operative in the past. The rates represent premiums which are to be collected tomorrow and should reflect a reasonable prediction of claim costs, claim frequencies and other economic factors which will have a bearing on the loss experience for the period the rates will be in effect.

The specific directions in the statutes and the court decisions justify regulatory authorities taking into consideration reasonable predictions of prospective costs in establishing rates that must apply in the future.

CONCLUSION

The advantages to be realized in using accident year experience and the need for applying trend and projection factors in the determination of automobile liability rates have been set out in the foregoing discussion. It has been established that rates based on accident year experience adjusted to show current conditions and probable future loss expectations will be more nearly correct than would be the case if the rates were based entirely upon past experience. However, it must be recognized that it is hardly possible to develop a formula to produce rates that will be exactly correct for the period they are to apply. This is true because past experience or past trends are seldom duplicated during future experience periods. Formulas and established procedures are desirable, but the element of judgment cannot be eliminated since there are many economic factors that must be considered as well as the credibility of the data to which the formulas are to be applied. To the extent possible, formulas and fixed rating procedures should be established; but when the existing conditions show that such formulas and procedures will not produce appropriate rates, there should be no hesitancy on the part of those responsible to take the necessary steps so that rate levels will not be excessive, inadequate or unfairly discriminatory.

AUTOMOBILE LIABILITY INSURANCE
Index Countrywide Average Paid Claim Costs
Based on All Types of Cars—Total Limits

Calendar Year	Base Year: 1941=100		Base: 1947-1949=100	
	B. I.	P. D.	B. I.	P. D.
1941	100.0	100.0		
1942	120.1	112.0		
1943	127.8	132.5		
1944	127.4	157.1		
1945	117.1	166.9		
1946	119.7	178.9		
1947	127.8	195.8)		
1948	140.1	210.1)	100.0	100.0
1949	146.8	216.2)		
1950	155.9	225.0	112.8	108.5
1951	171.2	256.5	123.9	123.7
1952	180.6	275.6	130.7	132.9
1953	199.7	299.7	144.5	144.5
1954	206.3	302.7	149.2	146.0
1955	207.1	317.7	149.8	153.2
1956	218.5	336.1	158.1	162.1
Ended 9/30/57	224.3	357.4	162.3	172.4

Based on Total Limits, All Types of Cars. The indexes for 1941-1953 were computed from experience gathered under a special call for a comparable group of companies. After 1953 this special call was discontinued. The indexes subsequent to 1953 are not strictly comparable because they were calculated by applying the per cent change in claim costs to the index of the preceding year. These indexes are based on the combined experience of the members and subscribers of the National Bureau of Casualty Underwriters and the Mutual Insurance Rating Bureau.

EXHIBIT III

CONSUMERS' PRICE INDEX
(COST OF LIVING INDEX — ALL ITEMS)
U. S. BUREAU OF LABOR STATISTICS

NEW: 100 = 1947-49

Calendar Year	Cost of Living Index All Items
1947)	
1948)	100.0
1949)	
1950	102.8
1951	111.0
1952	113.5
1953	114.4
1954	114.8
1955	114.5
1956	116.2
Ended 9/30/57	119.3

EXHIBIT IV

AUTOMOBILE LIABILITY — PRIVATE PASSENGER CARS

Texas Experience — Total Limits

AVERAGE PAID CLAIM COST AND AVERAGE PAID CLAIM COST INDEX

Calendar Year Ending	Bodily Injury		Property Damage	
	Average Paid Claim Cost*	Avg. Paid Claim Cost Indexes	Average Paid Claim Cost*	Avg. Paid Claim Cost Indexes
12/31/54	$591	100.0	$106	100.0
3/31/55	602	101.9	106	100.0
6/30/55	591	100.0	109	102.8
9/30/55	587	99.3	111	104.7
12/31/55	586	99.2	114	107.5
3/31/56	588	99.5	116	109.4
6/30/56	583	98.6	117	110.4
9/30/56	594	100.5	118	111.3
12/31/56	601	101.7	120	113.2
3/31/57	594	100.5	123	116.0
6/30/57	611	103.4	126	118.9
9/30/57	617	104.4	129	121.7
12/31/57	625	105.8	132	124.5

CLAIM FREQUENCY PER 100 CARS INSURED AND CLAIM FREQUENCY INDEX

Calendar Year Ending	Bodily Injury		Property Damage	
	Claim Frequency Per 100 Cars Insured	Claim Frequency Indexes	Claim Frequency Per 100 Cars Insured	Claim Frequency Indexes
12/31/54	1.46	100.0	6.60	100.0
3/31/55	1.47	100.7	6.49	98.3
6/30/55	1.48	101.4	6.41	97.1
9/30/55	1.51	103.4	6.45	97.7
12/31/55	1.53	104.8	6.46	97.9
3/31/56	1.57	107.5	6.62	100.3
6/30/56	1.63	111.6	6.77	102.6
9/30/56	1.65	113.0	6.77	102.6
12/31/56	1.65	113.0	6.78	102.7
3/31/57	1.64	112.3	6.71	101.7
6/30/57	1.68	115.1	6.75	102.3
9/30/57	1.73	118.5	6.86	103.9
12/31/57	1.79	122.6	7.07	107.1

* Bodily Injury is for indemnity only—medical payments are not included. All loss adjustment expenses are excluded.

Companies reporting to: National Bureau of Casualty Underwriters and Mutual Insurance Rating Bureau.

EXHIBIT V

Sheet 1

AUTOMOBILE LIABILITY — PRIVATE PASSENGER CARS

Texas Experience

LOSS LEVEL INDEX*

Calendar Year Ending	Bodily Injury Total Limits	Property Damage Total Limits
12/31/54	100.0	100.0
3/31/55	102.6	98.3
6/30/55	101.4	99.8
9/30/55	102.7	102.3
12/31/55	104.0	105.2
3/31/56	107.0	109.7
6/30/56	110.0	113.3
9/30/56	113.6	114.2
12/31/56	114.9	116.3
3/31/57	112.9	118.0
6/30/57	119.0	121.6
9/30/57	123.7	126.4
12/31/57	129.7	133.3

* Average paid claim cost indexes times claim frequency indexes—Exhibit V, Sheet 1.

Companies reporting to: National Bureau of Casualty Underwriters and Mutual Insurance Rating Bureau.

EXHIBIT V

Sheet 2

TEXAS AUTOMOBILE LIABILITY

PRIVATE PASSENGER - ACCIDENT YEAR

AVERAGE PAID CLAIM COST

	Bodily Injury - Basic Limits			Property Damage - Total Limits		
Year Ended	Paid Losses	No. of Claims	Average Paid Claim Cost	Paid Losses	No. of Claims	Average Paid Claim Cost
12/31/55	$ 8,938,764	16,551	$540	$ 7,714,238	67,963	$114
6/30/57 *	15,933,223	28,658	556	14,193,895	114,942	123
12/31/57	12,487,223	21,921	570	11,321,003	85,830	132

* 18 Months ending 6/30/57 (1/1/56 to 6/30/57)

CLAIM FREQUENCY

	Bodily Injury			Property Damage		
	No. of Cars	No. of Claims	Claim Frequency	No. of Cars	No. of Claims	Claim Frequency
12/31/54	1,094,386	15,930	1.46	1,095,304	72,274	6.60
12/31/55	1,140,408	17,396	1.53	1,137,041	73,424	6.46
12/31/56	1,154,265	19,069	1.65	1,152,001	78,127	6.78
6/30/57 *	1,743,319	29,385	1.69	1,739,962	119,711	6.88
12/31/57	1,206,742	21,625	1.79	1,204,273	85,118	7.07

* 18 Months ending 6/30/57 (1/1/56 to 6/30/57)

Development of Factors to Adjust Losses to Loss Level for Year Ended 12/31/57

	Average Paid Claim Cost (Basic Limits)		Claim Frequency	
	Bodily Injury	Property Damage	Bodily Injury	Property Damage
12/31/55	$540	$114	1.53	6.46
6/30/57 *	556	123	1.69	6.88
12/31/57	570	132	1.79	7.07

* 18 Months ending 6/30/57 (1/1/56 to 6/30/57)

	(1) Claim Cost	(2) Average Claim Cost Factor $570÷(1)	(3) Claim Frequency	(4) Claim Frequency Factor 1.79÷(3)	(5) Combined Frequency & Severity Factor (2) x (4)
BODILY INJURY					
(a) Accident Year 1955	$540	1.056	1.53	1.170	1.236
(b) Accident Period 1956-7*	556	1.025	1.69	1.059	1.085
	(1)	(2) $132÷(1)	(3)	(4) 7.07÷(3)	(5)
PROPERTY DAMAGE					
(a) Accident Year 1955	114	1.158	6.46	1.094	1.267
(b) Accident Period 1956-7*	123	1.073	6.88	1.028	1.103

*Accident Year 1956 plus 1st 6 months 1957.

EXHIBIT VI

TEXAS AUTOMOBILE LIABILITY

PRIVATE PASSENGER - POLICY YEAR

AVERAGE PAID CLAIM COST

	Bodily Injury - Total Limits			Property Damage - Total Limits		
Year Ended	Paid Losses	No. of Claims	Average Paid Claim Cost	Paid Losses	No. of Claims	Average Paid Claim Cost
12/31/54	$2,926,379	5,257	$557	$2,425,929	22,321	$109
12/31/55	3,503,707	6,739	520	3,105,974	26,806	116
12/31/56	5,085,818	8,654	588	4,013,029	32,478	124
12/31/57	5,870,146	9,874	595	4,939,647	37,827	131

CLAIM FREQUENCY

	Bodily Injury			Property Damage		
	No. of Cars	No. of Claims	Claim Frequency	No. of Cars	No. of Claims	Claim Frequency
6/30/57	555,637	8,892	1.60	555,954	34,874	6.27
12/31/57	581,290	9,874	1.70	581,190	37,827	6.51

Development of Factors to Adjust Losses to Loss Level for Year Ended 12/31/57

	Claim Costs (1) Claim Cost	(2) Average Claim Cost Factor $595÷(1)	Claim Frequency (3) Claim Frequency	(4) Claim Frequency Factor 1.70÷(3)	(5) Combined Frequency & Severity Factor (2) x (4)
BODILY INJURY					
(a) Policy Year 1954 = 1/2 Cal. Yr. 1954 +1/2 Cal. Yr. 1955	$539	1.104	1.60	1.063	1.174
(b) Policy Year 1955 = 1/2 Cal. Yr. 1955 +1/2 Cal. Yr. 1956	554	1.074	1.60	1.063	1.142
(c) Policy Year 1956 as of 12/31/56 = Cal. Year 1956	588	1.012	1.60	1.063	1.076
PROPERTY DAMAGE	(1)	(2) $131÷(1)	(3)	(4) 6.51÷(3)	(5)
(a) Policy Year 1954 = 1/2 Cal. Yr. 1954 +1/2 Cal. Yr. 1955	$113	1.159	6.27	1.038	1.203
(b) Policy Year 1955 = 1/2 Cal. Yr. 1955 +1/2 Cal. Yr. 1956	120	1.092	6.27	1.038	1.133
(c) Policy Year 1956 as of 12/31/56 = Cal. Year 1956	124	1.056	6.27	1.038	1.096

EXHIBIT VII

TEXAS

AUTOMOBILE LIABILITY INSURANCE — PRIVATE PASSENGER REVISION

(Revision Effective August 1, 1958)

Development of Factors to Adjust Accident Years 1955 and 1956-57 (a) and Policy Years 1955 and 1956 for Trend of Average Paid Claim Costs for 13 Months Subsequent to 6/30/57

(Based Upon Calendar Year Average Paid Claim Cost Data)

		Texas		
Coverage	Year Ended	Paid Losses (b)	Number of Paid Claims	Average Paid Claim Cost
Bodily Injury	12/31/55	$13,202,717	23,290	$567
(Total Limits)	12/31/57	19,566,979	31,795	615
Property Damage	12/31/55	10,820,212	94,769	114
(Total Limits)	12/31/57	16,260,650	123,657	131

	Bodily Injury	Property Damage
(1) Average Annual Change in Paid Claim Costs $\frac{12/31/57-12/31/55}{12/31/55} \div 2$ =	+ 4.3%	+ 7.5%
(2) 13 Month Average Change in Paid Claim Costs (Line I x 1.08) =	+ 4.6	+ 8.1
(3) Factor to Adjust Average Loss Experience for Accident Years 1955 and 1956-57(a) and Policy Years 1955 and 1956 for Trend of Average Paid Claim Costs for 13 Months Subsequent to 6/30/57		
1.00 + (2) =	1.046	1.081

(a) Accident Year 1956 Plus 1st Six Months of 1957.
(b) Excluding All Loss Adjustment Expense.

EXHIBIT VIII

A UNIFORM STATISTICAL PLAN AND INTEGRATED RATE FILING PROCEDURE FOR PRIVATE PASSENGER AUTOMOBILE INSURANCE

BY

STANLEY C. DuROSE, JR.

The casualty insurance rate analyst in the employ of a state insurance department who attempts to conscientiously administer the various statutes relating to insurance rates is constantly confronted with inconsistency and contradiction. In the discussion that follows, the thoughts of one such rate analyst are offered for consideration. The entire presentation represents certain ideas and conclusions of the writer, and they should not be construed to be the attitude or policy of the writer's employer.

The insurance against loss, expense, and liability resulting from the use of motor vehicles develops a larger premium volume than any other single kind of casualty insurance with the exception of accident and health insurance. In Wisconsin, where $344,839,837 fire and casualty premiums were written in 1957, a total of $99,656,550, or 28.9%, was reported as automobile insurance. The vast majority of automobile insurance premiums are the result of private passenger automobiles. It therefore behooves the state insurance regulatory officials to exercise extreme care in making decisions concerning rates and premium charges for private passenger automobiles. Any error that is made through commission or omission, even though small in relation to one individual, can, in the aggregate, reach gigantic proportions in terms of total premium dollars. This could be either detrimental or favorable to insurance companies and the public interest.

The Wisconsin Legislature, in 1947, saw fit to enact its version of the All Industry Casualty Rate Regulatory Bill. Section 204.37, Wisconsin Statutes, states:

> "**204.37. Insurance rates and practices: regulations; purpose of sections.** The purpose of sections 204.37 to 204.54 is to promote the public welfare by regulating insurance rates made by rating organizations and by insurers to the end that they shall not be excessive, inadequate or unfairly discriminatory, and to authorize and regulate co-operative action among insurers in rate making and in other matters within the scope of said sections. Nothing in said sections is intended (1) to prohibit or discourage reasonable competition, or (2) to prohibit, or encourage except to the extent necessary to accomplish the aforementioned purpose, uniformity in insurance rates, rating systems, rating plans or practices. Said sections shall be liberally interpreted to carry into effect the provisions of this section."

It seems significant that the legislature had foremost in mind the purpose "to promote the public welfare by regulating insurance rates." The legislature says further that the rate regulatory statutes are not intended "to prohibit or discourage reasonable competition." However, with respect to insurance rates and practices, uniformity is encouraged and intended by the legislature to the extent necessary to accomplish the purpose of regulating insurance rates to the end that they shall not be excessive, inadequate or unfairly discriminatory. The legislature has clearly authorized cooperative action among insurers in rate making, and it is the mandate of the legislature that the commissioner of insurance regulate such cooperative action in rate making and in other matters within the scope of the rate regulatory statutes, sections 204.37 to 204.54.

With respect to rate making, the legislature has given the commissioner of insurance certain tools, as follows:

> **"204.39. Rate making.** (1) All rates shall be made in accordance with the following provisions:
>
> "(a) Due consideration shall be given to past and prospective loss experience within and outside this state, to catastrophe hazards, if any, to a reasonable margin for underwriting profit and contingencies, to dividends, savings or unabsorbed premium deposits allowed or returned by insurers to their policyholders, members or subscribers, to past and prospective expenses both countrywide and those specially applicable to this state, and to all other relevant factors within and outside this state;
>
> "(b) The systems of expense provisions included in the rates for use by any insurer or group of insurers may differ from those of other insurers or groups of insurers to reflect the requirements of the operating methods of any such insurer or group with respect to any kind of insurance, or with respect to any subdivision or combination thereof for which subdivision or combination separate expense provisions are applicable;
>
> "(c) Risks may be grouped by classifications for the establishment of rates and minimum premiums. Classification rates may be modified to produce rates for individual risks in accordance with rating plans which establish standards for measuring variations in hazards or expense provisions, or both. Such standards may measure any differences among risks that can be demonstrated to have a probable effect upon losses or expenses;
>
> "(d) Rates shall not be excessive, inadequate or unfairly discriminatory.
>
> "(2) Except to the extent necessary to meet the provisions of subsection (1) (d), uniformity among insurers in any matters within the scope of this section is neither required nor prohibited."

Here the legislature has again stated that "Rates shall not be excessive, inadequate or unfairly discriminatory." The legislature repeats the admonition that uniformity among insurers in any matter within the scope of the section on rate making is neither required nor prohibited *except to the extent necessary to meet the provisions that rates shall not be excessive, inadequate or unfairly discriminatory.*

In respect to rate administration, the legislature has charged the commissioner with certain responsibilities in accordance with section

> "**204.49. Rate administration.** (1) RECORDING AND REPORTING OF LOSS AND EXPENSE EXPERIENCE. The commissioner shall promulgate reasonable rules and statistical plans, reasonably adapted to each of the rating systems on file with him which may be modified from time to time and which shall be used thereafter by each insurer in the recording and reporting of its loss and countrywide expense experience in order that the experience of all insurers may be made available at least annually in such form and detail as may be necessary to aid him in determining whether rating systems comply with the standards set forth in section 204.39. Such rules and plans may also provide for the recording and reporting of expense experience items which are specially applicable to this state and are not susceptible of determination by a prorating countrywide expense experience. In promulgating such rules and plans, the commissioner shall give due consideration to the rating systems on file with him and in order that such rules and plans may be as uniform as is practicable among the several states to the rules and to the form of the plans used for such rating systems in other states. No insurer shall be required to record or report its loss experience on a classification basis that is inconsistent with the rating system filed by it. The commissioner may designate one or more rating organizations or other agencies to assist him in gathering such experience and making compilations thereof, and such compilations shall be made available subject to reasonable rules promulgated by the commissioner to insurers and rating organizations.
>
> "(2) INTERCHANGE OF RATING PLAN DATA. Reasonable rules and plans may be promulgated by the commissioner for the interchange of data necessary for the application of rating plans.
>
> "(3) CONSULTATION WITH OTHER STATES. In order to further uniform administration of rate regulatory laws, the commissioner and every insurer and rating organization may exchange information and experience data with insurance supervisory officials, insurers and rating organizations in other states and may consult with them with respect to rate making and the application of rating.

"(4) RULES AND REGULATIONS. The commissioner may make reasonable rules and regulations in conformity with and necessary to enforce the provisions of sections 204.37 to 204.54."

We note that the commissioner is required to promulgate reasonable rules and statistical plans which shall be used by each insurer. Since the statute does not state that a company or a rating bureau, or even a statistical agency, may promulgate statistical plans, could we not logically conclude that the commissioner has the responsibility, after reviewing each of the rating systems on file, of promulgating a statistical plan that would more or less represent a common denominator for such rating systems? Due consideration must be given to the plans in effect in other states, and the commissioner's plan must be reasonably adapted to each of the rating systems on file. It would seem that a statistical plan that was not inconsistent with any given rating system would qualify as being reasonably adapted to the rating system. Is it not significant that the statute requires that the statistical plans be reasonably adapted to *each* of the rating systems on file? This, no doubt, means that no rating system can be disregarded in respect to the requirement for a statistical plan and that each rating system is just as important as any other rating system and merits the same consideration. But does this not also imply that a broad statistical plan accommodating a general treatment of the salient features of more than one rating system should underlie reasonable rules and statistical plans?

With these factors in mind, let us consider the present status of rates and statistical plans for private passenger automobile liability insurance in Wisconsin. In addition to a large number of companies which file rates and manuals of rules on an independent basis, the National Bureau of Casualty Underwriters and the Mutual Insurance Rating Bureau file rates and manuals on behalf of their members and subscribers. These two rating bureaus and the Midwestern Independent Statistical Service have been designated as statistical agents to assist the commissioner in the collection of underwriting experience. Each of the statistical agencies has filed certain statistical plans reasonably adapted to filed rating systems. The commissioner has accepted the various statistical plans in use by the statistical agencies.

In respect to private passenger automobiles, the rating systems on file are, almost without exception, very nearly identical. The statistical plans in use vary to perhaps a greater degree than the rating systems they are related to. There appears to have been little attempt in the past to encourage development of common statistical plans. One might then ask if there would be any value in having a common statistical plan. I submit that a common or uniform statistical plan is the only tool which is available to the commissioner to determine whether or not filed private passenger automobile rates meet the standards of the rate law. One statistical plan, coupled with a modification of the manner in which rates are filed, would produce statewide average pure

premiums for driver classifications and territories. The relativities between territories and between the various driver classifications based on the actions of all drivers could be determined. This would provide a realistic, accurate foundation on which all filings could be based in the absence of credible statistics to the contrary.

In order to more fully understand and evaluate the problem, let us consider the automobile bodily injury liability premium volume written in Wisconsin by companies affiliated with the principal rating bureaus and companies which file rates on an independent basis. Table I was prepared from the Annual Statements filed with the Wisconsin commissioner of insurance, and is based on the net direct automobile bodily injury premiums written in Wisconsin in 1951 and 1957. It is true that this summary represents the total automobile bodily injury writings rather than just private passenger premiums which are the subject under consideration. However, the distortion because of inclusion of commercial premiums is negligible. Property damage liability premiums for private passenger automobiles bear a more or less constant relationship to the bodily injury premiums, and thus for purposes of this study it would seem that what is true for bodily injury in respect to distribution of premiums and exposures between companies or territories or classifications would also be true for property damage.

TABLE I
WISCONSIN AUTOMOBILE BODILY INJURY LIABILITY
ANALYSIS OF WRITTEN PREMIUM

	Written Premium	*Number of Companies*	*Average Premium Per Company*	*Percent of Total Companies*	*Percent of Total Premium*
Calendar Year 1957					
NBCU Members & Subscribers	7,262,398	90	80,693	43.9%	15.4%
MIRB Members & Subscribers	3,340,219	19	175,801	9.3	7.1
All Other Companies	36,569,642	96	380,934	46.8	77.5
Total All Companies	47,172,259	205	230,109	100.0	100.0
Calendar Year 1951					
NBCU Members & Subscribers	7,233,261	72	100,462	49.0	23.3
MIRB Members & Subscribers	4,434,905	19	233,416	12.9	14.3
All Other Companies	19,343,629	56	345,421	38.1	62.4
Total All Companies	31,011,795	147	210,965	100.0	100.0

In 1951 there were 147 companies which transacted automobile liability insurance in Wisconsin, and by 1957 there were 205 companies reporting such premiums. During this period, the automobile liability premiums written increased from approximately 31 million dollars to slightly over 47 million dollars. Thus we have 39.4% more companies transacting automobile B.I. in 1957 than six years earlier, while at the same time the premium volume has increased approximately 52%. Although the rating bureaus have gained some members and subscribers, the number of companies filing rates on an independent basis has increased from 56 to 96. The premium volume reflects a similar increase, whereas the premiums written by bureau companies have declined somewhat. By the same token, the average premium written per Bureau company shows a decrease, with an increase in average premium per independent company. It can be seen that in 1951 the NBCU represented 49.0% of the automobile companies and they wrote 23.3% of the automobile premiums. In 1957, the NBCU represented 43.9% of the companies and they garnered 15.4% of the premiums. At the same time, the number of companies filing rates on an independent basis increased from 38.1% of the total number of companies in 1951 to 46.8% of the companies transacting automobile liability insurance in 1957. In 1957 the independent companies wrote 77.5% of the automobile bodily injury premiums as compared to 62.4% in 1951.

Now that we have considered the premiums written by the bureau companies and the independent companies, let us review the number of vehicles insured by each group of companies. In Table II we find a tabulation of the private passenger exposures in car years reported by companies affiliated with the NBCU, the MIRB, and companies which file rates independently. The exposures are tabulated by territory, with subtotals indicated for the exposures in rural areas and urban areas. We should recognize that there is some distortion, since the NBCU statistical report is for accident year 1956 and the MIRB and the MISS statistical reports are for policy year 1956. Because there are some independent companies which report underwriting experience to the NBCU and the MIRB, the column headed "All Other Companies" is a composite of policy year and accident year figures. It would not appear that this distortion is significant for the purposes of this discussion.

TABLE II

1956 PRIVATE PASSENGER AUTOMOBILE
ANALYSIS OF WRITTEN BODILY INJURY LIABILITY EXPOSURES

	Territory Code	*Total Car Years*	*NBCU Members & Subscribers*	*MIRB Members & Subscribers*	*All Other Companies*
	25	218,851	32,385	14,693	171,773
	85	54,178	11,089	8,008	35,081
	91	62,830	9,052	2,612	51,116
	92	8,113	1,770	522	5,821
	94	92,837	11,650	9,941	71,246
Total Urban Areas		436,809	65,946	35,776	335,087
	83	21,455	5,802	1,113	14,540
	84	113,755	18,016	6,058	89,681
	96	354,301	17,591	7,238	329,472
Total Rural Areas		489,511	41,409	14,409	433,693
Total All Territories		926,320	107,355	50,185	768,780
Percent Distribution By Territory					
	25	23.6%	30.2%	29.3%	22.3%
	85	5.8	10.3	16.0	4.6
	91	6.8	8.4	5.2	6.7
	92	0.9	1.6	1.0	0.8
	94	10.0	10.9	19.8	9.3
Total Urban Areas		47.2	61.4	71.3	43.6
	83	2.3	5.4	2.2	1.9
	84	12.3	16.8	12.1	11.7
	96	38.2	16.4	14.4	42.8
Total Rural Areas		52.8	36.8	28.7	56.4
Total All Territories		100.0	100.0	100.0	100.0

TABLE II *(Cont'd)*

Percent Distribution of Total Exposures

25	100.0%	14.8%	6.7%	78.5%
85	100.0	20.5	14.8	64.7
91	100.0	14.5	4.1	81.4
92	100.0	21.8	6.4	71.8
94	100.0	12.6	10.7	76.7
Total Urban Areas	100.0	15.1	8.2	76.7
83	100.0	27.0	5.2	67.8
84	100.0	15.9	5.3	78.8
96	100.0	5.0	2.0	93.0
Total Rural Areas	100.0	8.5	2.9	88.6
Total All Territories	100.0	11.6	5.4	83.0

NOTES:

1. NBCU Statistical Report for Accident Year 1956.
2. MIRB Statistical Report for Policy Year 1956.
3. Midwestern Independent Statistical Service Report for Policy Year 1956.
4. Column Titled "All Other Companies" Includes Independent Companies Reporting to NBCU, MIRB, and MISS.

A review of this table shows where each group of companies has the heaviest concentration of exposures. It is of interest to note that the independent companies have 88.6% of the exposures in rural areas and 76.7% of the exposures in the urban areas. It is perhaps more significant that the NBCU and the MIRB together write 11.4% of the rural exposures and 23.3% of the urban exposures. Thus, the rating bureau companies write proportionately twice as many private passenger vehicles in and around cities as they write vehicles in rural areas. For Wisconsin as a whole, we have the NBCU with 43.9% of the companies writing 11.6% of the private passenger automobiles. The independent companies, on the other hand, write 83.0% of all private passenger automobiles in 46.8% of all companies. This not only supports the findings developed from Table I but it shows that in number of vehicles written the disproportion is even greater. One cannot help but wonder if, in fact, the NBCU does have credible information on which to base its rate level. We can see that the portion of the business that NBCU members and subscribers write ranges from 5.0% in territory 96 up to 27.0% in territory 83. The MIRB, in filing rate revisions, usually depends on the combined statistics of MIRB and NBCU, and to that extent more credible experience would appear to underlie the MIRB rate level. The NBCU, however, in filing rate revisions, does rely on various combinations of territories to develop credibility, and in certain cases countrywide NBCU experience is used where credibility is lacking for Wisconsin alone. Most of us are to a degree quite provincial, and thus would prefer to see, whenever possible, rates that reflect the experience in our home territory or at most the experience in our state. We find it difficult to arouse any enthusiasm for higher factors because of unfavorable experience in other parts of the country. This is not to imply that it is not a two-way street. It is recognized that it is possible that Wisconsin may benefit from a more favorable countrywide result than what is developed in Wisconsin, but it more frequently is the opposite.

Although this information is of interest, the reader may question if Tables I and II do anything other than verify what most insurance people have assumed all along. If nothing else, we have now outlined our problem. We have the NBCU making rates on a fraction of the total experience, which in itself may or may not be undesirable, but it is also a fact that a majority of the companies which file rates on an independent basis follow the filings of the NBCU to a large extent. This, in general, is a desirable procedure, but any error or distortion of classification or territory relativities that is contained in the NBCU filing is spread to almost all companies. Without a consolidation of all experience, it is not possible to verify either accuracy or error. The bureau companies may be victims of adverse selection, which is one segment of the vicious circle which includes increased loss ratios and higher rates and back to more adverse selection. A consolidated tabulation of all experience would be a useful tool in gauging the degree, if any, of adverse selection. In any event, the portion of the

total automobile experience that serves as a foundation for the rate determinations of the NBCU is dangerously small. If the trend of the past 6 years is any sort of an indication of what we can expect in the future, then it would behoove rate regulatory officials to consider the road on which they wish to travel. By this I do not imply anything critical of independent companies. Far from it. We cannot help but recognize the contribution to progress and to competition in our economy. However, let us consider the automobile liability premium volume of many of the companies which file rates independently and support their rate level on principally their own underwriting experience. Table III and IV represent a tabulation of the automobile bodily injury liability premium volume written by each company in Wisconsin in 1951 and 1957 respectively. The Annual Statement filed by each company is the source, and thus the premiums reported include all automobile bodily injury premiums and they are not limited to private passenger automobiles.

TABLE III

1951 WISCONSIN AUTOMOBILE BODILY INJURY LIABILITY ANALYSIS OF COMPANY PREMIUM VOLUME (WRITTEN PREMIUM)

1951 Premium Volume	TOTAL ALL COMPANIES		NBCU MEMBERS & SUBSCRIBERS		MIRB MEMBERS & SUBSCRIBERS		ALL OTHER COMPANIES	
	Number of Companies	Percent of Total	Number of Companies	Percent of NBCU Total	Number of Companies	Percent of MIRB Total	Number of Companies	Percent of Total
Less Than 1,000	36	24.4%	24	33.3%	4	21.1%	8	14.3%
1,000— 9,999	21	14.3	10	13.9	4	21.1	7	12.5
10,000— 49,999	25	17.0	14	19.4	4	21.1	7	12.5
50,000— 99,999	11	7.5	3	4.2	1	5.2	7	12.5
100,000— 199,999	17	11.6	10	13.9	0	—	7	12.5
200,000— 499,999	17	11.6	6	8.3	4	21.1	7	12.5
500,000— 999,999	8	5.4	3	4.2	0	—	5	8.9
1,000,000—1,999,999	11	7.5	2	2.8	2	10.5	7	12.5
2,000,000 and Over	1	.7	0	—	0	—	1	1.8
Total	147	100.0	72	100.0	19	100.0	56	100.0
Accumulative Development								
Less Than 1,000	36	24.5%	24	33.3%	4	21.1%	8	14.3%
" " 10,000	57	38.7	34	47.2	8	42.2	15	26.8
" " 50,000	82	55.7	48	66.6	12	63.3	22	39.3
" " 100,000	93	63.2	51	70.8	13	68.5	29	51.8
" " 200,000	110	74.8	61	84.7	13	68.5	36	64.3
" " 500,000	127	86.4	67	93.0	17	89.6	43	76.8
" " 1,000,000	135	91.8	70	97.2	17	89.6	48	85.7
" " 2,000,000	146	99.3	72	100.0	19	100.0	55	98.2
Over 2,000,000	147	100.0	72		19		56	100.0

TABLE IV

1957 WISCONSIN AUTOMOBILE BODILY INJURY LIABILITY ANALYSIS OF COMPANY PREMIUM VOLUME (WRITTEN PREMIUM)

1957 Premium Volume	TOTAL ALL COMPANIES		NBCU MEMBERS & SUBSCRIBERS		MIRB MEMBERS & SUBSCRIBERS		ALL OTHER COMPANIES	
	Number of Companies	Percent of Total	Number of Companies	Percent of NBCU Total	Number of Companies	Percent of MIRB Total	Number of Companies	Percent of Total
Less Than 1,000	33	16.1%	22	24.4%	2	10.5%	9	9.4%
1,000— 9,999	49	23.9	24	26.7	5	26.3	20	20.8
10,000— 49,999	42	20.5	23	25.6	6	31.6	13	13.5
50,000— 99,999	20	9.7	6	6.7	0	—	14	14.6
100,000— 199,999	18	8.8	6	6.7	1	5.3	11	11.5
200,000— 499,999	18	8.8	4	4.4	4	21.0	10	10.4
500,000— 999,999	10	4.9	4	4.4	0	—	6	6.3
1,000,000—1,999,999	10	4.9	1	1.1	1	5.3	8	8.3
2,000,000 and Over	5	2.4	0	—	0	—	5	5.2
Total	205	100.0	90	100.0	19	100.0	96	100.0
Accumulative Development								
Less Than 1,000	33	16.1%	22	24.4%	2	10.5%	9	9.4%
" " 10,000	82	40.0	46	51.1	7	36.8	29	30.2
" " 50,000	124	60.4	69	76.7	13	68.4	42	43.7
" " 100,000	144	70.2	75	83.4	13	68.4	56	58.3
" " 200,000	162	79.0	81	90.1	14	73.7	67	69.8
" " 500,000	180	87.7	85	94.5	18	94.8	77	80.2
" " 1,000,000	190	92.6	89	98.9	18	94.7	83	86.5
" " 2,000,000	200	97.5	90	100.0	19	100.0	91	94.8
Over 2,000,000	205	100.0	90		19		96	100.0

These tables show the number of companies, classified as to the manner of filing automobile rates, which have written premium volume in accordance with the groupings indicated. For example, in 1951 there were 25 companies—14 NBCU, 4 MIRB, and 7 Independent—which had an annual premium volume between $10,000 and $49,999. In 1957 there were 23 NBCU, 6 MIRB, and 13 Independent, or a total of 42 companies within this same range. The accumulative compilation is perhaps most interesting, and we find that in 1951 there were 82 companies with less than $50,000 annual automobile premiums written, while in 1957 there were 124 companies in this category.

Our problem is now defined in greater detail. It becomes apparent that many companies do not have sufficient premium volume to develop any significant credibility in establishing rates and relativities between territories and driver classifications. Rather than attempting to define the premium volume that could be considered adequate for a single company to rely on for rate making, it might be easier for us to agree on what is not sufficient experience to establish credibility in rate making. Could we not assume that $200,000 in premium annually would be a minimum needed by a single company to establish even a small amount of credibility for rate making? We must remember that the premium volume tabulated represents all automobile bodily injury premiums. Thus, $200,000 in premiums would be equivalent to about $100,000 to $120,000 in loss payments which, on the basis of current average claim cost of approximately $575, would represent no more than 200 claims. If we divide this number of claims into the 7 territories and 5 or more driver classifications that are generally in use, it becomes apparent that $200,000 premium in one state for a single company is hardly credible experience for the projection of rates.

If, for the purpose of discussion, we can assume that anything less than $200,000 premium annually is not credible, than let us review the extent of the problem. We find that in 1951 there were 110 companies without credible experience, and in 1957 we had 162 companies, or 79.0% of all companies writing automobile insurance, which did not have credible experience in Wisconsin. With respect to the rating bureaus, we find that 90.1% of the NBCU and 73.7% of the MIRB companies are without credible experience. This is reasonable, since it might well be assumed that companies with smaller premium volume would find it economically feasible to affiliate with a rating bureau rather than attempting to staff a department that could cope with rates and manuals, policy forms, etc. We might also observe at this point that the NBCU, with a large proportion of companies with smaller premium volume, might tend to reflect a truer cross section of average insurance company operation.

We note that 69.8% of the companies filing rates on an independent basis had less than $200,000 automobile bodily injury premiums from all sources in 1957. Thus we have a minimum of 67 companies which are permitted to file rates and define territories and driver classifica-

tions with almost a free hand, and yet individually their filings are based on underwriting experience that clearly lacks credibility. The rate analyst is confronted with the situation where, on one hand, the NBCU is making rates for at least 43.9% of the insurance companies transacting automobile liability insurance but the rates are based on only 11.6% of the insured private passenger automobiles. On the other hand, we have almost 70% of the companies which file rates on an independent basis without credible experience for the support of their filings.

Other interesting comparisons could be made from the tables which have been presented, and additional evidence could be developed to further point up the problem that exists. For example, a tabulation of a representative sample of the variations in rates and territories and driver classifications would lend support to the suspicion that competition without guidance and regulation is not a satisfactory rate making device. Such tabulations would further emphasize the almost chaotic state through which we are passing and would add little to this discussion.

Now that our problem is reasonably well identified and defined, let us consider some of the practical aspects of reviewing the filings of companies filing rates on an independent basis. A company can usually get together a semi-reasonable explanation in support of a filing. Frequently they rely heavily in their supporting information on what their principal competitors are doing. Obviously, the insurance department rate analyst must accept at face value the bulk of the supporting information submitted. Except for routine checks of the current annual statement and expense exhibit of the company, he has little else on which to verify a rate filing. The rate analyst cannot, for example, go to the company and verify the company allocation of expenses for expense exhibit purposes. He cannot go to the company offices and verify the reasonableness of the company outstanding claim reserves. It is seldom indeed that an individual company filing rates on an independent basis will present anything more than earned premiums and incurred losses in support of a rate filing. Further, consider that portion of section 204.40 (4), Wisconsin Statutes, which states:

> ". . . A filing made by a rating organization shall be deemed to meet the requirements of sections 204.37 to 204.54 unless disapproved by the commissioner within the waiting period or any extension thereof. A filing made by an insurer for a kind of insurance or subdivision thereof as to which such insurer is not a member of or subscriber to a rating organization shall be deemed to meet the requirements of said sections unless disapproved by the commissioner after notice and hearing and findings made in accordance with the requirements of section 204.41 (1) (b)."

Thus, strict adherence to the statute requires a hearing prior to disapproval of any filing submitted by a company that is not affiliated

with a rating organization. Since most companies do not desire to become involved with a hearing, the usual procedure for the rate analyst when he discovers an objectionable feature in a filing is to point out to the company that a hearing will be necessary, and the desired correction is generally presented. However, the rate level in use with success by one company may be perfectly inadequate for another company due to method of acquisition, underwriting requirements, and length of time the company has been writing in a given area. It would seem that the rate analyst should have at his disposal some minimum standards by which he could measure a proposed filing. The statutes permit filings to be supported on the experience of other insurers or rating organizations, and would it not be difficult to suggest that an individual company filing rates on an independent basis should file a higher rate than a competitor? However, if there were available the average pure premiums of all drivers by territory and classification, we would have a guide to adequacy. The rate law contemplates that rates shall not be excessive or inadequate, and to let competition be the only factor in determining a rate level may produce a result that is contrary to the fundamentals of rate regulation and the public interest.

In considering the same subject of adequacy, we find that with our present procedures it is possible for a large company with ample surplus funds to use a rate level that would produce a statistically guaranteed underwriting loss. It would appear that a company could waive a profit and contingency load in their rate level if they so desired, and there seems to be no prohibiton against a company reflecting other elements, such as investment income, in rate level. However, would it not be contrary to statute to permit a company to use a rate level which, from an actuarial point of view, would produce an underwriting loss even after allowance for invesment income and waiver of profit and contingency considerations? Yet it is not uncommon for companies filing rates on an independent basis, in a time of increasing loss cost, to defer increasing what they know is an inadequate rate level in order that the local area involved can be subjected to an intensive advertising campaign designed to show the public that they have not increased rates. After such a company has effectively screened the area for the most desirable risks and have them on the books, then they suddenly are able to determine that an increase in rates is needed. This procedure may take anywhere from a few months to a year or more. It is not unique to Wisconsin or any specific area but seems inherent in our spirit of free competition. Who would argue against the conclusion that this is an unfair trade practice and a violation of the rate regulatory statutes? Whether it be a large company or small, the rate analyst is without power to cope with such a situation if he follows accepted methods of rate review.

The rate analyst sees only the company underwriting experience furnished to support rate filings as they are submitted. The statistical agencies furnish consolidations of underwriting experience for all

companies reporting, but this at the present time has little significance and is of little force in dealing with a single company. At the present time, the rate analyst becomes aware of excessive or inadequate rate levels of companies filing rates on an independent basis only when the company chooses to request a change in rate and submits underwriting experience as supporting information. The rating bureau statistical reports are furnished periodically, and the rate regulatory officials can review rate levels in the light of such underwriting experience. However, a consolidated statistical report of the companies filing rates on an independent basis is of little use at present since it represents an aggregate of many rate levels, and various definitions of driver classifications and territories. The relativities between the statistical plan territories and between statistical plan driver classifications which result from a comparison of the indicated pure premium are of some use, but the pure premium is the product of a composite of the divergent definitions of all independent companies, and thus it could hardly be used with any degree of confidence.

At present we have no integrated system providing a framework on which companies and rate regulatory officials alike could rely in the determination and review of rate levels. If there were such a system the companies and the public would profit from it equally. Is it not possible that much of the present difficulty the companies are experiencing in many areas is the result of the very conditions we are discussing here? Have not many rate levels been the product of competition and underwriting experience that lacked credibility? If there was a planned program where rates would be systematically increased or decreased in accordance with the trends of the loss and expense experience, the companies would fare equally well in the long run and at the same time they would create and build public confidence. If the insurers and the regulatory officials had confidence in a planned system, would not both parties derive many benefits from increased rates when they were needed and decreases in rates when they were indicated? Much of the present negotiating, maneuvering, and debate on details would be eliminated. Most insurance people agree that the present system of workmen's compensation rate making is perhaps the finest in operation today, and increases and decreases in rates in the over-all picture are about as automatic as they can be. It is this writer's opinion that the same result can be accomplished within the confines of the statutory authority existing today. It could be accomplished without violating a single freedom or privilege presently enjoyed by any company or rating organization.

We have shown that the rate regulatory statutes require the commissioner to promulgate reasonable rules and statistical plans reasonably adapted to the rating systems on file. It is also clear that the legislature intended and encouraged uniformity in insurance rates and practices to the extent necessary to protect the public interest and accomplish the end result that rates be neither excessive, inadequate nor unfairly discriminatory. We find that present procedures

for review and analysis may be effective to a certain degree in reviewing filings when submitted, but as a practical matter we do very little in respect to review of the existing filings of those companies which file rates independently. The scope of this paper is limited to the subject of liability insurance for private passenger automobiles, and to this extent I submit that it is not possible to attain the stated objectives of the rate regulatory law without:

(a) a minimum uniform statistical plan which would underlie the statistical plans in use by each insurer, and

(b) the establishment of an integrated rate filing procedure based on certain factors developed from the analysis of the consolidated underwriting experience of all companies.

The plan that I have in mind might well be divided into two separate programs which I shall designate as Phase I and Phase II. In Phase I, we shall discuss changes in procedure that could be accomplished within the statutes as they are now written. In Phase II, I shall attempt to look further into the future and discuss some possibilities that may require some broadening of the statutes.

First let us discuss a uniform statistical plan. This would be the cornerstone of Phase I. It would encompass, among other things, a method of reporting, on an accident year basis, the premiums, losses, exposures, and claims for the policy limits required by the financial responsibility law. Similar information would be required for the increased limits experience. Provision would be made to provide experience separately for each coverage, including such coverages as medical payments, death and disability, and uninsured motorist endorsements. From a plan such as this, we could get statewide pure premiums, claim frequency, and average claim cost. The trends of these rate making factors could be determined, and there would be a reasonable basis for predicting future events.

Our uniform statistical plan would erect certain territorial definitions which could well be sort of a common denominator of the present filings. The boundaries would be defined only after a detailed study of the principles and factors underlying the various territorial definitions now in use. All companies would be required to report their experience in accordance with the established territories. Companies wishing to depart in the matter of rate filings from the established territorial boundaries could do so by furnishing supporting information.

The uniform statistical plan would also define certain basic driver classifications. This too could be in effect a common denominator of all present filings. Companies wishing to depart from the established classifications in respect to rate filings could do so by furnishing supporting information in the same manner as they do at present.

In respect to the development of a uniform statistical plan, it is anticipated that each insurer and any other interested party would be given an opportunity to be heard on the matter. The insurance

commissioner has broad powers in the establishment of administrative rules. Notice also that section 204.49, Wisconsin Statutes, in reference to statistical plans, states that "The commissioner shall promulgate reasonable *rules* and statistical plans. . . ." It would seem that the procedure which we have outlined is not inconsistent with the statutes and, through the medium of a public hearing, every interested party would be given a chance to be heard. In this manner a workable uniform statistical plan could be developed. Anyone who was not satisfied with the end result could depart from the uniform statistical plan territories and classifications by merely providing supporting information such as required for present filings. The only restriction that would be necessary would be the requirement that all experience would have to be converted to the commissioner's territories and classifications when reported to the statistical agent.

The uniform statistical plan promulgated by the commissioner would represent the minimum requirements, and would not prevent the use of a more detailed statistical plan by any statistical agency. Any plan in use by a statistical agency would have to require at least as great detail as that provided by the commissioner's plan. The statistical reports and tabulations prepared by the statistical agency and furnished to the commissioner would be made on the basis of the commissioner's plan. Every company would be required to report its underwriting experience to one of the statistical agencies designated by the commissioner of insurance to assist in the collection of underwriting experience. Each company would be required to use, without deviation, the codes specified in the applicable statistical plan. Individual companies would not be permitted to devise their own system of codes merely because of small premium volume in certain classifications. We frequently find that many companies take the matter of statistical plans and reports much too lightly. It seems that quite often the people charged with the administration of the data processing department in company offices are basically accountants. The major concern is the balancing of the financial records, and they have little enthusiasm for the finer points associated with statistical plans. To permit any departure from the statistical plan codes is to invite disregard of the statistical plan requirements. In the first instance a machine accountant may request permission from the proper authority to amend or delete unused codes, but the second time he more likely than not will make an arbitrary combination of codes that will distort the underwriting experience. The statistical report would not show any impossible codes, and any error and distortion becomes permanent.

Once the uniform statistical plan is in use, then we can derive some basic factors from credible experience which can be used to facilitate rate filings. These basic factors will consist principally of pure premiums and number of claims for each driver classification in each territory. From this information we can obtain standard relativities between driver classifications and between territories. We also

will have claim frequency and average claim cost. The rate analyst will thus have an excellent yardstick for measuring rate filings for compliance with the statutes. The insurance company that lacks credible experience would have some basis for the rates they propose to use.

In respect to the filing of rates and the review thereof, it would be necessary to establish certain procedures. As a basic principle, it would be necessary that all rate filings reflect the territorial and classification relativities that are indicated from the consolidated experience. In addition, all rate filings would have as a foundation the pure premium indications of the uniform statistical plan experience. To this base the insurer or rating organization would add an applicable expense loading and an acceptable margin for profit and contingencies. A company or rating organization could depart from the uniform statistical plan pure premium indications by furnishing supporting information for the proposed filing. In order to avoid any unfair discrimination, it would seem necessary to permit only uniform departures by territory or classification. It would not be equitable, for example, to permit a company to file an unusually low rate for a single driver classification in a single territory. A company or rating bureau could depart from the standard relativities or pure premium for all classifications within a territory or in respect to a specific classification in all territories.

It is anticipated that the pure premiums established by the commissioner after review of the underwriting experience might well be modified on the basis of an acceptable formula. I have in mind that, in order to provide some stability, it would be desirable to use the most recent two or three-year experience period. Rather than a strict arithmetic average, it might be most feasible to use a weighted average such as 60-40 or 60-30-10. This, to a large extent, would build a composite trend factor into the pure premiums and thus territory and classification relativities. The establishment of pure premiums and relativities would be effective on the same specific date each year. It would be difficult to do this more frequently with any degree of accuracy because of the effect of the weather cycles on accidents. The period of time for which the experience is collected should be composed of 12-month increments. That is, we should use either 12 or 24 or 36-month experience periods in order to develop valid and credible experience. The pure premiums and relativities established by the commissioner would have the highest possible degree of credibility, since they would represent the experience of all drivers in the state or territory by classification. This would be a considerable improvement over the situation today where a fraction of the over-all state experience determines a majority of the rates and relativities in use. The commissioner's pure premiums and relativities would underlie all rate filings unless a company or rating organization could furnish information in support of the use of other factors.

It might be well to direct attention at this point to the fact that I have not proposed conversion of any premiums to a common level to reflect any approved departure from our basic factors. Actually, we have no common level because of the permissible variation in expense loading or pure premiums. The factors which we would establish are a product of claims statistics and thus are independent of rate level. Although the majority of companies use the same basic policy form, there are variations in use by some companies. If any given company was consistent in the use of a particular policy, the claims experience would reflect little distortion. The over-all average pure premiums would show a small increase or decrease, but the relativities would be substantially unaffected. The same rationalization can be used in respect to the argument that one group of companies or another can settle a given group of claims for greatly different amounts.

This then, in general terms, is Phase I of the proposed program for automobile liability insurance rates. There are several ways in which the proposed procedures could be installed. The new procedures could be imposed on all new filings submitted in the normal course of events. In order to expedite the transition, the commissioner could invite and encourage all companies and rating bureaus to present new filings. Or, if necessary, the commissioner could order new filings to be made by a specific date.

Now let us consider Phase II. This would probably require a change in the present rate regulatory statute, or at least a change in the present thinking in respect to the filing of rates. In brief, I have in mind that the commissioner would establish a rate or premium for a basic driver classification in a base territory. This rate or premium would reflect the over-all average pure premium for the classification and territory and the over-all average stock company expense and an acceptable allowance for profit and contingencies. The classification and territory pure premium relativities would be established in the same manner as proposed in Phase I. These relativities would then become factors to be applied to our basic rate or premium in order to produce the rate for any given driver classification and territory. A company or rating bureau, rather than filing rates, would then file a series of factors representing percentages of the established base. Supporting information would have to be furnished for any departure from the factors established by the commissioner. Any departure would have to be a uniform percentage from the commissioner's factors and would represent a combination of the expense and underwriting variation from average of a company or rating bureau.

I would propose that in this system the commissioner establish a new base premium and factors annually, to become effective on a specific date, such as September 1. In a manner similar to workmen's compensation, all policies of all companies would reflect the new rate base and factors on or after this date. No policy would be permitted to be cancelled or rewritten to take advantage of the new rates. The

supporting information for any departure from the standard factors would not be effective for more than one year, and in any event it would terminate on the effective date of the next annual revision of the commissioner's factors. This would have the effect of requiring annual filing of supporting information for any departure from the commissioner's factors. In addition, I suggest that it should be required that rate revisions be permitted only at this date and no other time. Thus, all drivers could look forward to a specific date each year for a revision of automobile rates based on the experience of the previous year. I submit that this would be a potent psychological weapon in the reduction of accidents and would be of greater value than any individual merit rating plan yet devised. There are also other advantages to a common rate change date. The companies and the public would benefit from a systematic program providing realistic rates related to current experience. The public would soon become accustomed to rate revisions and would accept them as a matter of fact. It would seem that this procedure would minimize, and to a large extent eliminate, extraneous pressures which are not actuarial in origin.

Now that we would have a common rate level, it would be an easy task for each company to expand its premiums to the common rate level when reporting underwriting experience to the statistical agents. Since Phase II of this program is superimposed on the principal elements of Phase I, we would then have both premiums and losses to review in our determination of whether or not the rate level is excessive or inadequate. It would also seem possible for the companies to record for statistical purposes only the applicable codes and the earned exposures. If the desired accuracy could be attained in computing earned exposures, then it would be a matter only of applying the various factors and earned exposure to the base premium in order to develop earned premiums. The earned exposure for a 6 or 12-months' policy would normally be a two-digit figure, as compared to five digits usually involved with dollars and cents of premium, and this would appear to be a method by which more information could be incorporated on one statistical punch card.

This completes a general outline of my thoughts concerning a uniform statistical plan and integrated rate filing procedure for private passenger automobiles. Throughout this discussion I have been principally concerned with bodily injury and property damage liability insurance for private passenger automobiles. It would appear that many of the same procedures could be applied to the physical damage coverages. The problems associated with physical damage rates and suggested solutions could well be the subject of another such paper.

ESTIMATING ULTIMATE INCURRED LOSSES IN AUTO LIABILITY INSURANCE

BY

FRANK HARWAYNE

INTRODUCTION

For many years insurance executives have been vitally concerned with the ravages of inflation. Primarily their direct concern has been with the stark reality of collecting premiums during one period of time and paying out losses at a time subsequent when the dollar has become devalued in some degree. They have felt that the insurance company is placed upon a treadmill which is inclined uphill. On an inflationary trend, if insurance contracts are priced according to last year's costs it is inevitable that when claims pay-out occurs several years hence, there simply will not be enough dollars available out of this year's premiums to pay such losses at the increased loss settlement level.

Some attempts have already been made to adjust past years' observed costs so that they will reflect current conditions more accurately. Invariably, such adjustments cover a period of time beyond the average date contained in normally reported ratemaking statistics; however they fall considerably short of the time when new rates are promulgated.

If we are to avoid predicting or guessing at the future course of our economy as it will affect future insurance experience and if we are to remain within the time covered by actual experience, serious limitations necessarily are imposed on any adjustment factors that may be used. Nevertheless we should search for direct insurance information which will narrow the average time encompassed by the data normally used for ratemaking and the actual date of rate revision.

The insurance information which comes to mind is the calendar year experience shown in the New York Supplemental Insurance Expense Exhibit; more particularly the latest policy year component of such calendar year experience is the most recent available data from a time standpoint. If the latest policy year component of the calendar year experience can be demonstrated to be predictable and can be shown to follow specific mathematical patterns of evolution then we can have substantial confidence in using this most recent segment of experience for adjusting normal ratemaking data to reflect more nearly the most recent insurance facts of which we have knowledge. Such an adjustment factor has been developed in Part V of this paper. It takes a form which is somewhat analagous to the rate level adjustment factor which has been used for several years in workmen's compensation insurance.

The paper is divided into five parts.

Part I demonstrates and develops the idea that policy year experience reported as of 36 months and subsequent can be predicted as to its ultimate outcome by applying specific discount factors to the outstanding losses.

Part II demonstrates and develops the idea that stable relationships exist between paid losses and ultimate incurred losses if the policy year experience is at least 36 months old. It proceeds from there and demonstrates that specific relationships between paid losses and ultimate incurred losses apply for policy year experience reported at 12 months and at 24 months as well.

Part III demonstrates that the use of the written premium-paid loss ratios at the end of 12 months and 24 months for predicting ultimate loss ratios gives results which are consistent with the actual ultimate loss ratios.

Part IV develops a theoretical equation which accurately describes the percentage of total policy year incurred losses which have been paid as of any reporting date.

Parts I through IV lay the foundation for concluding that paid policy year loss experience reported as of 12 months gives a reliable measure of the ultimate incurred loss experience.

Part V suggests a program for adapting policy year paid losses reported as of 12 months to supplementary ratemaking.

While this paper treats of the facts as they are, no one can fail to recognize that the specific percentages which are applicable today are subject to change and adjustment; however the available evidence suggests that such change will be small and more importantly, will be observable by the analyst in time to be reflected in revised specific percentages.

NEW YORK STATE AUTO LIABILITY INSURANCE EXPERIENCE

Several years ago the New York Supplemental Insurance Expense Exhibit was modified to require the reporting of New York State Auto Liability (bodily injury) experience for calendar year by policy year. A sufficient body of experience has now been compiled so as to enable a preliminary analysis to be undertaken.

In order to make the data comparable the raw losses were expressed in terms of each million dollars of premium. This facilitates comparisons of developments within the policy year as well as enables comparisons between policy years.

Part I

DEVELOPMENT OF A PROCEDURE FOR RECOGNIZING THE MOVEMENT OF OUTSTANDING LOSSES

Exhibit I contains the raw data for stock and mutual companies converted to a base of one million dollars of earned premium. Each

policy year of experience is shown as of December 31 carried forward at 12 month intervals. Column 1 shows the incurred loss* ratio expressed in millions of dollars of earned premium. Columns 2 and 3 provide a split of incurred losses as between outstanding and paid amounts respectively. For the sake of completeness, figures are also shown reported as of 12 and 24 months. However, as will be explained in Part II, these figures have to be considered in a somewhat different light than those reported at 36 months and subsequently.

By the time the policy year is 36 months old virtually all premiums and all claims have been entered on the company's books (except for relatively minor retrospective adjustments, etc.). This signifies that effectively from 36 months reporting until the ultimate closeout of cases the policy year experience encompasses a closed system wherein no new premiums are added and no new claims of significance can affect the total result. Examination of Exhibit I shows a steady downward progression of incurred losses per million dollars of earned premium after the 36 months reporting date.

If a reliable means of predicting the ultimate results could be found then we will have added to our knowledge of the ebb and flow of insurance experience taking into account economic and other elements which affect insurance experience. In an attempt to evaluate the movement of incurred losses we have departed from the usual method of estimating loss development factors on the total incurred losses. Instead we have arbitrarily considered the change in incurred losses between periods as related to the change in outstanding losses. This effectively assumes that the change in incurred losses could be assigned to those cases which have been disposed of between the two reporting dates. At first glance this might appear inconsistent with actual company practices of evaluating claims regardless of whether those claims have been paid during the year. We believe, however, that it is immaterial in the final analysis as to whether that assumption is completely valid or not. Our ultimate interest lies in determining the ultimate loss cost and not necessarily the 12 month progression of such loss cost. Because of the convenience of dealing with the figures of 12 month intervals we proceeded on this basis, retaining some reservations.

The results of this approach are shown on Exhibit II. That exhibit shows the amounts of change in losses outstanding as well as the savings incurred expressed as a percentage of the change in outstanding losses in the aggregate. Despite our prior reservations we are impressed with the results of this computation. The results show little variations in percentages from year to year. In the aggregate the average approximates the percentage for the individual year. The average estimated savings beyond 36 months is approximately 12% of the outstanding losses. What is most remarkable about the figures

*Pure losses only. Loss adjustment expenses are not included here but are reported elsewhere in accordance with the instructions for the Uniform Classifications of Expenses.

in Exhibit II is the clustering about the average for each policy year in the aggregate and for all policy years at 12 month intervals. Tests were likewise made on these same policy years for stock and mutual companies separately. The variations from the average are somewhat larger because smaller bodies of data are being considered. In the aggregate, however, the average savings from 36 to 84 months is likewise 12% separately for stock companies and for mutual companies. The stock and mutual company figures shown in Exhibit II for policy year 1952 from 36 to 48 months is somewhat lower than the average but is offset by higher than average developments beyond 48 months. Policy year 1954 exhibits the same characteristic from 36 to 48 months and is the lowest of any of the figures on that exhibit. However, this could well be offset in subsequent reportings of policy year 1954 and will not be known until 1958 and later.

The actual loss ratios at successive reporting dates are shown for each policy year:

Table A

STOCK & MUTUAL COMPANIES
NEW YORK STATE AUTO LIABILITY
ACTUAL LOSS RATIOS

	Policy Year Loss Ratio				
Reported As of Dec. 31	*1950*	*1951*	*1952*	*1953*	*1954*
1953	.649	.646			
1954	.642	.635	.583		
1955	.637	.627	.576	.543	
1956	.636	.623	.569	.534	.595
1957		.620	.566	.529	.588

The results of applying this 12% discount to outstanding losses are dramatically revealing. For comparative purposes the loss ratios for the same years are shown on a discounted basis:

Table B

STOCK & MUTUAL COMPANIES
NEW YORK STATE AUTO LIABILITY
DISCOUNTED LOSS RATIOS

	Policy Year Loss Ratio				
Reported As of Dec. 31	*1950*	*1951*	*1952*	*1953*	*1954*
1953	.635	.622			
1954	.635	.623	.561		
1955	.634	.620	.563	.522	
1956	.634	.620	.563	.522	.572
1957		.618	.562	.522	.575

For each policy year the year to year fluctuation in loss ratios has been practically eliminated by utilizing this discounting process. This is summarized in the table below which shows the average deviations (reflecting signs) from the latest reported loss ratios on an actual and a discounted basis:

Table C

STOCK & MUTUAL COMPANIES
NEW YORK STATE AUTO LIABILITY EXPERIENCE
DEVIATIONS OF ACTUAL & DISCOUNTED LOSS RATIOS

	Deviation from Latest Reported Loss Ratios	
Policy Year	*Actual Basis*	*Discounted Basis*
1950	+.007	+.001
1951	+.013	+.003
1952	+.010	+.000
1953	+.010	+.000
1954	+.007	—.003

Our conclusion is that with minor variations an estimated average saving of 12% on outstanding claims very closely approximates the true situation with respect to each and all policy years. Upon reflection we would normally expect some savings to occur because of the conservative practices required by prudent company operations. This is true with respect to precautionary reserves and is also true with respect to evaluation of doubtful liability cases.* Finally the magnitude of the savings is in keeping with the opinion expressed in some quarters that for tax purposes the Internal Revenue Service will allow a substantial savings on the run-off of claims before recomputation of income tax will be required.

The estimated savings of a fixed percentage of outstanding losses is a rather significant figure. It fills the gap which is created by using a cut-off date in the normal rate making process. Consider the experience as it is used at the final reporting for rate making purposes. If the outstanding amounts are known then the ultimate incurred loss cost may be accurately predicted simply by discounting the outstanding losses by that percentage. For example, policy year 1955 experience as shown on Exhibit I indicates incurred losses are $690,021 per

*Another possible partial explanation of a portion of the run-off runs as follows: Some carriers may not record loss adjustment expenses according to annual statement requirements. If a carrier included loss adjustment reserves with pure losses (i.e., failed to separate properly items belonging in Column 12½ from Column 12 of Schedule P Part 1A) and did the same thing as respects New York Auto Liability reserves, then a credit run-off would occur as unpaid claims expense which is included with unpaid losses become transferred into the paid category.

If this is true then the paid losses are the only pure loss elements which are common to all carriers.

million dollars of earned premium. On the basis described the ultimate incurred loss would be that amount less 12% of the outstanding losses of $223,728 shown in Column 2, or an ultimate incurred loss of $663,174 per million dollars of earned premium.

The experience of one large stock carrier (Bureau) and one large mutual carrier (Bureau) was also examined to see whether the pattern of savings for all carriers holds. Somewhat greater variability in savings was discovered. For the sake of completeness the savings are shown below for all available years comparable to that of Exhibit II:

Table D

NEW YORK STATE AUTO LIABILITY
AVERAGE SAVINGS ON OUTSTANDING LOSSES
FOR TWO INSURANCE CARRIERS

	Savings	
All Available Years	*1 Stock*	*1 Mutual*
36 to 48 Mos.	5.7%	13.5%
48 to 60 Mos.	9.8	17.4
60 to 72 Mos.	25.8	3.5
72 to 84 Mos.	34.0	22.7
36 to 84 Mos.	8.0%	13.0%

Before concluding Part I, it is pertinent to cite the results obtained for stock and mutual companies exclusive of two large independent carriers with substantial premiums in New York State. The resulting savings on outstanding losses is approximately 14%. For all available years comparable to that of Exhibit II the average savings is as follows:

Table E

STOCK & MUTUAL COMPANIES
(EXCLUDING TWO LARGE INDEPENDENT CARRIERS)
NEW YORK STATE AUTO LIABILITY
AVERAGE SAVINGS ON OUTSTANDING LOSSES

All Available Years	*Savings*
36 to 48 Mos.	13.2%
48 to 60 Mos.	15.6
60 to 72 Mos.	15.0
72 to 84 Mos.	13.8
36 to 84 Mos.	14.2%

Actual loss ratios with these two independent carriers eliminated are likewise shown in Table A-X:

Table A-X

STOCK & MUTUAL COMPANIES
(EXCLUDING TWO LARGE INDEPENDENT CARRIERS)
NEW YORK STATE AUTO LIABILITY
ACTUAL LOSS RATIOS

	Policy Year Loss Ratio				
Reported As of Dec. 31	*1950*	*1951*	*1952*	*1953*	*1954*
1953	.656	.655			
1954	.646	.639	.588		
1955	.642	.630	.578	.541	
1956	.640	.624	.571	.532	.595
1957		.622	.567	.525	.586

Similarly, the application of the 14% discount to outstanding losses is shown in Table B-X:

Table B-X

STOCK & MUTUAL COMPANIES
(EXCLUDING TWO LARGE INDEPENDENT CARRIERS)
NEW YORK STATE AUTO LIABILITY
DISCOUNTED LOSS RATIOS

	Policy Year Loss Ratio				
Reported As of Dec. 31	*1950*	*1951*	*1952*	*1953*	*1954*
1953	.639	.626			
1954	.638	.624	.562		
1955	.638	.622	.563	.517	
1956	.638	.620	.563	.518	.569
1957		.620	.563	.518	.571

The average deviations from the latest reported loss ratios on an actual basis are greater with the two independent carriers excluded while the average deviations from the latest loss ratios on a discounted basis are smaller. Essentially, therefore, for carriers which are members or subscribers of rating organizations, it is fair to conclude that an estimated average saving of 14% on outstanding claims very closely approximates the true situation with respect to each and all policy years.

With the two independent companies excluded and allowing for a 14% saving on outstanding losses the actual policy year 1955 loss ratio of .688 at 36 months should ultimately become .657.

One other important feature needs to be emphasized. It is the adaptability of this device to methods of reporting other than policy year reporting. While the savings are derived from policy year data throughout, we believe that the same results would flow under other

systems of compilation of statistics, provided it is a closed system in the sense that no new premiums and no new claims could be injected on subsequent reporting dates. This signifies an important area of utility with respect to more recent rate making procedures which are based on calendar-accident year experience. Aggregate information developed on this latter basis by rating and statistical organizations should be most welcome.

Part II

DEVELOPMENT OF STABLE RELATIONSHIPS BETWEEN PAID AND ULTIMATE INCURRED LOSSES

In Part I reference to experience reported prior to 36 months was made, and excluded from consideration there. This is because the fiscal reporting of experience at 12 and 24 months is too immature in that the data are seriously affected by estimates of earned premiums and also that claims are not entirely known. At 24 months reporting, the policy year reporting has not yet become a closed system in the sense described heretofore. At 12 months reporting the earned premiums are estimated; they are approximately 55% of the policy year written premiums. It may be that individual company practices of distributing countrywide earned premiums on a pro rata basis to the several States, produces this result. If the 55% of written premium result is something other than the net result of actual seasonal variation in premium writings then the earned-incurred loss ratios at 12 months are unduly distorted. In order to avoid the possibly distortionary effects of the foregoing it is believed that the 12 month losses related to written premiums are more appropriate. Exhibit III shows the experience of the available policy years at 12 months. The losses are expressed in terms of millions of dollars of written premiums.

With respect to loss experience at 24 months, for practically all policy years the incurred losses per million dollars of earned premiums are understated in comparison to ultimate incurred losses at 36 months. The explanation for this phenomenon may be that in using the cut-off date of December 31, companies include insufficient amounts for the year-end cases which have not been processed as of December 31. In the succeeding 12 months as these cases are entered on the company's books they will serve to increase the loss ratios. Here again the inadequacy of the 24 month reported figures may be related to the lack of a closed system for evaluation purposes.

In Part I we developed a means of predicting ultimate incurred losses. We have adapted the results of this predictive process to take advantage of the latest policy years reported at 12 and 24 months. Exhibit IV furnishes a comparison of the actual and the estimated ultimate incurred losses for each policy year. It will be noted that the estimated ultimate incurred losses for policy years 1954 and prior are extremely close to the actual reported incurred losses. As respects

policy year 1955 the difference is a little less than 4% and stems from the larger proportion of outstanding losses to incurred losses.

We have taken the actual paid losses and related them to the estimated ultimate incurred losses. Exhibit V shows the distribution of policy year paid losses at successive reporting dates. The remarkable feature of this exhibit is the lack of variation in the proportion of the total paid out as of any specified reporting date. In reading the figures across we found virtually no difference in the proportion of ultimate incurred loss paid out at the end of 12 months for policy years 1953, 1954 or 1955. An examination of the figures at 24 months and subsequently shows the pattern to hold almost as well. In order to develop this information in more usable form averages of these relationships are shown on Exhibit VI and VI-a. It should be noted that it makes very little difference whether the latest two years, three years, four years or five years are used. This is of course due to the fact that the individual years tend to cluster around a central average. In this connection, it is interesting to note Mr. A. H. Mowbray's paper in Volume VI of the Proceedings of the Casualty Actuarial Society on "The Actuarial Problems of the 1920 National Revision of Workmen's Compensation Insurance Rates and the Solutions Developed by the Actuarial Committee of the National Council." On Pages 274-275 he reports the conclusions of the committee that the ratios of losses paid at the end of the calendar year in which the policies were issued to the ultimate incurred losses under such policies were stable. He states "the preliminary investigations of the committee based on New York Schedule W returns indicate that the Losses Paid at the end of the calendar year in which the policies were issued bore a remarkably stable percentage relationship to the ultimate incurred losses on that same year of issue. *

*In the State of New York these percentages for a representative group of companies were on '16 Issues 13.9 per cent., on '17 Issues 14.2 per cent., on '18 Issues 13.7 per cent, Average of 3 years 13. 8 per cent., and similar stability has been shown by the figures for other states on a much smaller volume of data after allowance has been calculated for the effect of intervening amendments."

Exhibit VI may be used to develop a figure which is comparable to the ultimate incurred loss ratio. For example, policy year 1950 reported at 84 months is actually 63.6%. After eliminating 12% of the outstanding reserves it becomes 63.4 and this coincides with the actual paid loss divided by .9808. The results for other years compare favorably with the discounted loss ratios.

Exhibit VI-a provides a means for estimating the ultimate loss ratios for policy years 1956 and 1957. Exhibit VI-a shows the stability of the averages even at 12 months and 24 months reporting. If reliance can be placed upon these distributions of paid losses it would be possible to improve the predictions of ultimate loss costs.

Exhibit V was recomputed with the two large independent carriers excluded. While not shown here, in no case did any paid figure deviate

more than $80 per $10,000 of ultimate incurred losses from Exhibit V. Policy year 1954 and 1955 at 12 months became $698 and $700 respectively in lieu of $700 and $698. The average of the 12 month paid figure for the latest two years on Exhibit VI-a was unaffected while the average of the 24 month period figure became $4293 in lieu of $4237.

Part III

DEVELOPMENT OF A PROCEDURE FOR PROJECTING RECENT INSURANCE EXPENSE EXPERIENCE TO AN ULTIMATE BASIS

Part I develops a method of converting loss experience to an estimated ultimate incurred cost provided that the basic experience is at least 36 months old.

Part II uses the information developed in Part I for the purpose of developing the distribution of paid losses as of specified maturity dates. The remarkable consistency of adjacent policy years shown on Exhibit V is carried forward in the averages shown on Exhibits VI and VI-a. The closeness of the figures on Exhibit VI leads us to infer that the figures on Exhibit VI-a can likewise be relied upon as a measure of ultimate incurred losses. In this way we are able to eliminate the restriction that the system as defined heretofore must be a closed system. The figures appear to indicate that even though unknown claims will be included in the figures subsequent to 12 month and 24 month reports the amounts paid up to the cut-off date bear an approximately fixed relationship to the ultimate cost of all claims including the as yet unknown claims. Thus the conclusion to be drawn from Exhibit VI-a (two year average basis) is that the paid losses at 12 months are 6.99% of the ultimate incurred losses. The further inference to be drawn from this is that one need know only the amount of paid losses and the reporting date in order to determine the ultimate incurred losses. The amazing thing about this concept is that the application of these procedures to the 12 month figures shown on Exhibit III produces results for policy years 1953, 1954 and 1955 which are almost identical with loss ratios that would be produced by application of the methods described in Part I to the latest available experience for these policy years. The projection of 24 months experience to an ultimate incurred loss cost by the use of paid ratios also develops ultimate incurred losses which agree remarkably well with those obtained through Part I procedures.

A table is shown below disclosing these results using the two year averages of Exhibit VI-a for application to the paid losses. Also shown for comparative purposes are the discounted loss ratios as of December 31, 1957.

Table F

STOCK & MUTUAL COMPANIES
NEW YORK AUTO LIABILITY EXPERIENCE
POLICY YEAR LOSS RATIOS
DEVELOPED FROM PAID LOSSES
AND COMPARED WITH ULTIMATE LOSS RATIOS

Policy Year	*Loss Ratio Developed From Paid Losses*		*Ultimate Loss Ratio*
	12 Months	*24 Months*	
1952	—	.558	.562
1953	.525	.536	.522
1954	.576	.565	.575
1955	.662	.675	.663
1956	.662	.661	N.A.
1957	.701	—	N.A.

N.A.—not available.

Similar results are shown in Table F-X with the two large independent carriers excluded.

Table F-X

STOCK & MUTUAL COMPANIES
(EXCLUDING TWO LARGE INDEPENDENT CARRIERS)
NEW YORK AUTO LIABILITY EXPERIENCE
POLICY YEAR LOSS RATIOS
DEVELOPED FROM PAID LOSSES
AND COMPARED WITH ULTIMATE LOSS RATIOS

Policy Year	*Loss Ratio Developed From Paid Losses*		*Ultimate Loss Ratio*
	12 Months	*24 Months*	
1952	—	.561	.563
1953	.528	.532	.518
1954	.570	.563	.571
1955	.658	.667	.657
1956	.651	.662	N.A.
1957	.730	N.A.	N.A.

N.A.—not available.

If the foregoing procedure holds currently, and indications seem to point that way, then policy year 1956 and policy year 1957 incurred loss costs can be predicted reasonably well as respects ultimate costs

even though all the facts on cases recently arisen and cases not yet reported are not fully reflected.*

Part IV

AN EQUATION TO EXPRESS PAID LOSSES AS A FUNCTION OF TIME

When Exhibits VI and VI-a were consolidated, the following distribution of amounts paid was formed:

	Amount Paid	
t (in years)	*To Year End*	*During Year*
1	.0699	.0699
2	.4237	.3538
3	.7050	.2813
4	.8333	.1283
5	.9090	.0757
6	.9602	.0512
7	.9808	.0206

The amount paid during the year, when plotted, appears very much like a Pearson type curve. After considerable experimentation with the form $y = C_t{}^{B}e^{-A_t^{-1}}$ it was found that (1)

$$y = \sim 3500t^{-5.33942}e^{-10.911t^{-1}} \tag{2}$$

fit reasonably well. The fit could be improved slightly by adding the term $-.015t^{3}e^{-1.1t}\ \text{cosine}\sim t.$ (2a)

However, this form was found inconvenient to use for obtaining the amount paid to the year end.

Instead a fresh approach was made using the cumulative amounts paid to the year end. A curve of the form

$$\log_{10}y = At^{-B}10^{-ct} \tag{3}$$

was fitted to the observed values for t=1, 2, 3.

Through trial and error** and after much painstaking effort ably executed by Mr. Lester Dropkin, we found that

$$\log_{10}y = -2.0674t^{-.80599}10^{-.24841t} \tag{4}$$

produced values which were extremely close to the observed values. The differences between values computed from equation (4) and the observed values are shown below:

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*A note of caution should be made here. It is assumed that the distribution of policies will not vary substantially from year to year. If there should be sudden changes which would tend to change the distribution of exposures then the paid proportion of the total incurred losses will shift somewhat.

**See Appendix A for a description of the procedure used.

Differences From Observed Values

t (in years)	*Amount*	*Per Cent*
1	−.0018	−2.6%
2	−.0036	−0.8
3	−.0025	−0.4
4	+.0205	+2.5
5	+.0192	+2.1
6	+.0041	+0.4
7	+.0013	+0.1

Having satisfied ourselves that the percentage error was not large at any time for t greater than 1, we attempted to compare the function with actual observations at quarterly intervals for t less than 1.

Through the cooperation of two large statistical organizations we obtained policy year 1956 data paid by quarter year intervals. By equating the observed data at December 31, 1956 to .0699 of all losses we developed a distribution comparable to equation (4). We found the values to compare as follows:

t	*y from Equation (4)*	*Observed Values From Statistical Organization*	
		I	II
.25	.0000	.0005	.0005
.50	.0019	.0056	.0059
.75	.0209	.0232	.0227
1.00	.0681	.0699	.0699

It should be mentioned that the observed values include allocated claim expense and this might account for some of the difference. Even if it did not, the overall fit of the function to the data is quite good.

A table of values of y for various t's may be constructed from equation (4). Such a table is shown in Exhibit VII. The amounts paid between periods and cumulative amounts paid are illustrated in Figure I.

Part V

ADAPTATION OF PAID LOSSES TO SUPPLEMENTARY RATEMAKING

One of the chief dilemmas in insurance ratemaking practices is that concerned with closing the time gap between the reporting date of the detailed statistics to the ratemaking organization and the time of rate revision. Various conjectures based on external statistics (accident statistics, consumer price indices, wage rates, etc.) have at times been made in attempts to close this gap. More recently, trends of average insurance paid claim costs and paid claims have also been

utilized with some limited success. In workmen's compensation insurance ratemaking, calendar year experience has been utilized in order to supplement the normal policy year data used for ratemaking.

As a result of the dramatic demonstration of the stability of various paid ratios, it appears to us that supplemental insurance expense exhibit loss statistics might well be utilized to augment normal detailed ratemaking data. In the first place, the latest policy year component of the calendar year experience is approximately 10 months closer to the present time than is the latest detailed accident year statistics used for ratemaking. Secondly, the policy year component, properly developed, has been demonstrated to produce an error of less than 2.5% in the ultimate loss ratio. Therefore, it should be feasible to develop a program which will begin with the results indicated from an evaluation of accident year experience and advance it an additional 10 months,* and thus improve the ratemaking process as a whole.

Concretely, as a beginning, a rate level adjustment factor somewhat analagous to that used in workmen's compensation insurance could be used, except that the 12 month policy year would be used rather than the calendar year. The procedure could be expressed as follows:

$$1.0 + \left\{\frac{L_p}{.0699\ P_p} \div \frac{L_A}{P_A} \cdot \frac{1}{r_A}\right\} - r_p \pm .025 = F$$

where $.900 \leq F \leq 1.100$

In explanation of the foregoing,

L_p = 12 month policy year losses paid
P_p = 12 month policy year premiums written on current rate level
.0699 = proportion of ultimate losses paid as of 12 months
L_A = accident year losses incurred
P_A = accident year premiums earned on current rate level
r_A = accident year permissible loss ratio
r_p = policy year average permissible loss ratio for all auto liability
$\pm .025$ = neutral zone, based on maximum observed error in developing paid to ultimate losses
$.900 \pm F \pm 1.100$; limits of $\pm .100$ from unit, based on the assumption that the influence of economic and other factors reasonably to be reflected in insurance data should be limited to 10% over a period not exceeding 10 months.

r_A would be the average permissible loss ratio for all auto liability, which presupposes a simultaneous rate revision for private passenger,

*For example, in June 1959 the most recent ratemaking data that would be expected would cover the calendar-accident year ending June 30, 1958 with an average date of accident at December 1957. Policy year 1958 as contained in the Insurance Expense Exhibit as of December 31, 1958 has an approximate average accident date of September 1958.

commercial and all other cars; however since private passenger comprises the vast majority of the business, it might be considered alone if agreement could be reached on this point.

The neutral zone of $\pm.025$ would of course be applied to bring the factor closer to unity; as a further limitation, reversals above or below unity due to the use of $\pm.025$ by specific proviso could result in a factor of unity.

The neutral zone notion incorporates the concept of a sliding scale of credibility between the smallest and the largest allowable departure from the permissible loss ratio; the factor is therefore utilized to its greatest extent only when the experience shows extreme changes have occurred.

As an alternative, the influence of the latest 12 months might be dampened further by bringing in the last half of the preceding policy year into the computations. In this case

$$\frac{L_p}{.0699\ P_p} \tag{6}$$

would be replaced by

$$\left\{\frac{L_p}{P_p} + \frac{{}_1L_p}{{}_1P_p}\right\} \times \frac{1}{.4237} \text{ where} \tag{7}$$

1. the prescript, 1, refers to the developments during the latest calendar year on the next latest policy year,
2. the first fraction in the bracket is the paid-written loss ratio on present rate level for the *latest* 12 month policy year,
3. the second fraction in the bracket is the paid-written loss ratio on present rate level for the *second half of the preceding* 24 month policy year, and
4. the .4237 is the proportion of all losses paid by the end of 24 months.

This alternative approach would somewhat de-emphasize the 12 month policy year in favor of utilization of a larger volume of paid data. In either instance, both the .0699 and .4237 would be subject to periodic reexamination.

CONCLUSION

Some final observations are worth noting.

It seems to us that the foregoing analysis points to an underlying kernel of universality as respects the net effect of economic fluctuations together with the social impact of claim consciousness and traffic density as they have a bearing upon average insurance loss costs.

The consistency of Table B is improved when the experience of two large independent automobile insurers is excluded. These inde-

pendent companies exhibit a volume growth which is radically different from that of members and subscribers of rating organizations. As stated earlier the average saving on outstanding losses is 14% with the two companies excluded and closer to the average year by year. The exclusion of these two carriers produces year to year results equally consistent with those shown on Exhibit V and consequently Exhibits VI and VI-a.

Although criticism might be directed against inclusion of excess limits claims, the figures are available only on this basis; it is also believed that the size of the New York state volume of business and the use of $10,000/$20,000 limits in ratemaking minimizes such criticism.

Lest anyone be left with the impression that we believe the relationships derived are immutable, we hasten to add no such inference is intended. What does appear true is that the relationships change very slowly. This lethargy of change makes the averages which are developed along the lines of Exhibits II, VI and VI-a and applied as described for Tables F and F-X a useful tool for estimating ultimate costs.

It is hoped that these comments may afford the opportunity for exploration and analysis which will penetrate further into this uncharted field. With appropriate safeguards and further observation of data, perhaps a program may evolve which will recognize up to date experience earlier than is being done currently.

Exhibit I

STOCK AND MUTUAL COMPANIES
NEW YORK STATE AUTO LIABILITY INSURANCE
DISTRIBUTION OF POLICY YEAR LOSSES
(Per Million Dollars of Earned Premium)

Policy Year	*Reported As Of*	*Losses* (*1*) *Incurred*	(*2*) *Outstanding*	(*3*) *Paid*
1950*	48 Months	$648,819	$114,382	$534,437
	60 Months	641,676	56,612	585,064
	72 Months	637,455	26,012	611,443
	84 Months	635,927	13,623	622,304
1951*	36 Months	$646,395	$201,608	$444,787
	48 Months	635,197	103,832	531,365
	60 Months	627,166	58,354	568,812
	72 Months	622,769	25,611	597,158
	84 Months	620,133	13,705	606,428
1952*	24 Months	$579,689	$343,083	$236,606
	36 Months	583,434	185,605	397,829
	48 Months	576,037	108,157	467,880
	60 Months	569,489	57,094	512,395
	72 Months	565,778	28,777	537,001
1953	12 Months	$492,572	$426,673	$ 65,899
	24 Months	546,856	319,791	227,065
	36 Months	542,855	176,744	366,111
	48 Months	534,036	100,379	433,657
	60 Months	528,871	55,278	473,593
1954	12 Months	$521,595	$449,478	$ 72,117
	24 Months	588,243	348,726	239,517
	36 Months	594,707	188,022	406,685
	48 Months	588,269	107,197	481,072
1955	12 Months	$599,354	$516,547	$ 82,007
	24 Months	679,797	393,918	285,879
	36 Months	690,021	223,728	466,293
1956	12 Months	$605,198	$521,835	$ 83,363
	24 Months	709,689	429,579	280,110
1957	12 Months	$675,227	$587,920	$ 87,307

*Only experience of those carriers able to furnish complete data for these policy years has been included.

Exhibit II

STOCK AND MUTUAL COMPANIES
NEW YORK STATE AUTO LIABILITY INSURANCE
CHANGE IN POLICY YEAR LOSSES BY CALENDAR YEAR
(Per Million Dollars of Earned Premium)

Policy Year	*Calendar Year*	*Change In Losses* (1) *Incurred*	(2) *Outstanding*	(3) *Per Cent Savings* (1) ÷ (2)
1950*	48 to 60 Months	—$ 7,143	—$ 57,770	12.4%
	60 to 72 Months	— 4,221	— 30,600	13.8
	72 to 84 Months	— 1,528	— 12,389	12.3
	48 to 84 Months	—$12,892	—$100,759	12.8%
1951*	36 to 48 Months	—$11,198	— 97,776	11.5%
	48 to 60 Months	— 8,031	— 45,478	17.7
	60 to 72 Months	— 4,397	— 32,743	13.4
	72 to 84 Months	— 1,570	— 11,916	13.2
	36 to 84 Months	—$25,196	—$187,913	13.4%
1952*	36 to 48 Months	—$ 7,397	—$ 77,448	9.6%
	48 to 60 Months	— 6,548	— 51,063	12.8
	60 to 72 Months	— 3,846	— 28,339	13.6
	36 to 72 Months	—$17,791	—$156,850	11.3%
1953	36 to 48 Months	—$ 8,819	—$ 76,365	11.5%
	48 to 60 Months	— 5,165	— 45,101	11.5
	36 to 60 Months	—$13,984	—$121,466	11.5%
1954	36 to 48 Months	—$ 6,438	—$ 80,825	8.0%
All Available Years	36 to 48 Months	—$ 8,463	—$ 83,104	10.2%
	48 to 60 Months	— 6,722	— 49,853	13.5
	60 to 72 Months	— 4,155	— 30,561	13.6
	72 to 84 Months	— 1,549	— 12,153	12.7
	36 to 84 Months	—$20,889	—$175,671	11.9%

*Only experience of those carriers able to furnish complete data for these policy years has been included. For policy years 1951 and 1952, consolidated reporting of one group as of December 31, 1957 necessitated exclusion of two companies in that group for calculating the change from 72 to 84 months and 60 to 72 months respectively.

Exhibit III

STOCK AND MUTUAL COMPANIES
NEW YORK STATE AUTO LIABILITY INSURANCE
DISTRIBUTION OF POLICY YEAR LOSSES
REPORTED AS OF 12 MONTHS
(Per Million Dollars of Written Premium)

Policy Year	*Losses* (1) *Incurred*	(2) *Outstanding*	(3) *Paid*
1953	$274,178	$237,497	$36,681
1954	291,123	250,871	40,252
1955	335,120	288,820	46,300
1956	336,106	289,810	46,296
1957	379,081	330,066	49,015

Exhibit IV

STOCK AND MUTUAL COMPANIES
NEW YORK STATE AUTO LIABILITY INSURANCE
ACTUAL AND ULTIMATE† POLICY YEAR LOSSES
(Per Million Dollars of Earned Premium)

Policy Year and Report	*Item*	*Losses* (1) *Incurred*	(2) *Outstanding*	(3) *Paid*
1950* (84 Months)	Actual	$635,927	$ 13,623	$622,304
	Ultimate†	634,292		
1951* (84 Months)	Actual	$620,133	$ 13,705	$606,428
	Ultimate†	618,488		
1952* (72 Months)	Actual	$565,778	$ 28,277	$537,001
	Ultimate†	562,385		
1953 (60 Months)	Actual	$528,871	$ 55,278	$473,593
	Ultimate†	522,238		
1954 (48 Months)	Actual	$588,269	$107,197	$481,072
	Ultimate†	575,405		
1955 (36 Months)	Actual	$690,021	$223,728	$466,293
	Ultimate†	663,174		

†Ultimate equal to actual incurred less 12% of outstanding losses.
*Only experience of those carriers able to furnish complete data for these policy years has been included.

Exhibit V

STOCK AND MUTUAL COMPANIES
NEW YORK STATE AUTO LIABILITY INSURANCE
DISTRIBUTION OF POLICY YEAR PAID LOSSES
(Per $10,000 of Ultimate Incurred Losses)

Reported As Of	*Policy Year Paid Losses*					
	*1950**	*1951**	*1952**	*1953*	*1954*	*1955*
12 Months				$702	$700	$698
24 Months			$4207	4348	4163	4311
36 Months		$7192	7074	7010	7068	7031
48 Months	$8426	8591	8320	8304	8361	
60 Months	9224	9197	9111	9069		
72 Months	9640	9655	9549			
4 Months	9311	9805				

*Only experience of those carriers able to furnish complete data for these policy years has been included.

Note: Ultimate incurred losses obtained from Exhibit IV.
12 months figures based on Exhibit III.
Other figures based on Exhibit I.

Exhibit VI

STOCK AND MUTUAL COMPANIES
NEW YORK STATE AUTO LIABILITY INSURANCE
AVERAGE DISTRIBUTION OF POLICY YEAR PAID LOSSES
(Per $10,000 of Ultimate Incurred Losses)
(From Exhibit V)

Reported As of	*Average of Latest*			
	2 Yrs.	*3 Yrs.*	*4 Yrs.*	*5 Yrs.*
36 Months	$7050	$7036	$7046	$7075
48 Months	8333	8328	8394	8400
60 Months	9090	9126	9150	N.A.
72 Months	9602	9615	N.A.	N.A.
84 Months	9808	N.A.	N.A.	N.A.

N.A.—not available.

Exhibit VI-a

STOCK AND MUTUAL COMPANIES
NEW YORK STATE AUTO LIABILITY INSURANCE
AVERAGE DISTRIBUTION OF POLICY YEAR PAID LOSSES
(Per $10,000 of Ultimate Incurred Losses)
(From Exhibit V)

Reported As Of	*Average Paid Losses For Latest*		
	2 Yrs.	*3 Yrs.*	*4 Yrs.*
12 Months	$ 699	$ 700	N.A.
24 Months	$4237	$4274	$4257

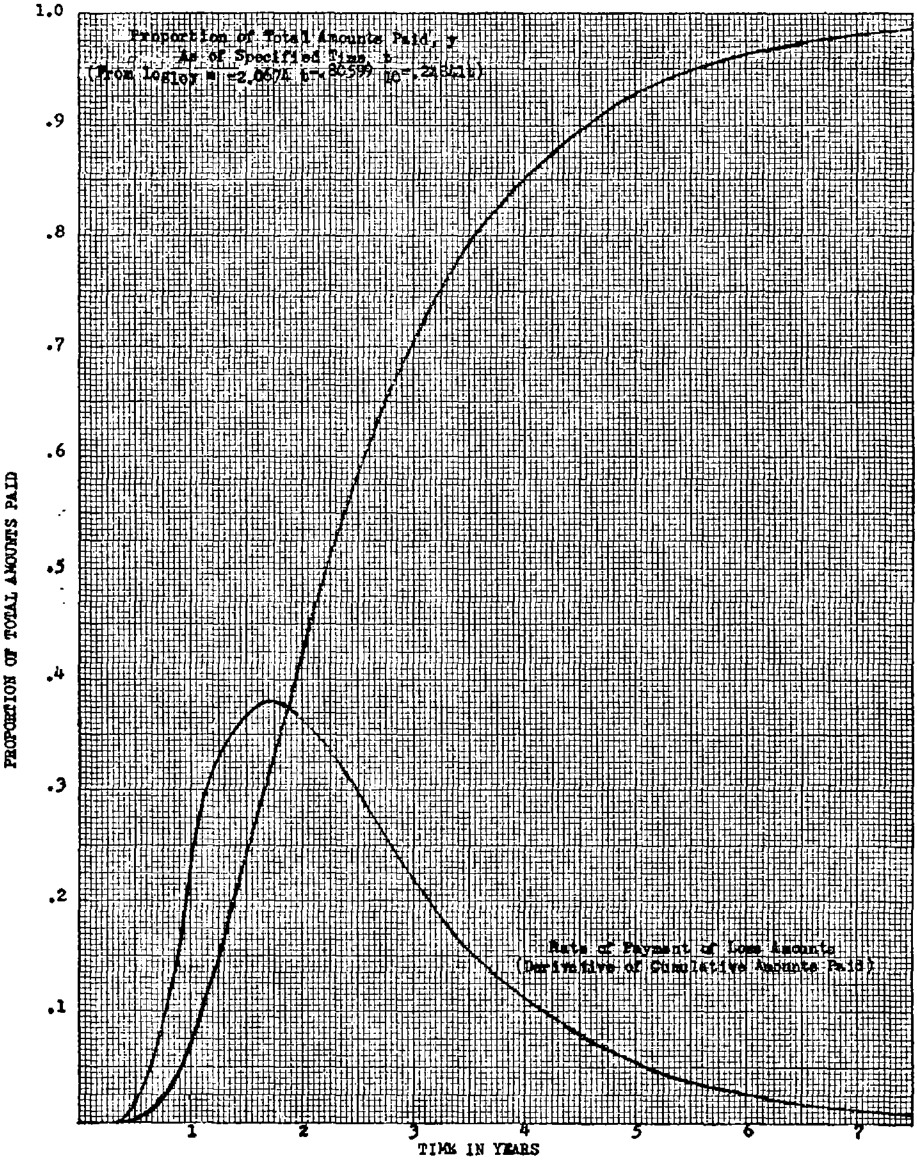
N.A.—not available.

Exhibit VII

Proportion of Total Amounts Paid, y
As of Specified Time, t
(From $\log_{10} y = -2.0674\, t^{-.80599} 10^{-.24841t}$)

t	*y*	*t*	*y*	*t*	*y*
1 mo.	.0000	1 yr. 9 mos.	.3281	5 yrs.	.9282
2 mos.	.0000	1 yr. 10 mos.	.3592	5 yrs. 6 mos.	.9495
3 mos.	.0000	2 yrs.	.4201	6 yrs.	.9643
4 mos.	.0001	2 yrs. 2 mos.	.4776	6 yrs. 6 mos.	.9747
5 mos.	.0005	2 yrs. 4 mos.	.5309	7 yrs.	.9821
6 mos.	.0019	2 yrs. 6 mos.	.5802	7 yrs. 6 mos.	.9872
7 mos.	.0052	2 yrs. 8 mos.	.6252	8 yrs.	.9909
8 mos.	.0110	2 yrs. 10 mos.	.6658	8 yrs. 6 mos.	.9935
9 mos.	.0201	3 yrs.	.7025	9 yrs.	.9953
10 mos.	.0326	3 yrs. 2 mos.	.7355	10 yrs.	.9976
11 mos.	.0487	3 yrs. 4 mos.	.7648	11 yrs.	.9987
1 yr.	.0681	3 yrs. 6 mos.	.7912	12 yrs.	.9993
1 yr. 2 mos.	.1158	3 yrs. 8 mos.	.8146	13 yrs.	.9997
1 yr. 4 mos.	.1718	3 yrs. 10 mos.	.8353	14 yrs.	.9998
1 yr. 6 mos.	.2332	4 yrs.	.8538	15 yrs.	.9999
1 yr. 8 mos.	.2966	4 yrs. 6 mos.	.8977	16 yrs.	1.0000

FIGURE I



Proportion of Total Amounts Paid, y
As of Specified Time, t
(From log10y = -2.0674 t-.86599 10-.24341t)
Rate of Payment of Loss Amounts
(Derivative of Cumulative Amounts Paid)
PROPORTION OF TOTAL AMOUNTS PAID
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
1
2
3
4
5
6
7
TIME IN YEARS

APPENDIX A

Notes on Derivation of Equation (4)

(*1*) After deciding to develop a curve which would fit the observed cumulative amounts paid, the next question to be settled was that of an appropriate form. To this end, two reasonable boundary conditions were set down:

(a) the curve to be equal to 0 at $t = 0$
(b) the curve to be equal to 1 at $t \geq 12$ yrs.

Furthermore, since we were dealing with a cumulative distribution function, it was simpler to fit a curve to the logarithms of the observed values rather than to the values themselves. Accordingly, the conditions (a) & (b) became:

(c) the (log) curve to approach $-\infty$ as t approached 0 from the right
(d) the (log) curve to equal 0 for some $t \geq 12$ yrs. or
(d') to approach 0 as t approached ∞, the difference from zero being negligible not before $t = 12$ yrs.

(*2*) A number of variant forms suggested themselves to us but basically two forms were considered. These were:

(a) $\log_{10} y = -ax^{-b}(c-x)^{d}$ with $c > 12$
(b) $\log_{10} y = -ax^{-b}e^{-cx}$

After a few trial runs, the form (b) was selected.

(*3*) The question of the method to be used to fit a curve of the desired form still remained. The curve could be fitted to three selected points or could be fitted by some variant of the method of least squares deviation. After considerable experimentation it was decided to fit the curve to three selected points. The three points selected were $t = 1$, 2 and 3. These were chosen because of their relatively greater importance in any practical applications. It was realized that by selecting the first three observed values, some unbalance in the fit would occur in the later points; however, this could be compensated for by a slight modification of the value of the constant a.

(*4*) To summarize to this point, a curve of the form $y = 10^{-ax^{-b}e^{-cx}}$ was selected as being appropriate; the constants to be determined from the equivalent form: $\log_{10} y = -ax^{-b}e^{-cx}$

(*5*) The constants were determined from the following:

t	observed y	$\log_{10} y$
1	.0699	−1.15552
2	.4237	− .37294
3	.7050	− .15181

Substituting we obtain 3 equations:

$$-1.15552 = -ae^{-c} \qquad \text{(i)}$$
$$-.37294 = -a2^{-b}e^{-2c} \qquad \text{(ii)}$$
$$-.15181 = -a3^{-b}e^{-3c} \qquad \text{(iii)}$$

Dividing (i) by (ii) and (ii) by (iii) we obtain

$$\frac{1.15552}{.37294} = 2^b e^c \qquad \text{(iv)}$$

$$\frac{.37294}{.15181} = \frac{(3)^b e^c}{(2)^b} \qquad \text{(v)}$$

b is obtained by dividing (iv) by (v) and solving (by logs):

$$\frac{(1.15552)\,(.15181)}{(.37294)^2} = \left\{\frac{4}{3}\right\}^b$$

$$b = \frac{\log_{10}1.15552 + \log_{10}.15181 - 2\log_{10}.37294}{\log_{10}4 - \log_{10}3}$$

b = .80599 (after simplifying)

c is next obtained by substituting the value of b just found in equation (iv) and solving (by logs):

$$\frac{1.15552}{.37294} = 2^{.80599}e^c$$

$$\log_{10}1.15552 - \log_{10}.37294 = .80599\log_{10}2 + c\log_{10}e$$

whence c = .57199

Finally a is obtained by substituting the value of c just found in equation (i) and solving (by logs):

$$1.15552 = ae^{-.57199}$$
$$\log_{10}1.15552 = \log_{10}a - .57199\log_{10}e$$

whence a = 2.0469 (after simplifying)

(*6*) The resultant equation at this point is:

$$\log_{10} y = -2.0469t^{-.80599}e^{-.57199t} \qquad \text{(vi)}$$

This equation fits the data exactly at t = 1, 2 and 3 and differs from the data at t=4, 5, 6 and 7 as follows:

t	*observed y*	*calculated y*	*difference*
1	.0699	.0699	.0000
2	.4237	.4237	.0000
3	.7050	.7050	.0000
4	.8333	.8552	+.0219
5	.9090	.9289	+.0199
6	.9602	.9647	+.0045
7	.9808	.9823	+.0015

(*7*) Since logarithms to base 10 are being used for calculation, and to make the form consistent the relation $10^{.43429} = e$ was used, whereupon (vi) now appears as:

$$\log_{10} y = -2.0469t^{-.80599}10^{-.24841t} \qquad \text{(vii)}$$

(*8*) Finally, to compensate for the unbalance in the fit for the later points (see 3 above) the constant a was changed to 2.0674. This particular value of a was obtained by numerous trials. The equation (vii) thus becomes:

$$\log_{10} y = -2.0674t^{-.80599}10^{-.24841t} \qquad \text{(Eq. 4)}$$

METHODS OF COST LIMITATION UNDER PRIVATE UNEMPLOYMENT BENEFIT PLANS

BY

MURRAY W. LATIMER

I. INTRODUCTION

For a number of years, several major labor organizations with large membership in mass production industries have had as a goal an increase in the income of their members during periods of unemployment. The rationale has been that the income of most workers while employed is insufficient to permit saving for unemployment; that unemployment compensation under existing state and federal laws is generally inadequate; and that, in consequence, the living standard of the unemployed is far lower than for those employed and that, in fact, only relief and private charity prevent many from becoming completely destitute.

The original trade union goal was the so-called "guaranteed annual wage." A demand made on the steel industry in 1944 by the United Steelworkers of America for an unlimited guarantee of wages for all employees led to a study, under the auspices of the Federal Government, of such experience as existed under, and the potentialities of, plans for guaranteeing wages.

The major findings of fact and conclusions of this study,[1] published in 1947, were:

1. Guaranteed wage plans had existed in the United States for many years but had affected only an infinitesimally small segment of the total employment.
2. With only one important exception, the plans were so hedged about with qualifications and restrictions as to remain virtually inoperative for most of the time and were subject to change after the occurrence of unfavorable experience.
3. Most of the plans covered employment in consumer goods industries, with products in constant and wide use, and not subject to substantial year-to-year fluctuations in demand.
4. The unemployment suffered by employees covered by the plans was largely seasonal; but the restrictions in the plans were such as substantially to eliminate seasonal workers from guarantees.
5. Any widening of the employments covered by wage guarantees could be accomplished only if such guarantees were severely restricted; conversely, widespread adoption of unqualified guarantees on an annual basis would endanger the economy.

[1] Office of War Mobilization and Reconversion, "Guaranteed Wages," Washington, Government Printing Office, 1947.

6. Direct legislative action for the establishment of guaranteed wage plans would be unwise, but action to remove certain obstacles was desirable. Among the obstacles were certain provisions of the Fair Labor Standards Act of 1938 which, while intended on the one hand to encourage wage guarantees by permitting an employer to avoid payment of the premium part of wages for overtime work, in fact discouraged such guarantees by requiring that the guarantee cover a full year, and specifying that if any employee worked more than 2080 hours in the guarantee year, the overtime penalty would again become operative.
7. Much the most promising method of increasing incomes of unemployed workers would be arrangements for supplementing the benefits under unemployment compensation laws.

By "guaranteed wages" is ordinarily meant a commitment by the employer to pay certain or all of his employees a full or partial wage for a specified time, whether or not work for such employees is available. "Supplemental unemployment benefits," as the name implies, means a commitment by the employer to augment the statutory unemployment compensation. Technically, the incomes to the unemployed could be made the same under the one as under the other, and limitation on liability could be accomplished in substantially identical manner. The major difference has to do with financing. Under guaranteed wage plans an employer will account for his costs when wages are paid. Under the federal income tax statutes he cannot charge any part of wages accrued for 1959 against his 1956 or 1957 or 1958 business; as a practical matter, this prevents use of pre-funding techniques. Such pre-funding is possible under supplemental unemployment benefit plans. The details will be described at appropriate later points in this paper.

Influenced perhaps by the conclusions in the Guaranteed Wage Report, trade unions have, in recent years, indicated but little interest in guaranteed wages. While the Fair Labor Standards Act has been amended to incorporate the Report's recommendations, there resulted no perceptible encouragement to wage or employment guarantees in return for elimination of premium overtime. Three unions—the Teamsters, Meat Packers and Longshoremen—have negotiated a number of contracts incorporating wage guarantees involving no sacrifice by employees of any right to premium overtime. These plans cover limited groups within the bargaining units; accounts of the operations of these new plans are almost non-existent, but there has been nothing, at least to the end of 1957, to suggest that thus far they have actually been operative. What might be the case if substantial unemployment were to occur within their coverages cannot be determined from available information

The war-time demand for guaranteed wages was based in large measure on a fear that the high unemployment of the 1930's would recur at the war's end. By the time the Guaranteed Wage Report was

published, it had become clear that this fear was greatly exaggerated; and for two years thereafter employment in general was rising steadily. Though substantial unemployment occurred in 1949 and in 1953-54 in the steel, auto and some other mass production industries, the unions in those industries were heavily committed to work out pension and insurance plans which, under the favorable conditions of generally high employment, had been given first priority in the non-cash wage area.

The 1949 unemployment was, for the most part, of brief duration. The 1953-54 dip was somewhat more prolonged and, particularly in many durable goods industries, rapid expansion of producing capacity was coupled with such substantial technical improvements that employment since has never equaled the pre-1954 peak. Developments such as these made it certain that, at the first opportunity, the unions in the mass production industries would give high priority to proposals for increase of their members' incomes during periods of unemployment. There had been sufficient prior discussion of the problem, including a fairly elaborate proposal made by the United Steelworkers to the steel industry in 1952, to make it certain that the aim of the unions would be to supplement state unemployment benefits rather than to secure direct employer guarantees of wages or employment.

The opportunity for negotiation along these lines came in 1955: first the United Automobile Workers negotiated supplemental unemployment benefit plans covering members at Ford, General Motors, Chrysler and other companies in the automobile and agricultural implements industries.* Similar plans were agreed upon between the Steelworkers and the American and Continental Can Companies later in 1955. A different type of supplementation plan was adopted in the glass industry, also in 1955. In 1956 plans resembling those in the can industry were adopted by agreement between the United Steelworkers and all major companies in the United States producing steel and aluminum, and many steel and aluminum-using companies.

Since 1955 several hundred supplemental unemployment benefit plans (usually abbreviated hereinafter to SUB plans) covering perhaps two millions of workers have come into existence.

In addition to the type of plan worked out in the steel and auto industries, there is another, frequently referred to as the "glass-type" plan (because first established on a substantial scale in the glass industry), under which credits of certain amounts (frequently 5 cents per hour for which pay is received) are made to the individual accounts of employees. If an employee becomes unemployed, he may draw (subject to a weekly maximum) on his individual account. He may also draw on his account when disabled. If an employee dies, the amount in his account is payable to his beneficiary, and if he leaves service, the balance in his account is payable to him. Investment earn-

* The auto plans described in this paper are those worked out in 1955. In 1958, after this paper was completed, there were some changes made in the plans.

ings are credited to the account. This is more a savings plan, with an incidental potential use during spells of unemployment, than an unemployment benefit plan and will not be discussed in this paper.

II. BASIC CHARACTERISTICS OF SUB PLANS

A. *Supplementation of State Benefits*

The aim of SUB plans is to supplement, not supplant, state benefits. The size of supplemental benefits cannot be judged independently of the state benefits they are intended to supplement; and except as the maximum limit produces other results, the larger the state benefit, the lower the supplemental payment, and the longer the duration of state benefits, the less will the aggregate supplemental benefits be. Supplementation implies also the adoption of state standards as to entitlement; if an individual is held by a state unemployment compensation agency, for example, to have refused suitable work without good cause and is denied a state benefit, he will be denied a supplemental benefit. In all the SUB plans the supplementation is not limited to weeks in which a state benefit is payable; but the state adjudication standards apply to the benefits for these periods as well. This means, of course, that in a company doing business in more than one state, adjudication standards will not have company-wide uniformity. The alternative was to formulate a completely consistent set of standards —a task which would have multiplied administrative burdens many times and probably have had an appreciable effect on costs. All state adjudication standards do not apply. As will be seen, there are certain cases in which supplemental benefits are not paid, though a state benefit may be.

In addition to state tie-ins on benefits and adjudication, SUB plans contemplate the state employment services will be a main avenue of reemployment for beneficiaries. Finally, since the average size of state benefits will affect the average size of supplemental benefits, changes in state laws will affect the level of reserves aimed at as "maximum" under the SUB plans.

B. *SUB Plan Coverage Based on Company Units*

Generally speaking, SUB plans, like private pension and group insurance arrangements, are on a company-by-company basis. With few exceptions the plans have been the result of union demands and have been formulated through the collective bargaining processes. There is only one exception of any consequence as regards broader coverage—a maritime plan which, because it has features unrelated to unemployment, is omitted here. No further development of multi-employer plans is known to be in contemplation. In the case of some multi-plant companies, particularly cases in which employees of the same company are represented by more than one union, there may be more than one SUB plan in the same company.

Administration by the companies is the rule. Differences of opinion between the company on the one hand and employees and the union on the other are to be settled by procedures similar to those used for the adjustment of disputes concerning wages and hours and the like, due account being taken of the fact that in many cases the subject of disagreement may be a state decision rather than one of the company.

C. *Detailed Terms of the SUB Plans*

The numbered paragraphs which follow set out in more detail the major provisions of the SUB plans in the steel and automobile industries on which attention is here to be focused.

1) Not all employees are to be entitled to supplemental benefits; eligibility is limited to those employees who, at time of becoming unemployed, have completed

1 year of service (auto and agricultural implement industries);

2 years of service (steel and aluminum industries, and can industry after September 1958);

3 years of service (can industry[2] until October 1958)

The employees who can be eligible for supplemental benefits, if unemployed, and other employees whose only reason for not being so eligible is the shortness of their service are sometimes referred to collectively as "covered employees."

2) To be compensated, unemployment must be initiated by the employer; under no circumstances are supplemental benefits to be paid to an employee whose employment terminated by voluntary action on his part, through discharge for cause, by leave of absence, or upon call for military duty.

3) In general, entitlement to state[3] benefits is a prerequisite for receipt of supplemental benefits, but there are certain exceptions to this general rule in a few types of situations. Supplemental benefits are to be paid if failure to be entitled to a state benefit is solely the result of

(a) The requirement of a second waiting week in a single benefit year;

(b) Failure to have sufficient base period earnings prior to layoff;

(c) A limit on the period of time state benefits are payable shorter than the limit for supplemental benefits.

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[2] In the can and steel plans there are certain additional requirements intended to weed out from eligibility for benefits purely seasonal workers.

[3] By definition in all the plans, "state benefits" include railroad unemployment insurance benefits, veterans' allowances and, in Canada, the Dominion unemployment insurance.

These three exceptions occur in all auto, agricultural implement, steel, aluminum and can plans. The plans in the last three industries add to these exceptions two others:

(d) Receipt of compensation in excess of the maximum permitted under state law[4] but less than the amount which would disqualify an employee for the higher overall benefit; and

(e) A layoff because of plant shutdown for vacation purposes of an employee not entitled to vacation pay.

4) Layoff of an eligible employee by the company and eligibility for state benefits (other than for the reasons just stated) is not the end of the eligibility requirement, however; there is more. Merely to state all the details of all plans would require many pages. It will suffice to summarize the other eligibility requirements of the steel industry plans, which are perhaps slightly more restrictive than those negotiated by other unions; the steel requirements may be summarized by saying, in addition to having the requisite service period and being entitled to state benefits (or failing to receive such a benefit solely because of one or more of the enumerated reasons), an employee must meet the following specifications:

(a) Have made a proper application;

(b) Have appeared personally and reported at a company office at such time each week as the company may require;

(c) Have a balance of at least one credit unit at the beginning of the benefit week;

(d) Be able to work and available for work;[5]

[4] The plans specify that one or more of these causes must be the "only" reason for not receiving a state benefit. In 1957 a number of steelworkers were employed on a short-time basis with wages sufficient to keep them from being "unemployed" within the meaning of state laws, but less than the gross supplemental benefit. An employee who had already begun a benefit year, or who was covered by a state law requiring no waiting period, could receive "supplemental" benefits since the only reason for his failure to receive a state benefit was the amount of his wages. But under a state law which pays no benefit until a "waiting period" is served (i.e., a week in which an employee could, except for the waiting period requirements, be entitled to a state benefit) the case is different. It may then be said that there are two reasons for such employee not receiving state benefits—excess wages, and failure to meet the waiting period requirement. The Union contended that only one reason, excess wages, was really involved. The matter was compromised by an agreement that if an employee had one week of earnings in excess of the state but under the supplemental plan limit, he would be deemed to have a waiting period for the purposes of the plan, assuming he had not started a state benefit year. The first subsequent week of total unemployment would also be a waiting period week in these situations.

[5] This is usually a requirement for eligibility for state benefits, but there are certain exceptions.

(e) If the state requires no waiting period, have had a week in which no benefits were received, though the employee concerned was otherwise entitled to them;

(f) Have not failed to follow up on any job to which there is a company referral, and accept any such job if offered and if suitable according to the standards of applicable state law;

(g) Have not failed to accept a job with the company, whether suitable or not, if such acceptance is required by the collective bargaining agreement;

(h) Have not failed to respond to a recall to own job within three days (or for a longer period if specified by the applicable collective bargaining agreement);

(i) Have neither been eligible for nor claiming any accident or sickness or total disability benefit, or a pension financed in whole or in part by the company;

(j) Have not received any supplemental unemployment benefits under any other plan, or have been eligible for such benefits under a plan in which the employee has longer service than with the particular employer;

(k) Have not been scheduled to be on vacation;

(l) The layoff must not have been the result of a strike, slowdown, work stoppage, picketing, concerted action, or labor dispute of any kind involving (i) the union which represents the collective bargaining unit of which an employee is a member, whether or not at the plant where such employee works; (ii) employees of the company, or of a transportation or utility company, which directly interferes with production or ingress or egress of material or product at the plant where the layoff occurred;

(m) The layoff must not have been the result of

(i) War or the hostile act of a foreign power;

(ii) Government regulations or controls over the amount or kind of material or product which the company may use or sell;

(iii) Sabotage, insurrection or act of God.

5) Duration of benefits of an eligible employee who is laid off depends on the number of his credit units. Credit units under the steel plans are acquired by an employee at the rate of one for each 80 hours of time paid for, plus time lost (not over 8 hours per day or 40 per week) because of certain union duties, or on account of disability if, in the last case, workmen's compensation or company insurance benefits are payable. No more than 52 credit units may be credited to an employee at any one time and, after his first credits, not more than 26

units may be accumulated by an employee in any 12-month period. In the auto industry plans, the maximum number of credit units which an employee may have at any one time is 26; credit units accumulate at the rate of one-half for each week of full time (for 32 or more hours, exclusive of premium pay). Hours in a week of less than 32 hours pay do not count; and no extra credit is given for hours in excess of 32 in a single week. For the first two years of operation credit units were acquired by employees having less than ten years of service at half the usual rate. In the Steelworker plans, hours were credited retroactively for one year before the date of the agreement, so that when benefits became payable an employee who worked normal hours regularly had 52 credit units.

6) It is contemplated that, as a rule, when the plans are in full operation, a supplemental benefit for a week will be payable to an employee for each credit unit he has. More specifically, at least one credit unit is charged off for each payment of a weekly benefit, and if the financial position of the supplemental benefit fund of a particular employer is below certain points, a week's benefit may cost an employee of that employer more than one credit unit. The number of credit units to be charged to an employee's account depends upon his length of service and the financial condition of the fund from which supplemental benefits are paid. The size of the benefit itself is not involved.

7) All credit units are cancelled upon quit, discharge for cause, or break in continuous service for another reason, or for willful falsification or withholding of a record. In the auto plans a break in service may come only after a continuous layoff has lasted for as long as five years (as against two years in the steel industry), but any remaining credit units are cancelled after a continuous layoff of 18 months. In the American Can plan, credit units are not cancelled by a long layoff but only by quit, discharge or falsification or withholding of records.

8) In both the steel and auto plans the weekly supplemental benefit for an employee is calculated by taking an amount equal to a percentage of his weekly after-tax pay and subtracting from such amount the sum of his state benefit and other compensation. The remainder may be reduced if it exceeds a certain maximum.[6] There are then five factors to be looked at: weekly after-tax pay, the percentage, the state benefit, other compensation, and the maximum.

9) The pay from which the calculation of the weekly benefit begins is based on 40 hours.[7] The pay factor in this calculation is, for the

[6] If, after subtracting the sum of state benefits and other compensation from the gross weekly benefit, the remainder is not over $2.00, no benefit is payable under the UAW plans; such small benefits may be paid at longer intervals, not over 13 weeks, under Steelworker agreements.

[7] In plans negotiated by the Steelworkers the multiplier is the number of scheduled hours less than 40 for employees who, for their own convenience, regularly work a weekly schedule less than 40 hours.

auto plans, the base hourly rate of the applicant at the time of (or, in some cases, the highest in the 30 days preceding) the layoff, including the cost-of-living allowance, but excluding all other premiums and bonuses; and for the steel and aluminum plans the average hourly earnings (exclusive of Sunday and overtime premium) in the first three of the last six months adjusted, if necessary, by any general wage change since the first day of the six-month period. For one of the major can companies the pay factor is average hourly earnings in the 52 weeks preceding layoff; and in the other can plan, the average hourly earnings in the first four of the last five weeks preceding the week of layoff.

10) The "after-tax straight-time weekly wage" of an employee under the steel plans is the weekly pay, calculated as described in the preceding paragraph, minus the federal income tax to be withheld from such pay for a person having the number of dependents of the employee. Under the UAW agreements, the "after-tax straight-time pay" is less than the weekly pay, as described in paragraph 9, by the sum of federal, state and municipal taxes and contributions required to be withheld from the employee's pay by the company. This means the deduction of federal income and old-age insurance taxes as a minimum.

11) Under the steel industry plans the percentage factor to be applied to weekly after-tax pay to find the gross weekly benefit is 65. By the terms of the UAW plans the percentage factor for the first four weeks of benefit in any continuous layoff is 65; for the remaining weeks of any continuous layoff the percentage is 60. Irrespective of the number of layoffs in a calendar year, the maximum number at the 65 per cent rate[8] is eight, and if the fund position is less than 49 per cent, the maximum weeks of benefit in any calendar year at 65 per cent are four.

12) From the gross weekly benefit, 65 or 60 per cent of after-tax pay, there is subtracted, first, the amount of the state unemployment compensation benefit (unless there is no such benefit and the reason therefor is one of those specified in paragraph 3). If the employee received no wages during the benefit week, the amount payable to him is the gross weekly benefit less the state benefit, but subject to certain maxima. For the purposes of the plans, a "state unemployment compensation benefit" includes benefits under a federal or territorial plan now in effect or any which may hereafter be adopted. Under the provisions of the Steelworker plans, in this case, the amount to be sub-

[8] There are several variants under Steelworker plans: in the can plans the 65 per cent of take-home pay is calculated only for single employees by wage groups; the aluminum agreement fixes the gross benefit for a single employee at 22 hours pay, which is approximately 65 per cent of take-home pay based on 40 hours. The benefit for employees with dependents is calculated in both can and aluminum plans by adding $2.00 for each dependent, up to four, to the benefit for a single employee.

tracted from the gross weekly benefit would be (i) the state benefit amount, plus (ii) the excess of the employee's wages over any amount disregarded by the state in calculating the benefit. The UAW provisions are, in effect, the same as for the Steelworker plans, except that, so far as the supplemental benefit is concerned, no wages are disregarded. In case an employee's wages in a benefit week are as large or larger than the amount which disqualifies him for state benefits, no supplemental benefit is payable under any UAW plan. If, under a steel plan, such wages do not exceed the sum of the gross benefit plus the disregarded wages, a supplemental benefit may be payable.[9]

13) The maximum weekly supplemental benefit amount under all UAW plans is $25. The $25 maximum applies only to employees without dependents under steel plans and only to the period when state benefits are payable.[10] If there are dependents (a wife, for this purpose—though only an "exemption" under the Federal Internal Revenue Code—is counted as a dependent), the weekly maximum is increased by $2.00 for each dependent up to four. As previously mentioned, in the aluminum and can industry plans the benefit in all cases in which there are dependents is calculated by adding to the benefit for a single employee $2.00 for each dependent up to four. For periods after state benefits are exhausted,[11] the above weekly maxima are increased under the steel plans by $22.50.[12]

14) If the weekly supplemental benefit—the remainder after subtraction of state benefits and other compensation from the gross weekly benefit—is less than the maximum, the maximum, of course, does not apply. In such a case, if the only income tax applicable is the federal, the allowance for dependents is approximately $1.50 where the percentage factor is 65, and $1.38 if the percentage factor is 60.[13]

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[9] The exact interpretation of this provision is the subject of a currently unresolved dispute between the steel companies and the United Steelworkers of America.

[10] By the terms of the Continental Can Company plan, there is no maximum other than that fixed by the gross weekly benefit.

[11] The period for which the lower maximum applies is extended under Steelworker agreements, after state benefit exhaustion, by the number of weeks for which an employee was eligible for state but not supplemental benefits.

[12] See footnote [10]. In the American Can plan the $22.50 is $21.80.

[13] The number of dependents for whom such supplemental benefit is allowable may be more or less than four if the $25 or other maximum referred to in paragraph 13 is not applicable:

2 dependents if the weekly wage before subtraction is less than $52;
3 dependents for such weekly wages between $52 and $64;
4 dependents for such weekly wages between $64 and $78;
5 dependents for such weekly wages between $78 and $90;
6 dependents for such weekly wages between $90 and $105;
7 dependents for such weekly wages between $105 and $115;
8 dependents for such weekly wages between $115 and $130;
9 dependents for such weekly wages of $130 or more.

15) The contributions for the support of the benefits are paid wholly by the employers in all the supplemental unemployment benefit plans negotiated by the Steelworkers and Automobile Workers. The contributions are paid into a trust fund and may be used only for the purpose of paying benefits and, to a limited extent, defraying the fees and expenses of the trustee. Contributions are to be made, up to a certain maximum, in amounts sufficient to bring the assets of the trust fund (usually referred to as the "SUB fund" or, in a clear context, the "fund") up to a certain level. If the fund is equal to or above the level, no contribution is made.

16) In the auto plans, the contribution to the SUB fund for any month is the smaller of (i) 5 cents multiplied by the compensated hours of covered employees in such month, or (ii) the amount required to bring the assets of the SUB fund up to the maximum level. By the terms of the steel plans, each company is to contribute to its SUB fund "(i) an amount determined by multiplying 3 cents by the total number of Contributory Hours for such month or (ii) such lesser amount which when added to such total finances of the Plan will equal maximum financing." "Contributory Hours" are hours worked by covered employees; "total finances" are the assets of the SUB fund on an accrual basis, including "contingent liability;" and "maximum financing" is what has been referred to as the "maximum level" and will be explained in the next paragraph. Assets of the SUB funds under both steel and auto plans are valued at market.

17) Under the steel plans, during the period when a SUB fund is building up to its maximum level, for each 3 cents in cash contributed by a company the company incurs an obligation (called "contingent liability") to contribute 2 cents "if and when such amounts are needed to provide the benefits of the Plan." If and when a steel company SUB fund reaches its maximum level, the company incurs a contingent liability with respect to a month for any excess of the difference between the maximum level of the fund and the sum of its total finances for the month plus 3 cents per contributory hour during the month, the maximum contingent liability to be incurred with respect to a month being 2 cents per contributory hour during that month. For example, assume that the maximum level of a SUB fund for some month is $1,000,000, the total finances for the same month $970,000, and the corresponding contributory hours 800,000. Then the contribution would be 3 cents for 800,000 hours, or $24,000, and $6,000 (¾ cent per contributory hour) would be added to the contingent liability.[14] If the total finances had been less than $960,000, the cash contribution would have remained at $24,000, the contingent

[14] Under the interpretation placed on the plan by the steel companies, the ratio between cash contributions and contingent liability is to be 60-40, irrespective of the difference between the maximum fund level and total finances.

liability incurred for the month would be $16,000, and the maximum level would continue to exceed total finances.

18) If the entire contingent liability is accounted for each month as a cost of operation,[15] the steel and auto plans may be said to have the same limit on contributions, except that the steel limit is in terms of hours worked and the auto limit is based on hours for which compensation is paid, the latter being the larger by from 6 to 8 per cent. If the contingent liability is accounted as a cost only as and when contributions based on it are made, no limit on monthly contributions for steel plans may be stated; for large contributions may be required for a month in which the hours of work may be very low.

19) At the other extreme, for a month in which no benefits are paid (or in which the benefits are no larger than the investment income of the fund) no contributions to the fund are required if the fund assets equal the maximum level. All the plans provide for an initial maximum level of the supplemental unemployment benefit level, and specify how that level is to be changed. As to the maximum level, the auto plans fix the initial maximum level of the fund as the product of $400 multiplied by the number of covered employees in active service. As the number of covered employees in service changes, the maximum fund level changes in equal ratio.

20) Under the steel plans the maximum level, for contribution purposes, was intended to be fixed at slightly over $200 per covered employee. The aim was to vary the maximum level not by the number of employees but by the number of hours worked over a period of 12 months. In fixing the level it was assumed that hours worked per year would average about 1950 per employee; the maximum level was expected to average (at about 10½¢ per hour) about $205 per covered employee. In recessions the average would be less; in periods of good business higher than this average. The fluctuations in maximum levels have an important bearing on the operation of the plans which will be explained later.

21) There is one further basis for changing the maximum level of the fund: the average size of the supplemental benefit. In the case of the auto plans, the maximum level per employee is to be unchanged if the supplemental benefits average $20 or over per week. In the case of the steel plans, the maximum level is to be calculated at 10.5 cents per hour worked in a 12-month period as long as supplemental benefits average $16 per week or more. If benefits average less than these amounts, the maximum funding would be reduced as follows:

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[15] The Internal Revenue Service has held that for federal income tax purposes contingent liability may be counted as a deductible expense only when actually paid as contribution into a SUB fund.

Auto		*Steel*	
Average Weekly Supplemental Benefit	*Percentage Reduction from Initial Maximum Level*	*Average Weekly Supplemental Benefit*	*Percentage Reduction from Initial Maximum Level*
$15-19.99	20	$12-15.99	20
10-14.99	40	8-11.99	40
5- 9.99	60	Less than $8	60
Less than $5	80		

22) The amount of the difference, as of each month-end, between the total assets of a SUB fund and the maximum level of that fund is one of the factors in determining what the employer will contribute to the SUB fund. Of course during the early stages of a plan, while the assets are being built up, it is certain that the maximum contribution will be made. Annual contribution liability per employee will not exceed $100 to $105 in the auto industry and $94 to $100 in steel, and in years like 1958 will average substantially lower. Even without expenditures, and assuming stable employment, it would take a period not much shorter than four years to accumulate assets equal to the maximum fund level for the auto companies and about two years for the steel companies.

23) Both the steel and auto plans use the ratio between the assets of the SUB funds and the corresponding maximum levels of the funds as the regulator of benefit payments. It is at this point that the greatest difference between the two groups of plans occurs: a larger than anticipated drain which threatens to lower the SUB fund unduly is compensated for under the auto plans by a reduction in the maximum number of benefit payments which may be made to an employee for a given number of credit units. In the steel plans, on the other hand, the main reliance in such a situation is in a reduction in the weekly benefit amount.

24) In both auto and steel plans, the payment of benefits began after an accumulation period of approximately one year. At the beginning of payments of benefits the assets of the SUB funds were roughly 25 per cent of their maximum level (this percentage of fund assets to maximum level will frequently be referred to as the "fund position") in the auto industry and about 50 per cent in the steel industry. In the auto industry the 25 per cent ratio was used as the basis for reducing durations of benefits just as if there had been unfavorable financial experience. Under the steel plans, on the other hand, the plans assumed that unfavorable experience was to be taken into account only after it occurred. For experience to be unfavorable, the SUB fund assets must be lower than the maximum level, not because time for accumulation of the fund has been too brief, but rather

because the accumulation is less rapid than might reasonably be expected. The framers of the steel plans believed that the use of variation in the benefit size as the method of coordinating income and expenditures would be more effective for that purpose than variation in durations of benefits and that such greater effectiveness of the benefit size method permitted the full-scale beginning of benefits to be adopted with safety.

25) The auto plans include a table by which the duration of benefits is to be regulated at all stages of the plans' operations. This regulation was accomplished by means of the number of credit units to be charged for a single week of benefits. Since the maximum limit on credit units is 26, the maximum duration of continuous benefits is 26 weeks if one credit unit is charged for each week of supplemental benefits, 13 weeks if the charge is two, 10.4 weeks if the charge for each week of supplemental benefits is 2.5 credit units, and so on. The full table of credit units to be charged under the auto plans for each week of benefits is as follows:

If the fund position applicable to the week for which a weekly supplemental benefit is paid is:	*And if the seniority of the person to whom such benefit is paid is* — *The credit units cancelled for such weekly benefit shall be*					
	1 to 5 Years	*5 to 10 Years*	*10 to 15 Years*	*15 to 20 Years*	*20 to 25 Years*	*25 Years and over*
85% or over	1.00	1.00	1.00	1.00	1.00	1.00
76-84.99%	1.11	1.00	1.00	1.00	1.00	1.00
67-75.99	1.25	1.11	1.00	1.00	1.00	1.00
58-66.99	1.43	1.25	1.11	1.00	1.00	1.00
49-57.99	1.67	1.43	1.25	1.11	1.00	1.00
40-48.99	2.00	1.67	1.43	1.25	1.11	1.00
31-39.99	2.50	2.00	1.67	1.43	1.25	1.11
22-30.99	3.33	2.50	2.00	1.67	1.43	1.25
13-21.99	5.00	3.33	2.50	2.00	1.67	1.43
4-12.99	10.00	5.00	3.33	2.50	2.00	1.67
Under 4	——	——	no benefit payable	——	——	——

26) As the preceding table indicates, when benefits first became payable under the auto plans no employee could receive benefits for as long as 26 weeks continuously, 20.8 weeks being the maximum. Moreover, it will be remembered that for the first two years of the operation of the auto plans employees with less than 10 years of seniority were to accumulate credit units at half the regular rate. Thus at the end of one year the maximum scheduled duration for an employee having five or fewer years of seniority would be 3.9 weeks, and for an employee having from five up to ten years, 5.2 weeks. At the beginning of the second year, even with no benefits paid during

the first year, the maximum durations for the under five and five to ten-year groups would be only 15.6 and 18.2 weeks, respectively, and the full 26 weeks could be paid only to employees having 20 or more years of seniority.

27) The table governing the reduction of benefits under the steel plans after the period when the same maximum fund levels govern benefit amounts as well as contributions is as follows:

If the fund position applicable to the week for which a supplemental benefit is paid is:	*The Weekly Benefit Shall Be*	*And if the continuous service of the applicant is*		
		2-8 Years	*8-15 Years*	*15 Years and over*
		The credit units cancelled for such weekly benefit shall be		
75.0% or more	100.0%	1.00	1.00	1.00
67.5 or more but less than 75.0%	75.0	1.00	1.00	1.00
60.0 or more but less than 67.5	67.5	1.00	1.00	1.00
52.5 or more but less than 60.0	60.0	1.00	1.00	1.00
45.0 or more but less than 52.5	52.5	1.25	1.00	1.00
38.0 or more but less than 45.0	45.0	1.25	1.00	1.00
31.0 or more but less than 38.0	37.5	2.00	1.25	1.00
24.0 or more but less than 31.0	30.0	2.00	1.25	1.00
17.0 or more but less than 24.0	22.5	2.00	2.00	1.00
10.0 or more but less than 17.0	15.0	5.00	2.00	1.25
less than 10.0		no benefits		

28) If the table in the preceding paragraph were to apply in the same way at the start of benefit payments as after the fund had reached its maximum level, the initial weekly supplemental benefits would be only 52.5 per cent of their intended amount. In order to avoid such an occurrence, a transitional set of maximum levels was provided. For the first month in which benefits were payable the maximum level of the SUB funds was fixed at 5 cents times the hours worked by covered employees in a full 12-month period. In the next month the maximum funding increases to 5.25 cents times the hours worked by covered employees in a 12-month period ending one month later than the 12-month period used for the maximum level for the preceding month. The maximum level thereafter increases by ¼ cent each month until the ultimate 10.5-cent level is reached 22 months after benefit payments begin. During this 22-month period of transition, the maximum level for benefits, therefore, is lower than the maximum level for contributions unless the fund assets actually equal the maximum level of contributions before the end of the transition period which thereupon ends. During the transition period, fund positions for the table in paragraph 27 are based on the lower maximum levels for benefits.

29) The 12-month periods, the hours worked in which these increasing factors apply, move forward by one month each month. It will be noted that benefits are payable in full until the fund position falls below 75 per cent. The basic steel plans provided for contribu-

tions to begin on August 1, 1956, and benefits on September 1, 1957. The maximum level for a month is based on the hours worked in the first 12 of the 14 months immediately preceding the month in question; and the asset side of the fund position calculation is taken one month later than the end of the 12-month period in which hours are counted.

30) The liability to make the contributions, determined pursuant to the provisions just described, constitutes the sole obligation of the companies under the SUB plans. If the assets of a fund are insufficient to meet its obligations, the company is obliged to continue the payment of any contributions due, but nothing more. The fund assets constitute the sole security for payment of benefits; and in the event that, despite the provisions for reducing total benefits, the assets are less than the benefits due, beneficiaries have no claim against anyone for any excess of benefits over assets.

III. BACKGROUND OF COST PROBLEM

Before analyzing, from the point of view of cost limitation, the provisions of the SUB plans, it may be helpful to summarize certain characteristics of the risk of unemployment in contrast to other risks which are, to a greater or lesser degree, in the category of "insurable." As further background, certain of the provisions of the SUB plans, as summarized in the preceding Section II, such as benefit amounts, maximum fund levels and fund position, are put into quantitative form.

Unemployment Has a High Catastrophic Risk

In most areas of insurance, the event giving rise to an insurance payment will occur, during any relatively short period of time, to a minor fraction of the persons or thing exposed to the risk of its occurring. This is, unfortunately, not true of unemployment benefits. If those subject to the risk of becoming unemployed are to be paid a benefit when actually unemployed, a major fraction of those exposed to the risk may become entitled to benefits in the course of a single 12-month period. During the first six months of the operation of the steel SUB plans there were, in fact, some cases in which all of the covered employees became unemployed. The potential risk impact is so large as to make the problem of cost limitation both more important and more difficult than in other benefit areas.

Commercial Underwriting Not Available for Unemployment Risks

Generally speaking, employers can secure commercial underwriting on any hazards to which they are exposed, whether the hazards involve their property or potential liabilities to employees, customers or others. Commercial underwriting may have more restrictions than some employers think necessary. Some coverages, like that for permanent and total disability in a pension plan, are incomplete and achieved mainly

by indirection; and those for new risks, particularly those of which knowledge involves the national security, may be inevitably slow in developing. But coverage in some form or other is available, so that an employer has the option of substituting a known premium for the unknown incidence of hazard.

Unemployment Risks Not Pooled on Multi-Company Basis

This is not true of the risk involved in the operation of a SUB plan. No underwriting of any kind is available. As mentioned in the last paragraph of the preceding section, there is no security for the payment of supplemental benefits other than the assets of the SUB fund from which the payments are due.

In the fields of pensions and insurance there have developed, in recent years, many plans covering the employees of numbers of employers. Such has been the case in such industries as men's and women's clothing, contract construction, brewing, milk distribution, and general highway transport. Except for a plan providing supplemental unemployment and other benefits in the maritime industry, no such pooling of the unemployment risk has occurred. On the contrary, in the steel industry, in several companies where single insurance and pension plans exist, separate SUB plans have been created for employees in different subsidiaries, or for employees represented by different union bargaining agents or, in some cases, for employees merely employed in different plants.

It is too early as yet to determine whether there may be any effort made to limit the relative size of hazard by pooling risks over areas wider than a single company. It can be said, in substance, no such pooling has yet occurred or is presently under discussion.

SUB Plans Tend to be Substantially Identical for Agreements with One Union

The provisions of SUB plans tend to be uniform for companies dealing with a single union. There are reasons for this on both sides. The union does not ordinarily wish to take responsibility for negotiating for one group of its members any arrangement which differs from that for others of its members. This has not been true for insurance and pension plans to the extent as in SUB. The reasons for this are probably, first, that employers have not had available consulting services on SUB problems and have not wished to suggest arrangements other than the "standard" plan because of uncertainty as to the consequences of any change. On the union side, the negotiators are normally not well versed in SUB problems and equally unwilling to step into new fields. In the steel industry in particular it has been recognized that since the size of benefits is dependent upon fund position, and since the fund position is likely to reflect any change in provisions relating to eligibility, contributions or benefit amount formula, any change in a substantive provision will have consequences which

are largely unforeseeable. Under these circumstances, negotiators on both sides prefer to adopt plans which at least have the sanction of many previous adoptions

In the steel industry there has also been another factor making for uniformity of plan. A committee of the American Iron and Steel Institute has made widely available to employers in the steel, steel-using and related industries a detailed description of the basic steel SUB plan and, more important, a manual specifying administrative procedures, complete with forms and accounts. No such substantial assistance would be available for any variant of the basic steel SUB plan.

Despite the forces making for uniformity, there have been some differences in detail in SUB plans negotiated by the United Steelworkers of America. The differences in benefits in some of these plans will be referred to in passing, later in this section. In basic principles, the plans are substantially identical and, except for the one mention of other steel plans, the description and analysis, so far as steel is concerned, will be on the plan in effect in all the basic steel companies.

Illustrative Calculations of Supplemental Benefits

Finally, before analyzing the specific cost limitation effects of the SUB plan provisions, it may be well to translate some of such provisions into rather more concrete form. First of all, it may be useful to give some benefit illustrations which will indicate to what extent maxima are effective, how much variation there is as between states, persons having differing wages and numbers of dependents, and how partial employment affects benefits.

Basis of Illustrations

For purposes of illustration, nine states have been selected, primarily with an eye to the importance of auto or steel employment in their industrial structure: Alabama, California, Colorado, Connecticut, Illinois, Maryland, Michigan, New York and Pennsylvania. Ohio and Indiana would have been included except for the fact that in neither state has supplementation of state unemployment benefits been permitted in accordance with the plans described in Section I. The nine states do include the state having the highest average state benefit and the highest maximum amount—Michigan—and one having one of the lowest maxima—Alabama.

The illustrations cover two hourly wage rates: $1.975 and $2.475, $79 and $99 for a 40-hour week.[16]

[16] These amounts were selected because they are mid-points of wage brackets used for the purpose of calculating federal income taxes. In computing taxes for calculating after-tax pay, the auto plans used the tax bracket method, while the steel companies used the percentage method. If wages of $2.00 and $2.50 per hour are used, there is a slight difference between auto and steel benefits resulting from differences in tax computation methods, since weekly wages at both these rates appear at the bottom of their brackets for a 40 hour week.

Gross Benefit Amounts

In Table 1 on the following page are shown the gross benefits under three SUB plans negotiated by the United Steelworkers of America and under the auto industry plans for the two wage rates mentioned—$1.975 and $2.475 per hour, or $79 and $99 per week—and varying numbers of dependents. Under the basic steel plan, for an employee whose gross benefit is based on the lower wage rate, the amount of such benefit will be $43.63 if he has no dependents, $46.67 if he has two dependents, and as much as $51.35 if he has six or more dependents. The gross benefits under the American Can and Alcoa plans are roughly comparable with those of basic steel—lower for employees with no dependents or six or more dependents, and higher for those with from one to five dependents. The differences are not large enough to be significant, however. Since the provision for benefits during periods of partial employment are calculated under the American Can

TABLE 1

Comparison of Gross[a] Weekly Benefit
Under Selected Supplemental Unemployment Benefit Plans

	Steelworkers			*Auto*	
				No Local Income Tax	
Dependents	*Basic Steel*	*American Can*	*Alcoa*	*1st 4 Weeks*	*After 4 Weeks*
	Weekly Straight-time Wage: $79				
0	$43.63	$43.62	$43.45	$42.46	$39.19
1	45.15	45.62	45.45	43.95	40.57
2	46.67	47.62	47.45	45.45	41.95
3	48.19	49.62	49.45	46.94	43.33
4	49.71	51.62	51.45	48.44	44.71
5	51.23	51.62	51.45	49.93	46.09
6	51.35	51.62	51.45	50.19	46.33
	Weekly Straight-time Wage: $99				
0	$54.29	$54.28	$54.45	$52.83	$48.76
1	55.81	56.28	56.45	54.32	50.14
2	57.33	58.28	58.45	55.82	51.52
3	58.85	60.28	60.45	57.31	52.90
4	60.37	62.28	62.45	58.81	54.28
5	61.89	62.28	62.45	60.30	55.66
6	63.41	62.28	62.45	61.80	57.04
7	64.35	62.28	62.45	62.90	58.06

[a] Before either subtraction of state unemployment benefits and other compensation or application of the maximum benefit.

and Alcoa plans in the same way as in the basic steel industry, the analysis of methods of cost limitation would hardly be helped by the multiplication of substantially identical examples.

The initial gross benefits under the auto plans are not substantially different from those in basic steel. The main difference lies in the subtraction of the OASI tax from the auto wage, but not steel, in the computation of the after-tax amount. After four weeks in any layoff, the gross auto benefits are reduced from 65 to 60 per cent of the after-tax pay.

From the gross benefit, as illustrated in Table 1, there is to be subtracted the amount of the state benefit to which an employee is entitled. In the steel and auto industries it may very well be that the state benefit will be based on wages lower than the rate applicable for SUB purposes. State benefits in the nine states used for illustrative purposes are, without going into detail, based on wages for periods which may go back for a year or more before the initial unemployment in a benefit year. In the auto industry, since 1950, there have been regular annual increments in wages and a cost-of-living allowance based on the BLS consumer price index which have, for the most part, resulted in steady wage increases. In the steel industry annual wage negotiations have produced the same result, even though not formalized into an annual improvement factor and a cost-of-living allowance until 1956.

The auto plans base the gross benefit on pay at or about the time of layoff. The steel plans go back to the first three of the last six months preceding a layoff—in order to avoid basing the average on demotions resulting from adjusting the numbers of employees to a reduced volume of work—and add to the average hourly straight-time wage for such period any intervening improvement factor or cost-of-living allowance. Thus, at the beginning of a layoff the wage rates of steel or auto workers are, other things being equal, higher than the wage rates for previous periods. For example, a steelworker in steel job class 4 currently has a base hourly rate of $2.14. During the last half of 1956 the rate was about $1.95, for the first half of 1957 about $1.98, and for the last half of 1957, $2.09.

In considering what wage rate might be used as the basis for calculating illustrative state benefits, it is to be borne in mind that, unlike the SUB plans, the actual wages count. Further, if substantial overtime is concentrated in a single quarter of a base year, the benefit under most state laws could, in effect, be based on current levels, even though the base rates may have been significantly lower. In considering to what extent to differentiate wages for SUB and state unemployment compensation purposes, it is necessary to bear in mind that the maximum is such as to reduce the effect of wage changes at the levels applicable to steel and auto workers. Finally, an employee who was demoted from six to 15 months before layoff may have a base period wage higher than his wage as used for SUB purposes. For all these reasons, and since the purpose of the analysis is to assess the

relative effectiveness of methods of cost limitation, it did not appear that the additional difficulties of calculating a relationship between wages at different periods would be warranted.

One differentiation between SUB methods and state methods has been made. Except for employees who, for their own convenience, work short time, SUB gross benefits are predicated on a 40-hour week. It is probable that employees laid off at the onset of a period of unemployment sufficiently widespread to become a cost problem will have state benefits based also on a week of 40 or more hours. But a layoff is not the only method of adjusting the volume of employment to the volume of work. Men laid off are frequently from lower job classes; men in higher job classes are then demoted to fill in. Probably as important as layoffs and demotions, except for relatively mild adjustments, are reductions in the hours of work. In the steel industry, under most union agreements the companies may reduce the work week to 32 hours before anyone in a particular seniority unit is laid off, and sometimes this is done. The more usual practice is to reduce forces to some extent by layoff, to make some demotions and, if the disparity between work and full-time employment of the remaining work force remains, reduce hours. If, some months later, there is a further decline in work and more employees are laid off, SUB gross benefits are affected only by demotions, if at all, but state benefits may be reduced because of the diminished weekly hours. In order to examine the effect of such a situation, the state benefits have been calculated on a 32-hour as well as a 40-hour week.

Illustrative State Benefit Amounts

The detail of state benefit amounts for the nine states, the wage rate-weekly-hour combinations for varying numbers of dependents, is given in Table A at the end of this statement. For convenience, the range of state benefits in the nine states is given here:

	Hourly Wage Rate		
	$1.975 (32 hrs.)	*$1.975 (40 hrs.) $2.475 (32 hrs.)*	*$2.475 (40 hrs.)*
Alabama	$28	$28	$28
California	32	37	40
Colorado	33	35	35
Connecticut	32-48[a]	40-60[a]	40-60[a]
Illinois	30-36[a]	30-42[a]	30-45[a]
Maryland	34-42[a]	35-43[a]	35-43[a]
Michigan	28-38[a]	30-41[a]	30-50[a]
New York	33	40	45
Pennsylvania	33	35	35

[a] Where two amounts are given, the lower is the maximum benefit for an employee without dependents. The higher amount is the maximum benefit for employees with dependents.

Detailed amounts of supplemental benefits for the nine states and the several wage-weekly-hour dependency groups are given in the appended Tables B through E. For illustrative purposes attention is here confined to an employee with two dependents (Table 2).

Illustrative Supplemental Benefit Amounts

For such an employee the range of supplemental benefits for total unemployment, as between the states, is relatively large, though in absolute amounts, of course, the differences are, except for the maximum applicable here only in Alabama, the same as in the gross benefits shown in Table 1. Where the state benefit is based on a 40-hour week, the range in supplemental benefit amounts under the steel plans is from $2.67 in Connecticut to $18.67 in Alabama for a weekly wage of $79, and from a low of $13.33 to a high of $29 (in the same states) for the $99 weekly wage. The auto supplemental benefits are scaled somewhat lower than those in the steel industry, particularly after the first four weeks; in several cases the supplemental benefit is zero where the wage is $79 per week and the state benefits are based on a 40-hour week. The supplemental benefits are increased if the state benefits are based on a 32 rather than a 40-hour week. The significant factors can be seen more easily if the detail is summarized by use of averages.

Comparison of Average State and Supplemental Benefits

For the cases given in Table 2 on the next page the mean total weekly unemployment benefit, divided as between state and supplemental, would be as follows (giving the benefits in each of the nine states equal weight):

	$79 Weekly Wage			*$99 Weekly Wage*		
		Auto Plans			*Auto Plans*	
	Basic Steel Plans	*1st 4 Weeks*	*Thereafter*	*Basic Steel Plans*	*1st 4 Weeks*	*Thereafter*
	State Benefits Based on 40-Hour Week					
State benefits	$36.89	$36.89	$36.89	$38.11	$38.11	$38.11
Supplemental benefits	9.78	8.40	4.86	19.18	17.40	13.41
Total	46.67	45.29[a]	41.75[a]	57.29[b]	55.51[b]	51.52
	State Benefits Based on 32-Hour Week					
State benefits	$33.56	$33.56	$33.56	$36.89	$36.89	$36.89
Supplemental benefits	13.11	11.89	8.39	20.40	18.62	14.63
Total	46.67	45.45	41.95	57.29	55.51	51.52

[a] The total is less than 65 or 60 per cent of after-tax pay (see Table 1) because if the excess of such 65 or 60 per cent is less than $2.00, no supplemental benefit is paid.

[b] The total is less than 65 per cent of after-tax pay (see Table 1) because of the effect of the maximum.

TABLE 2

Comparative Weekly Supplemental Benefits for Total Unemployment in Nine States
(Employees with Two Dependents)

	Basic Steel Plans Weekly Wage		*Auto Plans*			
			Weekly Wage $79		*Weekly Wage $99*	
	$79	*$99*	*1st 4 Weeks of Layoff*	*Thereafter*	*1st 4 Weeks of Layoff*	*Thereafter*
State Benefits Based on 40-Hour Week Equivalent						
Alabama	$18.67	$29.00[a]	$17.45	$13.95	$25.00[a]	$23.52
California	9.67	17.33	8.45	4.95	15.82	11.52
Colorado	11.67	22.33	10.45	6.95	20.82	16.52
Connecticut	2.67	13.33	0[b]	0	11.82	7.52
Illinois	10.67	21.33	9.45	5.95	19.82	15.52
Maryland	9.67	20.33	8.45	4.95	18.82	14.52
Michigan	6.67	14.33	5.45	0[b]	12.82	8.52
New York	6.67	12.33	5.45	0	10.82	6.52
Pennsylvania	11.67	22.33	10.45	6.95	20.82	16.52
State Benefits Based on 32-Hour Week Equivalent						
Alabama	$18.67	$29.00[a]	$17.45	$13.95	$25.00[a]	$23.52
California	14.67	20.33	13.45	9.95	18.82	14.52
Colorado	13.67	22.33	12.45	8.95	20.82	16.52
Connecticut	10.67	13.33	9.45	5.95	11.82	7.52
Illinois	10.67	21.33	9.45	5.95	19.82	15.52
Maryland	10.67	20.33	9.45	5.95	18.82	14.52
Michigan	11.67	17.33	10.45	6.95	15.82	11.52
New York	13.67	17.33	12.45	8.95	15.82	11.52
Pennsylvania	13.67	22.33	12.45	8.95	20.82	16.52

[a] Maximum.

[b] Excess of gross benefit over state benefit is less than $2.00, so that no supplemental benefit is payable.

An increase in base wages from $79 to $99 per week, 25.32 per cent, increases the supplemental benefit when the state benefit is based on a 40-hour week by 96 per cent under the basic steel plans, 107 per cent under the auto plans during the first four weeks and 176 per cent under the auto plans after the first four weeks. If the state benefit is based on a 32-hour week rather than 40 hours, the supplemental benefit based on a weekly wage of $79 is raised by 34 per cent in steel, 42 during the first four weeks of layoff under the auto plans and 73 for weeks after the first four. The increase from the same cause at

the $99 weekly wage level is less than 10 per cent in all cases because, even on a 32-hour week, wages are such that, in most cases, the state benefit is at its maximum.

Supplemental Benefits Payable for Weeks of Partial Employment

The amount of supplemental benefits payable under the auto plans is always affected by any compensation earned by a worker for part-time employment; this is true to a much lesser extent under the steel plans. The precise effect of compensation on the amount of the supplemental benefit varies with the different unemployment compensation laws. With unimportant exceptions, the state laws disregard small amounts of compensation in determining the amount of the state unemployment benefit. Usually the disregarded compensation is a uniform amount: $6.00 in Alabama and Pennsylvania; $3.00 in California, Colorado and Connecticut; $7.00 in Illinois and Maryland.

In Michigan and New York the situation is less simple. The Michigan law specifies that if the compensation earned in a week by an eligible employee is less than one-half his weekly benefit amount, the full benefit is payable. But in a week in which such an employee earns one-half or more but less than the total of his weekly benefit amount, one-half of the weekly benefit is payable. If the Michigan benefit is $40, for example, the amount of compensation disregarded may range from nothing up to $19.99. In New York one-fourth of the weekly benefit amount is withheld for each day of employment in a week. Thus if the weekly benefit is $40 and an employee works one day and earns $12, the benefit is reduced by $10 and thus $2.00 is, in effect, disregarded; if he had earned $15, $5.00 would, in effect, be disregarded.

The states differ also in the definition of partial unemployment. In Alabama, California and Colorado an employee is partially unemployed under the state law if he earns in a week less than his weekly benefit amount; he is not unemployed at all if his compensation in a week equals or exceeds that amount. In Pennsylvania an employee is partially unemployed if he has wages less than his weekly benefit amount plus $6.00. In Illinois, Maryland and Michigan an employee is partially unemployed when his weekly compensation is less than his weekly benefit amount, including allowances for dependents. In Connecticut, however, one cent less than the sum of the weekly benefit amount (exclusive of allowances for dependents) plus the disregarded amount is the point in wages at which partial unemployment stops. Finally, in New York, no person who earns in a week an amount equal to the maximum weekly benefit amount—$45—is unemployed for that week, even if he worked only one day.

To summarize for the nine states used here for illustrative purposes, suppose an employee with two dependents (wife and child) whose state benefit is based on wages for a 40-hour week of $79, works one

day and earns $12. His state benefit for total unemployment and for partial unemployment would be:

	State Benefit for			*Maximum Weekly Earnings to be Partially Unemployed*
	Total Unemployment	*Partial Unemployment*	*Compensation Disregarded*[a]	
Alabama	$28	$22	$ 6	$27.99
California	37	28	3	36.99
Colorado	35	26	3	34.99
Connecticut	44	35	3	42.99
Illinois	36	31	7	35.99
Maryland	37	32	7	36.99
Michigan	40	40	12	39.99
New York	40	30	2	44.99
Pennsylvania	35	29	6	40.99

[a] Because the states round benefits to multiples of $1.00 or 50 cents, the compensation disregarded may be 49 cents (Colorado) or 99 cents higher (California, Connecticut, Illinois, Pennsylvania) or either 50 cents higher or 49 cents lower (Alabama, Maryland) than is given here.

The Steelworker plans follow the states in disregarding compensation. Whatever the state disregards in computing the state benefit is disregarded in computing the supplemental benefit. Thus, whenever a state benefit is payable, the steel supplemental benefit is the same, irrespective of the amount of compensation. But under the auto plans the total of the state benefit and wages is subtracted from the gross 65 or 60 per cent of take-home pay to arrive at the supplemental benefit amount. Further, under the auto plans, if an employee's compensation exceeds the maximum amount which he may earn and still be counted as partially unemployed, no state benefit, and hence no supplemental benefit, is payable. In the steel plans a supplemental benefit is payable to an employee so long as his compensation, less the amount to be disregarded, is less than 65 per cent of his take-home pay.

These differences in the terms of the steel and auto plans have important consequences in the amount of supplemental benefits which are paid to persons who are partially employed. These differences are indicated in some detail in Table 3 for employees with two dependents whose state benefits are based on full-time earnings, who are employed for one, two, three and four days in a week, and who earn at a smaller rate ($12) and at the regular rate for each day worked in weeks of partial employment. The amounts in Table 3 are simple averages of the amounts in the 9 States.

Under the steel plans there is no reduction in supplemental benefits up to the point where state benefits cease to be payable, and under the Union interpretation of the agreements, the supplemental benefits may be larger after state benefits cease to be payable because of the wages earned than if there is no employment at all. Under the auto

plans, however, any wages earned in a week result in a reduction in the supplemental benefit for that week if any part of such wages is disregarded in calculating the state benefit. If the state benefit is reduced by the exact amount of any wages earned, the supplemental benefit would be the same, under both auto and steel plans, as if no wages had been earned.

TABLE 3

State and Supplemental Benefits and Total Benefits and Wages in Weeks of Partial Employment

	Days Employed in Week				
	0	*1*	*2*	*3*	*4*
	Benefits Based on $79 Weekly Wage Current Wages $12.00 Per Day				
State benefit	$36.89	$30.33	$17.67	$ 6.44	0
Supplemental benefit					
Steel	9.78	9.78	9.78	10.56[a]	$ 4.78[b]
Auto[1]	8.40	3.86	3.47	1.10	0
Auto[2]	4.86	1.32	1.32	0	0
Total benefits					
Steel	46.67	40.11	27.45	17.00	4.78
Auto[1]	45.29	34.19	21.14	7.54	0
Auto[2]	41.75	31.65	18.99	6.44	0
Total benefits and wages					
Steel	46.67	52.11	51.45	53.00	52.78
Auto[1]	45.29	46.19	45.14	43.54	48.00
Auto[2]	41.75	43.65	42.99	42.44	48.00
Current Wages $15.80 Per Day					
State benefit	36.89	27.72	11.72	0	0
Supplemental benefit					
Steel	9.78	9.78	10.05[c]	5.38[d]	0
Auto[1]	8.40	3.01	1.78	0	0
Auto[2]	4.86	1.31	0	0	0
Total benefits					
Steel	46.67	37.50	21.77	5.38	0
Auto[1]	45.29	30.73	13.50	0	0
Auto[2]	41.75	29.03	11.72	0	0
Total benefits and wages					
Steel	46.67	53.30	53.37	52.78	63.20
Auto[1]	45.29	46.53	45.10	47.40	63.20
Auto[2]	41.75	44.83	43.32	47.40	63.20

(Footnotes on next page.)

TABLE 3 (Cont'd)

	Days Employed in Week				
	0	*1*	*2*	*3*	*4*
	Benefits Based on $99 Weekly Wage Current Wages $12.00 Per Day				
State benefit	$38.11	$31.42	$18.44	$ 7.08	0
Supplemental benefit					
Steel	19.18	19.18	19.18	20.00[e]	$15.44[f]
Auto[1]	17.40	12.31	13.38	6.32	0
Auto[2]	13.41	8.49	9.08	3.93	0
Total benefit					
Steel	57.29	50.60	37.62	27.08	15.44
Auto[1]	55.51	43.73	31.82	13.40	0
Auto[2]	51.52	39.91	27.52	11.01	0
Total benefits and wages					
Steel	57.29	62.60	61.62	63.08	63.44
Auto[1]	55.51	55.73	55.82	49.40	48.00
Auto[2]	51.52	51.91	51.52	47.01	48.00
	Current Wages $19.80 Per Day				
State benefit	38.11	25.69	6.44	0	0
Supplemental benefit					
Steel	19.18	19.18	19.28[g]	4.04[h]	0
Auto[1]	17.40	11.10	3.85	0	0
Auto[2]	13.41	7.50	2.42	0	0
Total benefit					
Steel	57.29	44.87	25.72	4.04	0
Auto[1]	55.51	36.79	10.29	0	0
Auto[2]	51.52	33.19	8.86	0	0
Total benefits and wages					
Steel	57.29	64.67	65.32	63.44	0
Auto[1]	55.51	56.59	49.89	59.40	0
Auto[2]	51.52	52.99	48.46	59.40	0

[1] During the first 4 weeks of layoff.
[2] After the first 4 weeks of layoff.
[a] Under the company interpretation of the plan, the mean benefit would be $8.23.
[b] Company: $0.70.
[c] Company: $8.72.
[d] Company: $0.59.
[e] Company: $18.08.
[f] Company: $10.33.
[g] Company: $15.36.
[h] Company: $0.54.

In assessing the relation of partial employment to the amount of benefits, state and supplemental, it should not be overlooked that at certain points, under many state laws, the earning of additional wages results in a reduction in income. The points at which this occurs differ as between the state laws. In each of the following cases, if wages earned in a week are increased by one cent, the state benefit is reduced to zero, so that the total income for the week is reduced by one cent less than the state benefit as given.

	State Benefit for Total Unemployment	*Wages Earned in Week*	*State Benefit*
Alabama	$28	$27.99	$ 6.00
California	40	39.99	3.00
Colorado	35	34.99	3.00
Illinois	36	35.99	7.00
Maryland	37	36.99	7.00
Michigan	40	19.99	40.00[a]
Michigan	40	39.99	20.00[a]
New York	45	44.99[b]	11.25

[a] If the wage in this case were increased to $20, the benefit would be reduced to $20, with a resulting loss of weekly income of $19.99. (See page 111)

[b] Assumed to be earned on three days. If such a wage were earned in two days, the loss of weekly income resulting from increasing wages by one cent would be $22.49.

The maximum loss of weekly income in Connecticut and Pennsylvania from an increase of one cent in weekly wages is $1.00 and results from the fact that all benefits are rounded to the next higher multiple of $1.00.

Illustrative Calculations of Maximum Fund Levels

Since the determination of the maximum level of the fund is important for the calculation of both contributions and benefits, illustrations of the methods of calculation are in order. The calculations will be based on the following assumed facts as to numbers of employees and hours of work:

Month	*Number of Employees*[a]	*Hours Worked (000's)*	*Month*	*Number of Employees*[a]	*Hours Worked (000's)*
0	—	0	9	—	16,500
1	—	17,500	10	—	17,500
2	—	17,750	11	—	17,800
3	—	18,000	12	101,000	18,000
4	—	17,000	13	101,500	18,500
5	—	17,500	14	101,000	18,000
6	—	16,800	15	100,500	17,400
7	—	16,400	16	100,000	17,000
8	—	16,400	17	99,000	16,000
			18	98,000	15,000

[a] On the last date for which data are available for the first day of the following month, including employees having credit units who are on layoff.

Month 0 is the month immediately preceding the month for which contributions began, the latter being month 1. Hours worked in month 0 (which are relevant in the steel plans) are set down as zero because there was, in fact, a steel strike in that month, and that fact was part of the background in fixing the maximum level for benefits for the first month of benefit payments.

The maximum fund level for any month for the auto plans is, explicitly or in effect, the product of $400 multiplied by the number of employees on the last available date before the the first day of the month. The payments under the auto plans began with month 13. The number of employees in the illustrations, for the latest date in the 12th month, was 101,000; therefore the maximum level of the fund for the 13th month was $400 times 101,000, or $40,400,000.

Under the steel industry plans, the payment of benefits began with month 14. The maximum level of the fund for any month is based on the hours worked in the first 12 of the 14 months preceding such month; for month 14, the first 12 of the preceding 14 months are months 0 to 11, inclusive. The hours worked in such period totalled 189,150,000. The maximum level for contributions for month 14 would be 10.5 cents multiplied by 189,150,000, or $19,860,750, and the maximum level for benefits would be 5 cents multiplied by 189,150,000, or $9,457,500. The hours worked applicable to other months used in the illustration for the steel plans would be:

Month	*Hours Worked (000's)*
15	207,150
16	208,150
17	208,400
18	207,800

The maximum level of the auto and steel funds, using the hypothetical figures, for months 14 through 18 would be:

		Steel Fund		
			For Benefits	
Month	*Auto Fund*	*For Contributions*	*Cents Factor*	*Amount*
14	$40,600,000	$19,860,750	5.00	$ 9,457,500
15	40,400,000	21,750,750	5.25	10,875,375
16	40,200,000	21,855,750	5.50	11,448,250
17	40,000,000	21,882,000	5.75	11,983,000
18	39,600,000	21,819,000	6.00	12,468,000

Illustrative Calculations of Contributions

Until the assets of a SUB fund are smaller than the maximum level on the applicable date by less than the contribution for a month, the contributions are payable at the maximum rate. When the assets of a

SUB fund are equal or close to the applicable maximum level, the contributions may be reduced. For example, suppose that for month X the maximum level of an auto SUB fund is $40,000,000; the assets of the fund on the Friday preceding the first Monday of the month were $39,600,000. Compensated hours for each of the four pay periods ending in the month were 4,100,000. The contribution for the first pay period would be $205,000 at the 5-cent rate. The contribution for the second pay period would be only $195,000, less than 5 cents per compensated hour, since such a contribution would be the total required to bring the assets up to the maximum level. No contributions would be required for other pay periods in the month.

It may be of interest to follow the calculation of contributions under the auto SUB plan for several months, assuming no changes in assets resulting from changes in security prices and omitting investment income:

Month	*Maximum Level of Fund*	*Assets of SUB Fund on Computation Date*[a]	*Compensated Hours In Period Between Computation Dates*	*Contributions*	*Benefits Paid*
W	$40,000,000	$39,600,000	16,400,000	$400,000	$1,000,000
X	39,800,000	39,000,000	14,000,000	700,000	300,000
Y	39,500,000	39,400,000	15,000,000	100,000	250,000
Z		39,250,000			

[a] The Friday before the first Monday in the month.

In month W, the $400,000 contribution was the excess of the maximum level of the fund over the assets on the Friday before the first Monday of the month. But benefits exceeded contributions by $600,000, so that the fund assets declined to $39,000,000 on the next computation date. The maximum level dropped by $200,000, $800,000 in excess of assets. Contributions were at the 5-cent maximum, $700,000. Benefits were only $300,000, so that the assets increased to $39,400,000. The maximum level declined to $39,500,000, or only $100,000 more than assets, so the contributions for the month were much below the 5-cent level.

Turning now to steel, assume that at some time after the maximum level is the same for both benefits and contributions, the hours worked during an 18-month period are those of the illustration in the eighth preceding paragraph. The maximum level for contributions as given in the second preceding tabulation would be the maximum level for all purposes; and for one additional month the maximum level would be (based on the 12 months ending with 16—here called 46) $21,819,000. It is assumed that the hours worked in month 49 were 14,000,000.

Suppose that, for present purposes, the assets of the steel SUB fund at the end of the month 13 (called 43 for present purposes) were composed of cash and investments, $5,225,000; cash contributions accrued but unpaid of $465,000; contingent liability accrued (includ-

ing that for hours worked in month 43) of $15,910,000; or a total of $21,600,000.

For ease in following the calculation of contribution amounts, the necessary data are shown in Table 4. Since there is a lag between the end of a 12-month period and the month for which the hours in the 12-month period form the basis of the maximum fund level, that level is not given for months 43 and 44. The contributions and benefits for month 44 are assumed to be $300,000 and $100,000, respectively, with no contingent liability accrual. Therefore both investments and total assets increase in 44 over 43 by $200,000.

The maximum fund level for month 45 is $21,750,750, smaller by $49,250 than the total assets at the end of month 44. In such case, the plan specifies that the contingent liability is to be reduced by the amount of the excess. Since the assets will then equal the maximum fund level, no cash contribution is due. Benefits accrued in month 45 total $125,000, so that there is a reduction in total assets during the month of $174,250 to $21,625,750.

The maximum fund level for month 46 is $21,855,750, $230,000 more than the assets at the end of 45. Since three cents per hour worked in month 46 is $510,000, the $230,000 will be a cash contribution and no contingent liability accrued. Benefits accrued during the month aggregate $380,750, so investments and total assets are reduced by $150,750 to $21,475,000.

The maximum fund level for month 47 ($21,882,000) exceeds the assets at the end of month 46 ($21,475,000) by $407,000. The hours worked in month 47, 16,000,000, would make the maximum current cash contribution $480,000. Since the excess of the month's maximum fund level over the previous month-end asset total is the smaller, the cash contribution for month 47 is $407,000.[17]

TABLE 4

Illustrative Calculations of Contributions and of Changes in Contingent Liability

Month	*Maximum Level of Fund for Month*	*Assets of SUB Fund at Month-End*			*Hours Worked in Month (000's)*
		Investments[a]	*Contingent Liability*	*Total*	
43	[b]	$5,690,000[c]	$15,910,000	$21,600,000[c]	[b]
44	[b]	5,890,000	15,910,000	21,800,000	18,000
45	$21,750,750	5,765,000	15,860,750[d]	21,625,750	17,400
46	21,855,750	5,614,250	15,860,750	21,475,000	17,000
47	21,882,000	5,403,300	15,860,750	21,264,050	16,000
48	21,819,000	5,076,300	15,965,700	21,042,000	15,000
49	21,819,000	4,496,300	16,245,700	20,742,000	14,000

(Footnotes on next page.)

TABLE 4 *(Cont'd)*

	Accrual During Month		
Month	*Contributions*	*Contingent Liability*	*Benefits*
43			—
44	$300,000	—	$100,000
45	0	$ 49,250[d]	125,000
46	230,000	—	380,750
47	407,000	—	617,950
48	450,000	104,950	777,000
49	420,000	280,000	1,000,000

[a] Including contributions accrued and unpaid.
[b] Not relevant to the illustration.
[c] Arbitrarily assumed.
[d] Decrease; at the end of month 44, assets of the fund exceeded the maximum level by $49,250.

The benefit accruals in month 47 ($617,950) are larger than the contribution by $210,950. Since no contingent liability accrued, the month-end assets are $21,264,050, less by $554,950 than the maximum level. The hours worked in month 48 are 15,000,000, making the month's maximum cash contribution $450,000 and maximum contingent liability accrual $300,000. The excess of the maximum fund level over assets at the end of month 47 exceeds the maximum cash contribution for month 48, but is less than the sum of 5 cents times hours worked; therefore the cash contribution for month 48 is $450,000 and the excess of $554,950 over $450,000, or $104,950 (being no more than $300,000), is the contingent liability accrual for the same month.[17] Benefit accruals for month 48 being $777,000, cash and investments are reduced from month 47 by $327,000 and total assets by $222,050.

The excess of the maximum fund level for month 49 over the previous month-end asset total is $777,000. The hours worked in month 49 being 14,000,000, the maximum cash contribution is $420,000 and the maximum contingent liability accrual is $280,000. Since the sum of the two is less than the $777,000 excess of maximum fund level over previous month-end assets, the lower amounts are the contribution and contingent contribution liability for month 49.

[17] Under the companies' interpretation of the steel plan, all obligations to contribute less than five cents per hour worked are to be divided between cash contribution and contingent liability accrual in the ratio of 3 to 2. The accrual of cash contributions and contingent liability under this interpretation would be as follows:

Month	*Cash Contribution*	*Contingent Liability Accrual*
44	$180,000	$120,000
45	0	Decrease 49,250
46	138,000	92,000
47	244,200	162,800
48	332,970	221,980
49	420,000	280,000

It will be noted that in the last two months of the seven-month period illustrated in Table 4, the assets of the SUB fund in the form of cash and investments declined by $907,000. If the benefits plus fees and expenses of the trustee paid from a steel SUB fund average more than 3 cents per hour worked in excess of any investment income, it will only be a question of time until all the SUB fund assets will usually consist entirely of contingent liability.[18] Suppose at the end of month 48 in Table 4 the entire assets of the fund, $21,042,000, consisted of contingent liability. Then the cash contribution required during month 49 would be the amount required to pay the benefits—$1,000,000, or 7⅐ cents per hour worked during the month. At the end of month 49, the assets would still be composed wholly of contingent liability.

Illustrative Fund Position Calculations

Under both auto and steel plans, the fund position which governs the payment of benefits is calculated monthly.[19] Under the auto plans the fund position is the quotient, expressed as a percentage, of the assets of the fund on the computation date for a month divided by the maximum fund level applicable to the same month. Looking at the tabulation on page 117, the fund position for month W would be $\frac{39,600,000}{40,000,000}$, or 99.00 per cent; for month X, $\frac{39,000,000}{39,800,000}$, or 97.98 per cent; and $\frac{39,400,000}{39,500,000}$, or 99.75 per cent for month Y.

Under the steel plans the fund position for any month is the quotient, also expressed in percentage form, of the assets of the fund on the last day of the second month preceding the month in question divided by the maximum funding for such month. The maximum funding, it will be recalled, is the product, of 10.5 cents (or a lesser amount during the initial transition period), and the hours worked in the first 12 of the last 14 months preceding the month in question. In Table 4 the fund positions are:

Month 45	$\frac{21,600,000}{21,750,000}$	99.31 per cent
46	$\frac{21,800,000}{21,855,750}$	99.75 per cent
47	$\frac{21,625,750}{21,882,000}$	98.83 per cent
48	$\frac{21,475,000}{21,819,000}$	98.42 per cent
49	$\frac{21,264,050}{21,819,000}$	97.46 per cent

[18] Under the companies' interpretation of the steel SUB plans, the time required to exhaust all assets of the SUB funds, other than contingent liability, will be shorter than under the interpretation followed here.

[19] Under the auto plans, if the fund position is less than 13 per cent, it is to be calculated for each pay period separately.

IV. METHODS OF COST LIMITATION

Having described the terms of the SUB plans, attention will now be directed to the effect of those terms in producing limitations on costs. The analysis will, in substantial part, be qualitative; the experience on which final judgments can be based does not yet exist, though the records of the current recession will, when compiled, be of great utility for analytic purposes.

In general, cost limitation will be discussed in terms of the average for a covered group. The fact that the employees who are covered under the plan of Company A are members of the bargaining unit represented by Union B—60 per cent of all the employees of the company—is not regarded as a cost limitation as compared with Company C which has a plan applicable to the bargaining units represented by Unions B, D and E—80 per cent of its employees. It may very well be that the average cost per total employee in Company C will be higher than for Company A. But if the cost per covered employee for Company A is higher than for Company C, the former will be taken as having, for present purposes, the higher cost. Thus the concentration is on the plan area, and not on the plan area in relation to the total employment of a company.

A. *Limitations on Eligibility of Covered Employees*

A "covered" employee is, by definition, an employee with respect to whom a contribution (measured by his hours of work or pay) is paid by the employer to the SUB fund. The fact that an employee is covered does not mean that his unemployment is compensable. First, his employment must have lasted without interruption for a certain period of time; this period of time is one year in the auto industry and two years in steel. Obviously a larger proportion of covered employees will qualify if the service requirement is one year than if it is two. The relative cost-limiting effect will depend on the proportion of employees having less than the requisite service and on the relative probability of becoming unemployed as between the two groups. This probability is influenced greatly by the organization of the company with respect to production (or the rendition of service) and by the form of the seniority system.

Take the simplest type of case: assume that the covered employees of a company are in a single seniority unit, that the work is fairly simple, and that it is allocated solely on the basis of seniority. In such a case, if 10 per cent of the employees have less than the requisite service, a reduction in force of 10 per cent by the employer could be made without any employee who might, in such case, become eligible for benefits being affected; or if the force were to be reduced by 20 per cent, only 10 per cent could become eligible.

As a practical matter, this overall seniority system is not common. In most companies having SUB plans there is elaborate departmental organization and a high degree of specialization. Senority units are

likely to follow departmental lines, and an employee who is laid off in Department A may have no right to transfer to Department B in case of layoff. If the proportions of employees at different periods of service were about the same for all departments, and if, in a reduction of output, all departments were to be affected in equal proportion, the effect of a length-of-service qualification on eligibility would be about the same as if there were a single production unit without any departmentalization. This is quite unlikely to be the case. Departments will vary widely in the proportions of eligibles and, if forces are reduced on the average x per cent, the reduction in some departments may be $\frac{x}{10}$ per cent, or 10x per cent; and those with the heaviest reduction will not necessarily be the departments having the largest proportion of short-service employees.

In certain situations, the concentrations of layoffs may be heaviest in production units having the largest proportion of longer-service employees. Take, for example, a large steel mill having a number of blast furnaces. Each blast furnace will have for its quota of employees of various grades from the very highly skilled to laborers. Frequently each blast furnace constitutes a separate seniority unit. The furnace will either be shut down or operating; there is no in-between. If the furnace is shut down, all the employees will be laid off and, normally, they will have no right to take any job on another blast furnace, that being a separate senority unit. Further, the oldest blast furnaces, usually being technically the least efficient, are the ones most likely to be shut down when production is curtailed. Because they are the oldest, the employees assigned to them will, on the average, have the longest service, and the number of employees laid off will be disproportionately large. Under the conditions, a reduction of 10 per cent in output may well result in a layoff of 15 per cent of the employees, and even though in the plant as a whole 15 per cent of all employees have less than qualifying service, three-quarters or more of the employees laid off may be eligible.

There are many other factors which will affect the proportion of eligibles among employees laid off in addition to the length-of-service requirement. If a company has been expanding, the proportion of employees of short service will probably be higher than if productive capacity has been unchanged for a period; and, other things being equal, the longer the period of no change, the higher will be the proportion of employees who will meet the service requirement.

The first action when output ceases to expand is to stop hiring; employees quitting, retiring, dying or dismissed are not replaced. Except in periods of layoff, the largest cause of termination is quitting, and quits come predominantly from among employees with short serv-

ice. Cessation of hiring over any period normally results in a steady and rapid increase in the proportion of employees having one or two years of service.

It is clear that no general rule can be laid down as to the effect on cost of any length-of-service requirement. It will never be possible to say that if the service requirement is one year, no costs will be incurred until x per cent of the employees have been laid off, or that a two-year requirement will reduce costs by y per cent as compared with a one-year requirement.

In preparation for the formulation of SUB plans in the basic steel industry, the United Steelworkers of America, in 1956, collected data on the number and duration of layoffs of employees of steel companies having differing periods of service, by years, from 1949 through 1955. The following tabulation summarizes these data from 30 to 35 companies (some of the companies could not supply data for the earlier years) having from 75,000 to 95,000 employees. The largest company included had about 11,000 employees. The very largest companies did not report in comparable form. The data are as follows:

Year	Weeks of Layoff Per Employee	Percentage of Total Layoffs of Employees Having Service of		
		Less Than 1 Year[a]	1 to 2 Years	2 Years and Over
1949	6.3	45.0	16.0	39.0
1950	3.7	88.4	3.6	8.0
1951	1.6	65.1	6.7	28.2
1952	1.9	84.4	7.9	7.7
1953	1.7	30.1	20.2	49.7
1954	6.7	66.8	10.1	23.1
1955	2.4	83.2	2.8	14.0
1949-52	3.1	66.5	9.9	23.6
1953-54	4.4	60.3	11.9	27.8
1953-55	3.7	65.4	9.9	24.7
1949-55	3.4	65.9	9.9	24.2

[a] Includes also, for employees with one or more years of service, that part of the layoffs lasting one year which is in excess of one year.

Probably one of the two most serious defects in the data is the impossibility of separating that part of the layoffs of employees having one or more years of service which is over one year from the layoffs of employees having less than one year of service. In other words, the data were collected with the assumption already made that no employee having less than one year of service would be eligible for benefits, and that no benefit would be payable after one year of layoff. What the data represent is the year-by-year proportion of layoffs

which may be compensable, given these eligibility and duration conditions.

On the average, with a two-year service requirement roughly one-quarter of layoff time might be compensable—from as low as 7.7 per cent in 1952 to 48.9 per cent in 1953. Further, if the eligibility were fixed at one rather than two years of service, the compensable layoff area would be increased, on the average, by about 41 per cent.

The second serious defect in the data is the inclusion in the year in which the layoff began of all layoffs beginning in a particular year. This affects mainly 1953 and 1954. The totals for the two years do not give a completely accurate picture; it seems probable that if records had been maintained for the 12-month period beginning September 1, 1953, the results would have been very close to those for 1949 when the layoffs began in January and February. Despite these defects in the data, the averages for the two cycles—1949-52 and 1953-55—are strikingly similar.

It is to be pointed out that layoff and unemployment are not the same thing. While an employee must be on layoff to be entitled to supplemental unemployment benefits, there is much more to entitlement than merely being on layoff.

Finally, it is to be noted that all the data cited are averages. Examination of the data for individual companies reveals that even in 1949, 1953 and 1954 there were companies without any employees on layoff who could be entitled to supplemental benefits; and that, on the other hand, there were, even in 1951, cases in which compensable layoffs ran to five weeks per covered employee. Clearly, the cost calculations are to be performed on a company-by-company basis in the light of the experience of the particular company, and, with the realization, abundantly illustrated by the data from which the averages given here have been taken, that the past is not necessarily a good guide to the future.[20]

B. *Limitations on Characteristics of Compensable Unemployment*

A layoff is ordinarily defined as a temporary separation of an employee from service, initiated by the employer because of the inability

[20] In estimating supplemental benefit costs under steelworker plans, it was assumed that the proportion to the total of past layoffs of persons having one or more years of service would be the proportion of the total, for the future, applicable to employees having two or more years of service. While an employee on layoff will normally have some credit units, it would be possible for him to have relatively few such units. To determine how many credit units employees have would require an examination of the hours of each—obviously impractical. In the steel cost calculations it was assumed that at the time of first layoff, all employees had the maximum allowable credit units and that those who, after layoff, returned with unbroken seniority would acquire half as many credit units as there were weeks, up to 52, before any subsequent layoff. No doubt this assumption exaggerated the accumulation of credit units, but the over-statement can hardly have been a significant one.

of the employer to find work for such employee. Not all employees laid off are to be entitled to supplemental benefits. Thus, if employees are laid off in a plant because a flood prevents the operation of the plant, they may not be entitled to supplemental benefits because their layoff is to be attributed to an "act of God." Several other types of layoff are similarly not compensable. So far as is known, no employer—certainly no employer in the steel industry—maintained any records relating to the cause of layoff. The impression has been that the various disqualifying causes of layoff (see items (l), page 94, and (m), page 94) are relatively unimportant as far as cost limitations are concerned.[21]

Having been laid off for a non-disqualifying reason, an employee will normally be entitled to supplemental benefits for any week for which he qualifies for a state unemployment benefit. There may be a few cases[22] in which an employee may receive a state but not a supplemental benefit when the cause of the layoff is not itself disqualifying. Much more important costwise are the exceptions to the rule that eligibility for supplemental benefits depends on receipt of a state benefit. Of the five exceptions (pages 92-93), the most important is that which specifies that the exhaustion of state benefits, because of the limit in the state law on the period for which such benefits are payable, will not operate to prevent an employee who is otherwise eligible from receiving supplemental benefits.

In the seven-year period 1949-55, inclusive, among the 30-odd steel companies which furnished comparable records, from 5.48 per cent (1950) to 23.94 per cent (1949) of the layoffs of employees having more than one year of service lasted beyond the duration of state unemployment compensation in the state in which the layoff occurred. In two of the first three years of the period, the proportion of weeks of layoff running beyond state durations was smaller than the proportion of layoffs; that is, the average duration of layoffs beyond the state maxima was short in relation to the periods for which state benefits were payable. The opposite was true for the five years 1950 and 1952-55.

In no year was the average total duration of layoffs as long as 17 weeks, or more than 3.3 weeks beyond the end of state benefits. The percentages of layoffs of employees, having one or more years of service which lasted beyond the end of the state benefits, the percentages of the total weeks of layoff which were in the period after exhaustion of state benefits, and the average duration of layoffs—total and up to

[21] In calculating the cost of steel SUB plans, no allowance was made for any disqualifications arising from reasons for layoffs.

[22] Under some seniority agreements an employee on layoff must, in order to keep his seniority, accept any job offered him in the plant. Under these circumstances, refusal by a highly skilled employee to accept a laborer's job would disqualify him for supplemental benefits, but would usually have no effect on his state benefits. There is a specific exclusion of certain skilled employees from this sort of supplemental benefit disqualification in the auto plans.

the maximum period of state benefits—are given in the following tabulation:

	Percentage of Layoffs Exceeding Maximum State Benefit Duration	*Percentage of Total Weeks of Layoff Which Occurred After Maximum Duration of State Benefits*	*Average Total Duration of All Layoffs (weeks)*	*Average Duration of Layoffs Up to Maximum State Duration (weeks)*
1949	23.94	18.51	16.95	13.81
1950	5.48	16.23	6.94	5.81
1951	10.60	9.96	9.58	8.62
1952	9.02	12.20	8.94	7.85
1953	21.49	23.01	14.30	11.01
1954	19.23	19.42	13.99	11.27
1955	11.67	15.28	9.87	8.36
1949-52	16.17	16.29	12.72	10.65
1953-55	18.57	19.92	13.39	10.72
1949-55	17.40	18.19	13.06	10.69

The reports from the companies divided layoffs of employees having one or more years of service into two overall groups—those employees who returned from layoff when recalled, and those who did not. The major reason for not returning upon recall is known to be employment on another job. In calculating the total weeks of layoff it was assumed that those employees who returned to work on recall had no employment while on layoff, while half of the time between layoff and recall for those who did not return was assumed to have been spent in other employment. On the average, about 20 per cent of the employees laid off did not respond to recall, so that the allowance for outside employment during layoff is of the order of 10 per cent of the total weeks of layoff.

The further assumptions implicit in the calculations are (1) that during the entire period of layoff there will be no disqualification [other than for employment mentioned in the item (3)]; (2) that during the period up to the point of maximum state durations, a state benefit will be subtracted from the gross overall benefit to arrive at the supplemental benefit; (3) that except for the allowance for outside employment, while on layoff, of employees laid off who did not return when recalled, there will be no deductions from gross benefits other than the state benefits; and (4) the $47.50 to $55.50 maximum will apply to all weeks of layoff after the end of state benefits.

The first assumption is undoubtely an overstatement: there are disqualifications for state benefits, and hence for supplemental benefits. No reason appears for thinking that any such disqualifications will have any significant cost effect. The second assumption is substantially correct: if a state benefit is not paid for one of the non-disqualifying reasons, other than exhaustion, the amount of the supplemental benefit is subject to the $25 to $33 maximum—not the higher one.

The third assumption also produces some overstatement. Undoubtedly there are subtractions from gross benefits other than the state benefits. Many employees have subsidiary employments which are not affected by layoff from the principal job. And some part-time employment is available and taken even in periods of substantial recession. Checks by one large company in 1956 indicated that then, and for the preceding year, as many as half of the employees laid off were employed and earning wages in outside employment large enough to wipe out the state benefit. In the case of another smaller company, of 720 employees laid off for 12,293 weeks (excluding those weeks in excess of state durations), mainly in 1954, state benefits were paid to only 534. The weeks of benefit plus the waiting period week for those receiving state benefits totalled 8,408, or 68.4 per cent of the total weeks of layoff. Even if all the other laid-off employees got a waiting period credit, the percentage of actual to theoretical compensable weeks was only 70. This third assumption may contain substantial overstatements.

The fourth assumption is not exact: for several reasons the $25 to $33 maxima for weekly benefits may be applicable to a laid-off employee after he has exhausted his state benefits. The general rule is that the lower maximum will apply in the same benefit year for as many weeks after state benefit exhaustion as there were weeks in which state benefits, but not supplemental benefits, are received. For example, if an employee gets state benefits before he completes two years of service, and after meeting the service requirement, and in the same benefit year, has another extended layoff, the $25 to $33 maxima apply after exhaustion of state benefits for as many weeks as state benefits were received during the ineligibility period. This rule prevents persons who expect long layoffs from deliberately foregoing supplemental benefits during the state benefit period in the hope of increasing the number of weeks to which the $47.50 to $55.50 maxima apply.

C. *Requirements for Action by Employees*

In order to be entitled to supplemental benefits, an employee must maintain a live application for employment at a state employment office, whether or not he is entitled to state benefits. He must make application in person for the supplemental benefit and normally apply in the same fashion for a state benefit, so long as the latter may be payable.

The requirement of personal reporting at a company office may be more onerous than the corresponding state requirement. Under the interstate benefit arrangements, an unemployed person may register at any one of a large number of employment or unemployment compensation offices anywhere in the United States. Some of the larger steel companies authorize the acceptance of applications for supplemental benefits at any company office where covered employees work.

But even the largest company has few offices as compared to the agencies involved in the administration of state benefits. The requirement of personal reporting at a company office will operate to restrict supplemental benefits somewhat. On the other hand, the desire to make sure of meeting the reporting requirement may lead some laid-off employees to restrict the area in which their search for employment is carried on and thus lead to longer durations. During periods when jobs are scarce and supplemental benefit costs are highest, the restriction of benefits may outweigh the narrowed area of job seeking, which, under these conditions, would likely be fruitless anyway.

The steel plans—but not the auto—require that an employee be able to and available for work. This is a usual requirement of state law, but there are exceptions in eight states:[23] in these states claimants who have filed a claim and registered for work are not ineligible for state benefits because of illness or disability so long as no work which is suitable, but for the disability, is offered and refused. The requirement in the steel plans contains no such exception.[24]

Under the steel SUB plans, the employer has the right to refer laid-off employees to other jobs; failure to take such a job, if suitable under the applicable state standards, will disqualify the employees for receipt of supplemental benefits—and for state benefits as well, of course, if the refusal is made known to the state authorities. Early experience in the steel industry indicates that company activity in arranging for referrals may have considerable effect on the volume of outside employment. In two cases involving large numbers of employees, jobs for laid-off employees were secured by company activity; in neither of these cases would the state employment office have referred any of the laid-off employees to the particular jobs. Thus company job-seeking activity may well be an important factor in limiting supplemental unemployment benefit costs.

The attitude of employees in the search for work will always be important costwise; if employees receiving supplemental benefits are themselves anxious to get work, it is reasonably certain that the cost of benefits will be less than if there is no such desire. Not only will a person who wants work bestir himself to find some, but offered work on the margin of suitability will be accepted, whereas if the attitude is passive, search for jobs will be held to a minimum and no work which the state is willing to account as unsuitable—and state rules always govern on outside jobs—will be accepted. It is over this point that the main controversy as to the desirability of benefits supplementing state unemployment compensation is carried on.

Irrespective of any views on this point, it seems reasonable to sup-

[23] Delaware, Idaho, Maine, Maryland, Montana, Nevada, Tennessee, Vermont.

[24] There is a currently unresolved dispute as to the interpretation of the steel plan as to Illinois; in that state, state benefits for a week are reduced by one-fifth for each day on which an otherwise eligible employee is unavailable for work. The company holds, erroneously according to the union, that such an employee is disqualified for supplemental benefits for the whole week.

pose that job seeking and job acceptance will be affected by the effect on income of taking a job. If part-time work, for example, does not add to income, less of it will be accepted than if such employment makes total income higher.

The aim, in general, of the provision of state laws specifying that some part of wages earned in a week will be disregarded in calculating the state benefit is that there be an incentive for unemployed persons to take partial employment. Unless this is done, the income of such a person is the same if his wages are not more than his weekly benefit. The definition of unemployment in most state laws is not consistent with the aim of encouraging acceptance of part-time employment. For the existence of a point or points at which a small increase in wages results in loss of income constitutes discouragement rather than encouragement of employment. This discouragement is not offset, for steel and auto workers, by other sanctions such as that which makes rejection of suitable employment a bar to state (and supplemental) benefits. Wages which are involved in the cases illustrated here are too low (or the hours too short if the wage rates are appropriate) for the employment to be suitable for the workers involved.

The steel SUB plans aim at preserving whatever incentive exists in state unemployment compensation laws by disregarding the same amounts of wages.[25] In the auto plans, however, there is no gain in income from partial employment yielding wages less than the gross weekly benefit.

While, looking only at the amounts of benefits, the steelworker plans seem to incur higher costs for partial unemployment than do the auto plans—higher even than the costs of total unemployment—these could prove to be more theoretical than real. For the apparent higher steel costs are the result of the aim of preventing any employee from ever losing income by working and, up to the limit of the amount disregarded, increasing his income by working. This will not occur in all cases, even under the Union interpretation of the steel SUB plans, because of the vagaries of state law. But under the companies' reading of the plans there will occur, in many states, a reduction in total income when earnings reach a certain point. The avoidance of such results, within the limits of the usual disregarded amounts of earnings, should save, through more accepted employment, at least as much as is spent in the extra benefits required to carry out the policy of preventing or minimizing the loss of income referred to.

[25] The disagreement between companies and the Union as to the interpretation of the steel plan has to do with (i) the question as to whether the wages are to be disregarded beyond the point at which state benefits are payable in those states in which partial unemployment involves earning less than the state benefit amount, and (ii) the treatment of wages in states such as Michigan and New York in which no fixed amount is to be disregarded.

D. *Relation of SUB Fund Assets and Their Maximum Levels to Contributions and the Amount and Duration of Supplemental Benefits*

The heart of the control of costs in SUB plans is the relation between the actual assets of the SUB funds and their maximum levels. The differences between the fund assets and the maximum fund levels are one of the two factors governing contributions, the other factor being the maximum contribution per hour. And the ratios of fund assets to the maximum fund levels govern the duration of supplemental benefits in the auto plans, and the amount and sometimes the duration of benefits in the steel plans.

It would be possible to specify a fixed contribution to a SUB fund to provide for payment of supplemental benefits until the fund is exhausted, then simply stop. Such an arrangement would be unsatisfactory from all points of view. First, in case of favorable experience, there would be no point in simply accumulating funds. Some limit needs to be fixed on accumulations; and there should be some savings possible from low benefits in order to give incentives for the stabilization of employment.

Second, on the benefit side, it is undesirable to pay full benefits for a period and then come to a complete halt for a time, with perhaps alternate periods of full benefits and no benefits. Such an arrangement would give to employees first laid off a better chance of collecting benefits than those who, in a serious recession, would be laid off later, the latter being, on the average, the longer-service employees. Further, in a serious recession—and the problems of cost arise mainly in such a period—gradual reductions in benefits are preferable to a sudden shift from full benefits to no benefits at all and vice versa. Gradual reductions make it possible for beneficiaries to count on some income from the plans, even if not the full amounts. Finally, from the standpoint of administration, some definite arrangement with respect to benefit amount adjustment is essential in order to avoid hopeless confusion as to who is entitled to how much for what weeks if there were alternation between benefit payments and no benefits.

Numerous aspects of the many interrelations between maximum levels of funds, fund assets, contributions and benefit amounts could be explored. Attention will be directed here to (1) the initial size of the maximum levels and some of the implications of that size; (2) the methods of changing the maximum levels and some of the consequences of such changes on contributions in periods of both rising and falling employment; (3) the special problems of beginning a SUB fund, with special reference to the differences between the auto and steel plans; (4) the effectiveness of control of benefit costs by varying their duration as compared with variations in benefit amount; and finally, (5) the adequacy of controls: the chances that, on the one hand, funds may be exhausted despite controls and, on the other, that costs will be held below the limit aimed at at the expense of lowered benefits.

Fixing Initial Maximum Fund Levels

The initial maximum level of the funds under the auto plans ($400 per employee) would, if matched by assets, be sufficient to pay the maximum benefit for about 60 per cent of the maximum duration to all covered employees or to pay the maximum benefit for the maximum duration to about 60 per cent of all covered employees. The actual fixing of the maximum level appears to have been based on some such rough calculation and without any calculation as to the probability of assets equal to the maximum level being exhausted.

The steel maximum level for contributions was based on the assumptions (a) that hours of work would average about 1950 a year, making the average maximum level about $205 per employee; (b) that the fund positions at which full benefits will be paid are fixed so that, after assets have come to equal the ultimate maximum level, the combination of liquidation of assets plus current contributions will make it possible to spend in a single year the normal contributions[26] for about two years before reducing the benefits; and (c) if more than normal contributions for two years are spent in a single year, the situation is such as to call for benefit reductions. It was recognized that the factors which would, after assets have reached the ultimate maximum level, permit expenditure of as much as 10 cents per hour without affecting benefits, would, in the early stages of benefits, produce benefit reductions before the 10-cent expenditure level is reached. That is, the arrangement gives asset accumulation priority over benefit expenditures.

Methods of Changing Maximum Fund Level and Their Consequences—Auto Plans

The maximum levels of auto funds are changed by two factors: the changing numbers of employees and variations in the average weekly benefit. If the average weekly benefit were to be $20 or more, the maximum level of the auto funds for any month would be the initial maximum level per employee, $400, multiplied by the number of employees on the latest available date in the preceding month. So long as the number of employees does not change and the average weekly benefit is above $20, the initial maximum fund level will not be changed.

If the number of employees is reduced, but entirely as a result of layoff, the maximum level of the fund will not be reduced immediately, but will remain for a time at the level as of the date the layoffs began, since the number of employees used as the multiplier includes employees on layoff who have credit units. As employees exhaust credit units they are dropped from the multiplier. This seems an

[26] The two-year contributions included the maximum contingent liability accrual; for regular cash contributions, the aim was to permit expenditure of about 3½ years' contributions, or in the range of 10 to 11 cents per hour worked.

anomalous arrangement, for the process implies that the liquidation of liability has not reduced liability for the payment of any benefits until all of the benefits due to some individuals have been paid in full. If, after assets have attained the maximum level, benefits are paid to half of all employees for half of the maximum duration, surely there will have been some reduction in the fund liability and required reserves could properly be reduced in recognition of that fact. Yet under the assumptions as stated, the maximum level of the fund would be as high as ever.

It could hardly be contended, in the area of unemployment, with the possibility, at least for some employers, that all employees will be unemployed, that maximum levels can be reduced as rapidly as benefits are paid. Moreover, it would be rare for maximum levels to fail to fall because of reductions in numbers of employees resulting from employees terminating, for reasons other than layoffs, who are not replaced, or from layoffs of ineligibles. If assets are at the maximum level, reserves are released in these circumstances, but if there is no immediate unemployment, the release of reserves simply results in a reduction or omission of contributions which may later have the effect of reducing benefits. For maximum effectiveness, reduction of reserves should be timed so as to be available for benefit payments.

The device relating maximum fund levels in the auto plans to average amounts of weekly supplemental benefits implies that either the main variable in the aggregate benefit disbursements is the average benefit size, or that there is a high positive correlation between the relative number of employees on layoff, the average duration of benefits, and the average weekly benefit amount. The schedule suggests the simpler assumption, but the more complex relationship probably has substantial validity. And for that very reason, the device may have peculiar results.

In periods of relatively low unemployment, the average employee on layoff will have relatively short service and, therefore, below average wages. Even a relatively low-paid automobile worker will have, in relation to the average of all unemployed persons, relatively high wages, and his state benefit, both because of his wage level and the fact that it is based on a 40 or near 40-hour week, will be above average. Further, during periods of relatively light unemployment, persons on layoff from an auto company will have better than average chances of getting part-time outside employment. For all these reasons, in such a period supplemental benefits will tend to be low.

As a period of light unemployment is followed by one in which layoffs become progressively heavier, persons with higher wages who have been working part time for the auto company will be laid off. Though

working short time, gross supplemental benefits will be based on a 40-hour week. Despite higher wage rates, the shorter work week will have tended to reduce average state benefits.[27] The opportunities for partial outside employment will be less than before; and even within the 26-week maximum duration, some of the laid-off employees will still be entitled to supplemental benefits, but with no state benefit offset. Thus average benefits will tend to rise.[28]

If average benefits decline from over $20 to under $20, the maximum level of the auto funds declines by 20 per cent—from $400 to $320 per employee. Since unemployment will probably be light during such a period, the reduction in maximum level will result in elimination of contributions for an extended period.

Some indication of the periods for which contributions may be omitted is given in the following tabulation:

Benefit Expenditures (Annual Rate)	*Maximum Level of Fund Changes from $400 to $320 per Employee*			*Maximum Level of Fund Changes from $320 to $240 per Employee*		
	Financial Position[a]			*Financial Position*[a]		
	105%	*100%*	*90%*	*105%*	*100%*	*90%*
	(Years)			*(Years)*		
$ 40	2.5	2.0	1.0	2.4	2.0	1.2
75	1.3	1.1	.5	1.3	1.1	.6
100	1.0	0.8	.4	1.0	0.8	.5

[a] Measured against maximum fund level before reduction.

The tabulation assumes that the employment multiplier remains constant. If the employment multiplier rises, the period of no contributions will be shortened; a reduction in the employment multiplier lengthens the period. Moderately high benefit expenditures would probably be accompanied by a reduction in the employment multiplier and thus tend to lengthen the period of no contributions. However, as benefit expenditures rise, the average benefits may increase, causing the maximum level to move up, reducing the financial position, certainly requiring maximum contributions, with a reduction in benefit durations as well.

If the average benefit fluctuates around a breakpoint in average benefits ($20, $15, $10), there may be an alternation of rapid changes in fund positions and benefit durations resulting from relatively small differences in experience.

[27] In Michigan, for example, the weekly state benefit for a man with a dependent wife and child is lower if based on $2.50 per hour and an average 32-hour week than if based on $2.01 per hour and an average 40-hour week. In most states both persons would be entitled to the state maximum.

[28] The main reason for benefits not increasing under such circumstances would be amendments of state laws raising state benefits, hardly to be counted on in planning SUB financing.

Methods of Changing Maximum Fund Level and Their Consequences—Steel Plans

The maximum levels of SUB funds under the steel plans, so far as contributions are concerned, are to be changed as a result of shifts in two factors: the total number of man-hours worked by covered employees, and the average weekly supplemental benefit. Ultimately the maximum level for benefits will be identical with that for contributions, with a gradual rise from about 48 per cent of the contributions maximum when benefits start to 100 per cent of that level during the first three years of a plan's operations.

The steel plans have a section (similar to the one in the auto plan) which specifies that, if the average weekly benefit (before any reduction for financial position) is less than $16 per week, the maximum fund level will be reduced. However, it was not expected to become operative under any existing or even somewhat higher level of state benefits. The difficulties inherent in the arrangement were recognized. It is hoped, by a study of the experience as it develops, to devise a more satisfactory method of adjusting maximum fund levels to potential liabilities.

The maximum level of the fund for any month is based on the hours worked in the first 12 of the last 14 months preceding the month in question. The fund position applicable to a month is based on the ratio between the fund assets on the last day of the second month preceding the month in question, while the contributions are, subject to the maximum, based on the excess of the maximum level of the fund for the month in question over the fund assets of the month immediately preceding. The aim of these provisions is a dual one: to secure reasonably prompt contributions when the fund position falls because of benefit expenditures, and to release assets so as to support benefits higher than contributions without reducing the fund position to the point of benefit reductions.

An illustration may make this clear. Suppose that for at least 14 months, to oversimplify, employment has been stable at 100,000, each employee working, on the average, 170 hours in each month, or a total of 17,000,000. Then in the first month of the second year hours fall by 1,000,000 per month for seven months, stabilizing at 10,000,000 hours per month. Assume also that:

(1) Employment by months in the second year is:

Month 1	94,000	Month 5	70,500
2	88,000	6	64,500
3	82,000	7	58,500
4	76,000		

(2) The percentages of those becoming unemployed who are eligible for supplemental benefits are, by months:

Months 1 and 2	50
3	75
4 and after	100

(3) Those becoming unemployed have, on the average, two weeks of unemployment in the month of layoff (three weeks in months 3 and 6), one of which is the waiting period;

(4) There are four benefit weeks in months 1 and 2, 4 and 5, 7 and 8 and so on, and five benefit weeks in months 3, 6, 9 and so on;

(5) State benefits run for 26 weeks for all employees eligible for supplemental benefits;

(6) There are no disqualifications or partial employment;

(7) Supplemental benefits during the state benefit periods are $20 per week, and $50 after state benefits exhaustion;

(8) Investment income is 0.16 per cent per month on the previous month's balance (taken to the nearest multiple of $1000), and the trustee's fee and expense is $1000 per month;

(9) Maximum levels for contributions and benefits are identical.

The contributions, benefits, changes in contingent liability, and the financial positions are shown in the upper section of Table 5. The benefit expenditures and trustee's fees in months 1 and 2 of year 2 are promptly replaced in the next months by contributions and investment income. The expenditures in months 3 and later are so large that the contribution limit prevents replacement and there is a steady reduction in the assets of the fund and in total finances.[29] The financial position is reduced more slowly because, for any month, it is based on total finances at the end of the second preceding month. Though expenditures for the eight months through which the illustration is carried are about 11.3 cents per hour, the financial position is above 80 per cent for month 9. Under the assumptions as stated, the financial position for month 10 would be less than 75 per cent, and benefits would be reduced by 25 per cent for that month. Until month 8, the financial position is above 95 per cent. In months 8 and 9 the financial position is above 95 per cent. In months 8 and 9 the financial positions are 88.91 per cent and 81.70 per cent, respectively.

[29] Total finances is the sum of the assets of the fund, which includes the contribution recorded for the current month, not actually paid until after the month-end, and the contingent liability.

TABLE 5

Liability and Benefits Under Alternative Methods of Calculating Maximum Fund Levels and Fund Positions

		Receipts			Disbursements		Finances				
Yr.	Mo.	Cash	Contin. Liab.	Investment Income	Benefits	Trustee's Fee	Assets[a]	Contin. Liab.	Total	Maximum Level	Fund Position %
					(All Figures in Thousands)						
					Maximum Level and Fund Position as in Steel Plans						
1	12	—			—		$7461	$13,970	$21,431		
2	1	—	–$11[b]	$12	$60	$1	7412	13,959	21,371	$21,420	
	2	$48	—	12	300	1	7171	13,959	21,130	21,420	
	3	289	—	12	780	1	6691	13,959	20,650	21,420	
	4	390	260	11	960	1	6131	14,219	20,350	21,315	
	5	360	240	10	1430	1	5070	14,459	19,529	21,105	
	6	330	220	8	2440	1	2967	14,679	17,646	20,790	
	7	300	200	5	2450	1	821	14,879	15,700	20,370	95.87
	8	300[c]	200[c]	1	2990	1	—	13,210	13,210	19,845	88.91
		1869[d]	–1869[d]								
	9									19,215	81.70
					Maximum Level for Month Based on Hours Worked in 12-Month Period Ended With and Finances as of Last Business Day of Preceding Month						
2	1	—	–$11[b]	$12	$60	$1	$7412	$13,959	$21,371	$21,420	
	2	—	–56[b]	12	300	1	7123	13,903	21,026	21,315	
	3	$79	—	12	780	1	6433	13,903	20,336	21,105	
	4	390	64[e]	10	960	1	5872	13,967	19,839	20,790	
	5	360	171	10	1430	1	4811	14,138	18,949	20,370	
	6	330	220	7	2440	1	2707	14,358	17,065	19,845	
	7	300	200	5	2450	1	561	14,558	15,119	19,215	88.81
	8	300[c]	200[c]	1	2990	1	—	12,629	12,629	18,480	81.81
		2129	–2129[d]								
	9									17,745	71.16

TABLE 5 *(Cont'd)*

Yr.	Mo.	Receipts: Cash	Receipts: Contin. Liab.	Receipts: Investment Income	Disbursements: Benefits	Disbursements: Trustee's Fee	Finances: Assets[a]	Finances: Contin. Liab.	Finances: Total	Maximum Level	Fund Position %
				Maximum Level for Month Based on Number of Employees With Credit Units on Latest Available Date in Preceding Month and Finances as of Last Business Day of Such Month							
2	1		–$11.0[b]	$12	$60.0	$1	$7412	$13,959.0	$21,371.0	$21,420.0	
	2		–593.6[b]	12	300.0	1	7123	13,365.4	20,488.4	20,777.4	
	3		–353.6[b]	11	780.0	1	6353	13,011.8	19,364.8	20,134.8	
	4	$390	58.7	10	960.0	1	5792	13,070.5	18,862.5	19,813.5	
	5	360	240.0	9	1430.0	1	4730	13,310.5	18,040.5	19,813.5	
	6	330	220.0	7	2440.0	1	2626	13,530.5	16,156.5	19,813.5	
	7	300	200.0	4	2450.0	1	479	13,730.5	14,209.5	19,813.5	81.54
	8	300[c]	200.0[c]	—	2242.5[f]	1	—	12,466.0	12,466.0	19,813.5	71.71
		1464.5[d]	–1464.5[d]								
	9									19,813.4	62.90

[a] Including accrued contributions as of month-end.

[b] Reduction in contingent liability because total finances at end of preceding month exceeded maximum for current month.

[c] Contribution and contingent liability based on hours worked in month.

[d] Contribution based on contingent liability needed to pay benefits in month. Contingent liability reduced by amount of the contribution.

[e] Balance needed to make up difference between cash contribution at 3 cents per hour worked and total excess of maximum fund levels over total finances at end of the preceding month.

[f] Benefits in full were $2,990,000 but are reduced 25 per cent because fund is less than 75 per cent.

It will be noted that total contributions for month 8 were $2,169,000 (21.69 cents per hour). This is the result of the fact that two cents of the maximum liability for contributions is not paid in cash currently, but only when needed. For the full eight months' contributions total $3,886,000, or 3.85 cents per hour. If the contingent liability had not been included in the plan but all liability for contributions had been met in cash currently on the basis of five cents per hour the contributions for the eight months would have been a little over three cents per hour (omitting the effect of any additional investment income) despite the expenditures of over 11 cents per hour.

Thus the methods used in the steel plans to adjust contributions so as promptly to replace benefits, and to permit benefits to be paid in full up to an annual cost of 10 cents per hour seems to work out well for a period of months, some with current benefit expenditures as high as 30 cents per hour (month 8). In the example given there were benefit ($11,410,000) and other expenditures ($8,000) of $11,418,000 financed as follows:

Contributions—cash	$ 2,017,000
contingent	1,869,000
Investment income	71,000
Financial position (88.91%)	2,199,000
Reduction of maximum level	1,586,000
Lag	4,436,000
Gross	$12,178,000
Less contingent liability reduction	760,000
Net	$11,418,000

The reduction in the maximum level of the fund operates irrespective of the cause of the reduction in hours. Thus suppose, instead of adjusting the volume of employment solely by layoffs, there are laid off only those who are ineligible for supplemental benefits (7500 employees) and that, as work falls off, hours are reduced by eight per week (20 per cent) until all employees are working a 32-hour schedule. After all active employees are on a 32-hour week and further reductions are necessary, there would again be layoffs. Under this change in assumption, no layoffs of eligibles would occur until month 5, and total benefits through month 8 would be $2,774,400 instead of $11,410,000 though hours of work are, by definition, identical.

More important, the cash contributions are, on these modified assumptions, only $457,000; and the contingent liability is reduced by $583,400. The reduction in the maximum fund level and the lag in the month for the calculation of the financial position not only result in relatively low benefits not being replaced (6.45 cents per hour for the four months in which benefits are paid, and 2.75 cents per hour for the eight months in the illustration) but the contingent liability is reduced by $583,400, making the total assets of the fund lower by

a net of $126,400 because of the conjuncture of the provisions. Thus, in such a case, the funding devices fail to accomplish the intended purposes.

Comparison of Methods of Calculating Maximum Fund Levels and Fund Positions in Steel and Auto SUB Plans

The steel and auto plans differ in two respects as to method of calculating maximum fund levels and financial position: using the numbers of employees with credit units rather than hours worked in a 12-month period as the main factor in calculating changes in such levels from month to month, and taking the figure for a date close to the beginning of the month rather than one two months old.

The middle section of Table 5 indicates the effect of eliminating the lag between the end of the 12-month period, the hours in which are used as the multiplier to get the maximum fund level,[30] and the current month.

In the second section, benefits for the same eight months would be the same as in the illustration in the top section. The sources of the expenditures are:

Contributions—cash	$ 1,759,000
contingent	2,129,000
Investment income	69,000
Financial position (81.81%)	3,361,000
Reduction in maximum level	2,951,000
Lag	2,490,000
Gross	$12,759,000
Less contingent liability reduction	1,341,000
Net	$11,418,000

The replacement of expenditures is less than under the steel plan method: as a result, total finances at the end of month 8 are almost $600,000 less than if the steel method had been followed without modification. The fund positions are lower than those in the steel illustration because, while the total finances are less, the maximum fund level declines more rapidly. Further, because the regular contributions are smaller, the contributions based on contingent liability in month 8 are increased as compared with the steel plan by $260,000. Total cash contributions under this modified method are slightly larger than under the steel method. In month 9 benefits would be reduced 25 per cent under the modified method and, as a result, contributions, for conversion of contingent liability would be smaller than under the steel method without modification.

[30] The data needed to calculate fund positions for a month must be available, if the financial position is near a critical point, by the middle of the month. It is here assumed that the hours worked in a month are known accurately by the middle of the following month.

The last section of Table 5 indicates how the maximum fund level and financial position procedures of the auto plans would operate. In order to maintain reasonable comparability between the steel and auto methods, the maximum level per employee is fixed at $214.20, so that for month 1 the aggregate maximum levels are identical. Expenditures, again, for the eight-month period are less than under the steel plan because a 25 per cent reduction in month 8 makes benefits in that month $747,500 less than if the full amount were to be paid. The sources of payments were as follows:

Contributions—cash	$ 1,680,000
contingent	1,464,500
Investment income	65,000
Financial position (71.71%)	5,604,000
Reduction in maximum level	1,617,500
Lag	1,743,500
Gross	$12,174,500
Less contingent liability reduction	1,504,000
Net	$10,670,500

The auto method[31] results in cash contributions smaller than under the steel plans by $337,000, and reduces rather than increases contingent liability. The total liability for contributions—cash and contingent—is $3,126,000 under the steel arrangements against $1,640,500 by the terms of the auto plans. As of the end of month 8, total finances of the steel method without modification exceed those under the auto method by $1,491,500—the sum of the higher contribution liability under the steel arrangement plus the extra investment income.

So far as cash contributions are concerned, the auto plan contributions for the eight months total $3,144,500, smaller by $741,500 than under the unmodified steel method. This discrepancy will increase in month 9 when there will be a benefit reduction of 32.5 per cent under the auto arrangement as compared to full benefits under the steel method.

Under most circumstances, the auto method of calculating maximum fund levels and financial positions will result in lower contribution liability than will the method used in the steel plans.

The five-cent per hour total liability limit is not reached under any of the three arrangements examined in this section.

To recapitulate, for the eight-month period covered by the illustra-

[31] Reference to the "auto method" does not imply that the entire auto plan financial pattern is followed; there is, for example, no contingent liability under any auto plan. What is called the "auto method" means simply the use of numbers of employees with credit units as the basis of changing maximum fund levels and the reduction of lag to the irreducible minimum of one month. The steel plan's use of reductions in benefits rather than in durations as the primary means of balancing contributions and benefits is retained.

tions, the contributions made and benefits paid under the three methods are:

	Steel		*Auto*		*Intermediate*	
	Amount (000's)	*Cents per Hour*	*Amount (000's)*	*Cents per Hour*	*Amount (000's)*	*Cents per Hour*
Regular cash contributions	$ 2,017	2.00	$ 1,680.0	1.66	$ 1,759	1.74
Cash under contingent liability	1,869	1.85	1,464.5	1.45	2,129	2.11
Total cash contribution	3,886	3.85	3,144.5	3.11	3,888	3.85
Regular contingent liability accrual	1,109	1.10	—39.5	—0.04	788	0.78
Total regular cash and contingent liability	3,126	3.10	1,640.5	1.62	2,547	2.52
Benefits paid	11,410	11.30	10,662.5	10.56	11,410	11.30

If the aim is to provide benefits for a liability averaging five cents per hour, these devices are not effective for a moderately long period of unemployment. In terms of its own aims, the steel plan works out better than either of the two other methods.

Relative Effectiveness of Reductions in Duration and Reductions in Benefit Amounts as in Adjusting Benefits to Contributions

As has been pointed out, the steel plans rely mainly on reductions in benefit amounts to adjust benefits to finances, whereas the auto plans rely for that purpose on variations in the period for which benefits are to be paid. If all persons entitled to benefits were to be entitled to them for the maximum duration, the two methods would have identical results. Ordinarily, given a group of employees laid off, some will be recalled or get other employment almost immediately; a few will, for one reason or another, be disqualified for benefits; some will be recalled to replace those terminated for reasons other than layoff; and this attrition in the numbers of unemployed will be a continuous process. The faster unemployed are reemployed or become ineligible for benefits for other reasons, the less effective will curtailment of duration be in reducing benefits.

Experience under SUB plans, when available, will indicate the differences between these two methods. State unemployment benefit experience might give some indication up to the end of the state benefit period. Though not necessarily indicative of unemployment, the 1949-55 layoff experience in steel is believed to be a better index of the effectiveness of the two methods than state experience would be. The numbers of employees laid off by 26 steel companies, mostly small, in the years 1949-55, by the year layoff began and by the length of time the layoff lasted, are given in Table 6.

Total weeks of layoff at the several durations were calculated on the assumption that the numbers at each interval were equally distributed therein. Thus in 1949, the total weeks of layoff, up to 52 weeks, ran to 172,767. The weeks of layoff for those whose absences did not exceed 39 weeks totaled 111,842, there were 1249 whose layoffs exceeded 39 weeks, so that total weeks of layoff up to 39, amounted to 160,553 (including the 1249 employees at 39 weeks of layoff). In the same year, weeks of layoff up to 39 were 7.07 per cent less than weeks of layoff up to 52. The following tabulation shows similar percentages for other years and periods.

Weeks of Layoff Up to	*Are Less Than Weeks of Layoff Up to*	*By the Following Percentages for the Specified Year in Which the Layoffs Started*						
		1949	*1950*	*1951*	*1952*	*1953*	*1954*	*1955*
39 weeks	52 weeks	7.07	2.62	4.33	2.75	9.84	5.50	4.39
30 weeks	39 weeks	9.70	2.80	5.65	4.47	10.54	7.88	6.59
26 weeks	30 weeks	6.96	1.81	3.35	4.18	6.44	5.08	4.13
26 weeks	39 weeks	15.83	4.56	8.81	8.46	16.31	12.55	10.45
22 weeks	26 weeks	9.00	2.90	4.06	5.88	7.92	6.28	5.36
18 weeks	26 weeks	19.72	7.07	8.68	12.60	17.26	13.57	12.08
14 weeks	26 weeks	32.15	12.84	14.29	21.34	28.23	22.28	21.34
10 weeks	26 weeks	46.70	22.64	23.67	33.15	40.93	33.27	33.87

The effect of reducing durations has the greatest impact in years of high expenditure.[32] Even so, in 1949 a 26-week duration would have had to be reduced to less than ten weeks in order to reduce benefits by half. If, in some year, under an auto plan a fund position were 50 per cent, maximum durations would be reduced for employees having less than 20 years of service by from ten to 40 per cent, as compared with durations if the fund position were 85 per cent or over. If the average reduction were, say 31 per cent, or the equivalent of changing to a maximum of 18 weeks in place of 26, benefits would be reduced by 20 per cent. On the same financial position the steel plans would reduce all benefits by 47.5 per cent and reduce some durations by 25 per cent. This latter would reduce the benefits of those affected by probably less than ten per cent.

[32] Layoffs starting in 1953 began late in the year, and any limitation on duration of benefits for these layoffs would have been effective in 1954. Layoffs starting in 1949 and 1954 occurred early in the year and were largely finished by the end of the year.

TABLE 6

Number of Employees Laid Off By Year Layoff Began and by Total Duration of Layoffs in Weeks

Total Duration of Layoffs in Weeks	*Year Layoff Began*						
	1949	*1950*	*1951*	*1952*	*1953*	*1954*	*1955*
1 but less than 2	532	947	1284	883	1373	4547	1185
2 but less than 3	511	451	322	560	652	3607	535
3 but less than 4	359	186	256	347	970	3035	211
4 but less than 6	977	299	1210	307	424	4043	348
6 but less than 8	931	246	740	201	347	3239	293
8 but less than 10	473	305	224	238	359	2128	190
10 but less than 14	773	310	559	211	274	1756	219
14 but less than 18	662	100	143	204	239	1068	271
18 but less than 22	494	61	41	69	245	693	112
22 but less than 26	664	68	63	44	179	562	91
26 but less than 30	498	39	48	161	126	591	67
30 but less than 39	963	16	84	135	257	1075	89
39 but less than 52	619	28	144	30	214	1349	165
52 and over	630	30	70	49	489	593	36
Total	9086	3086	5188	3439	6148	28,286	3812

There can be no question that the method of reducing benefits incorporated in the steel plans is far more powerful than the corresponding provision of the auto plans.

V. THEORETICAL "MODEL" EXPERIENCES

A. *Estimated Costs of Benefits*

In preparation for the formulation of the steel industry SUB plan, data were collected from a number of companies covering layoffs of employees having more than one year of service, with classification by year of layoff (1949 through 1955), rate of compensation, length of service, state in which unemployment occurred, whether or not there was a return to service on recall, and with length of layoffs divided so as to make possible a division of the weeks of layoff between the period of state benefits and thereafter. The current rates of pay were translated into 1956 rates, with an allowance for further increase, and gross benefits were calculated on the basis of such adjusted rates. From the gross benefits, state benefits at the 1956 levels were subtracted for the period for which state benefits were payable. In calculating the state benefits it was assumed that laid-off employees had worked an average of 36 hours in their base periods.[33] For sup-

[33] In Pennsylvania it was assumed that the state benefit would, under that provision fixing the benefit at not less than one-half full-time compensation, be 20 hours' pay (not over $35).

plemental benefits, dependents were assumed to average 1.8 per employee. For states with dependents' allowances, the average number of dependents, for state benefit purposes, was taken from the latest available reports to the Bureau of Employment Security. No reports being available for Illinois, it was arbitrarily assumed that each person unemployed would have two-thirds of a dependent. It was assumed that all employees laid off who returned to service were unemployed and eligible continuously during the entire period of layoff, up to 53 weeks. One week was allowed as waiting period once each year. Those who did not return when recalled were assumed to be unemployed and eligible for half the period between layoff and date of recall to maximum of 27 weeks. The maximum weekly benefit was assumed to be, during the period when state benefits were payable, $25 plus $2.00 per dependent. The net benefits so calculated were totaled for each company by years. The total for each year was divided by the hours worked by all covered employees during the year to get a cents-per-hour cost.

Data were received from 71 companies for the following periods:

	Number of Companies		*Number of Companies*
1949-55	37	1954-55	5
1950-55	4	1953-54	1
1951-55	2	1954 only	7
1952-55	1	1955 only	1
1953-55	13[a]	Total	71

[a] Data from four companies for the three-year period could not be processed for each year separately.

The companies which reported each year had smaller layoff volumes than those companies reporting for 1953-55 or for 1954 and 1955 only. But measured by medians, in only two years would benefit costs have been as high as three cents per hour (Table 7). And the median cost for the entire period reported, for those reporting three years or longer, was two cents or less.

TABLE 7

Number of Companies Classified by Estimated Annual Cost of Supplemental Benefits (in Cents per Hour) and by Year Covered by Reports, 1949-55

Cents	*1949* [1]	*1950* [1]	*1951* [1]	*1952* [1]	*1953* [1]	*1953* [2]	*1954* [1]	*1954* [2]	*1955* [1]	*1955* [2]	*1949-55* [1]	*1953-55* [1]	*1953-55* [2]
0	6	17	20	20	11	13	7	8	16	23	3	6	6
Under 1	7	15	13	10	10	13	9	12	16	20	11	11	14
1.0- 1.99	2	2	—	2	5	8	5	5	3	4	8	4	7
2.0- 2.99	3	1	—	2	2	2	—	—	—	1	5	4	5
3.0- 3.99	4	—	2	1	1	2	3	5	1	3	2	3	3
4.0- 4.99	—	—	—	2	1	3	3	4	1	1	4	3	5
5.0- 7.49	3	—	—	—	4	5	3	4	—	—	2	4	9
7.5- 9.99	2	—	1	—	1	3	2	4	—	—	1	—	—
10-14.99	2	2	1	—	—	2	2	5	—	—	—	—	—
15-19.99	2	—	—	—	1	1	1	2	—	—	1	1	2
20-24.99	1	—	—	—	—	—	—	1	—	—	—	—	—
25-29.99	2	—	—	—	—	—	—	—	—	—	—	—	1
30 and over	3	—	—	—	1	1	2	3	—	1	—	1	1
Total	37	37	37	37	37	53	37	53	37	53	37	37	53
Median	3.53	0.05	0	0	0.27	1.14	1.65	3.24	0.02	0.03	1.76	1.38	1.81
Mean (unweighted)	9.34	0.92	0.92	0.55	3.32	3.54	5.13	7.95	0.46	1.46	2.41	3.20	4.03
					All Reports								
0	—	18	24	24	13		8		23		—	6	
Under 1	—	16	14	11	14		16		24		—	16	
1.0- 1.99	—	3	—	3	8		5		8		—	8	
2.0- 2.99	—	1	—	2	2		1		1		—	6	
3.0- 3.99	—	—	2	1	2		5		4		—	5	
4.0- 4.99	—	—	—	2	3		6		1		—	6	
5.0- 7.49	—	—	1	1	5		6		—		—	10	
7.5- 9.99	—	—	1	—	3		5		—		—	—	
10-14.99	—	2	1	—	2		6		—		—	1	
15-19.99	—	1	—	—	1		3		—		—	3	
20-24.99	—	—	—	—	—		1		—		—	—	
25-29.99	—	—	—	—	—		1		—		—	1	
30 and over	—	—	—	—	1		3		1		—	1	
Total	—	41	43	44	54		66		59		—	63[3]	
Median	—	0.06	0	0	0.92		3.43		0.03		—	2.07	
Mean (unweighted)	—	1.29	0.97	0.61	3.48		7.86		1.32		—	4.23	

[1] Companies reporting for each year 1949-55.
[2] Companies reporting for each year 1553-1955.
[3] Includes five companies reporting for 1954-55, four reporting for 1953-55 without breakdowns by years, and one company reporting for 1953-54.

On the other hand, there are companies which had average costs over periods of years of 7.5 cents or higher. And, particularly in 1949 and 1954, the proportion of companies with relatively large costs is high—the proportions with costs over 15 cents per hour in those two years being about 20 and 12 per cent respectively.

The cost-of-benefit calculations were based on the assumptions of 100 per cent payments and (except for those failing to respond to recall) on 100 per cent eligibility for supplemental benefits throughout the first 52 weeks of layoff. These assumptions were thought to be conservative; it was concluded that if (1) the plans could be begun at a favorable period, and (2) such favorable period was without substantial interruption for two years—i.e., until the ultimate maximum level of the fund was matched by finances—five out of six of the plans would be able, with contributions, cash and contingent, of 5 cents per hour, to pay benefits in full during periods of unemployment slightly more severe than occurred in 1949 and 1954.

For some plans it is clear that, on the basis of past experience, either contributions larger than the expected maximum would be required, or benefits would have to be reduced, either by beginning with a gross benefit of less than 65 per cent or by reducing the maximum amounts at the beginning or by building some adjustment device into the plan.

Since it is hardly to be assumed either that a plan with a past history of low costs will not have high costs in the future, or that past high costs place future low costs out of question, the adjustment of benefits to contributions on the basis of actual experience rather than forecast was decided upon.

A "Model" Experience, 1949-56

Calculations made for whole years, as in the preceding section, may fail to catch certain critical points. Very heavy unemployment for a short period might, because of the month-by-month limit on contributions, result in drains which could reduce the fund so rapidly that, because of the lag between the current month and the months used in calculating its financial position, the devices intended to keep a balance between benefits and the supporting finances would not have time to operate. In order to judge the effectiveness of those devices, and as a final check on the estimates, a model experience was constructed.

This model was based on the layoff experience of relatively small companies, having about 10,000 employees on the average, and little higher than average proportion of layoffs. It was clear that if the plan were started in 1949, the benefits due until the end of 1953 would be very small. In order to observe the effect of a substantial volume of layoffs beginning with the initiation of benefits, a hypothetical work-hour experience was constructed, back to January 1, 1948. The extrapolation for any month was based on the relationship between the product of the number of basic steel production and maintenance employees in that month (as reported in the *Monthly Labor Review*)

multiplied by the average weekly hours for the same industry in the same month (from the same source) and the corresponding product for the month of January 1949.

Data were available for most of 1956, and hours were extrapolated to the end of the year by the method used for 1948. Benefits were put in for the last half of the year arbitrarily; it is known that there were few layoffs.

For the first model, the benefits were assumed to be payable to 80 per cent of the employees who, on the day of layoff, had two or more years of service. Average benefits during the period of state benefits were assumed to be $17.50 per week and, after state benefit exhaustion, $50 per week. Interest was calculated on fund assets at the current rates of interest on 60-90-day prime commercial paper. The fees and expenses of the trustee, beginning with the payment of benefits, was assumed to be $9000 per year and $3600 during the first year.

The results of the first model construction are summarized in Table 8. It may be noted that:

(1) In only one year, 1949, did expenditures for benefits exceed 5 cents per hour;

(2) After the initial build-up of finances, cash contributions in no year were as much as three cents per hour for the full year;

(3) After the first three years, contingent liability accruals were never as high as one cent per hour in any year, and there were no accruals in three years, the previous accrual being reduced in two of these three;

(4) In 1954 the maximum level fell faster than benefits and, as a consequence, the cash contributions were but little more than 12 per cent of benefit payments;

(5) Because the heaviest unemployment occurred in 1949, before assets had reached the ultimate maximum level, benefits were reduced under the formula;

(6) The reductions, which would not have occurred if the assets at the start of the 1949 recession had reached the maximum level for contributions, affected only five months, one in 1949 and the others in 1950;

(7) The reductions diminished 1949 benefits by about 1.5 per cent and 1950 benefits by less than 12 per cent;

(8) The reductions began four months after the peak in benefits had been reached, and the total amount of reductions, $28,348, was less by 40 per cent than the decline in full benefits from the peak to the month in which the reduction started; and

(9) No contingent liability had to be converted into cash.

TABLE 8

Contributions, Investment Income and Expenditures During the Years 1949-1956 and Finances at Year-End Aggregates and in Cents Per Hour Worked in the Year

Model A

Year	Hours Worked	Contributions: Cash	Contributions: Contingent Liability Accruals	Investment Income	Administrative Expense
		Aggregates			
1948	19,811,329	$ 594,337	$ 396,228	$ 2,631	$ 3,600
1949	13,796,724	413,901	275,936	4,733	8,100
1950	18,053,344	541,600	361,066	2,984	9,000
1951	19,374,234	525,264	159,541	10,788	9,000
1952	16,682,962	70,458	—	12,337	9,000
1953	17,131,329	335,525	81,205	12,506	9,000
1954	12,756,718	65,546	—	6,731	9,000
1955	14,975,960	257,306	—	4,927	9,000
1956	18,878,166	435,709	22,840	13,871	9,000
Total	151,460,766	3,239,646	1,296,816	71,508	74,700

Year	Benefits Paid	Finances at Year-End: Fund Assets[a]	Finances at Year-End: Contingent Liability	Finances at Year-End: Total	Reduction in Contingent Liability During Year
1948	—	$593,368	$ 396,228	$ 989,596	
1949	$ 909,835[b]	94,067	672,164	766,231	
1950	109,744[b]	519,907	1,033,230	1,553,137	
1951	178,823	868,136	1,192,771	2,060,907	
1952	241,908	700,023	1,011,442	1,711,465	$181,329
1953	276,674	762,380	1,092,647	1,855,027	—
1954	547,074	278,583	1,055,758	1,334,341	36,889
1955	94,177	437,639	1,055,758	1,493,397	
1956	30,858	847,361	1,078,598	1,925,959	
Total	2,389,093	847,361	1,078,598	1,925,959	218,218

[a]Including accrued contributions to be paid in cash.

[b]Total benefits paid after reduction of benefits in accordance with SUB benefits reduction schedule. Benefits at the 100 per cent level would be higher than benefits paid by $13,903 in 1949 and $14,445 in 1950.

TABLE 8 *(Cont'd)*

Year	Contributions: Cash	Contributions: Contingent Liability Accruals	Contributions: Investment Income	Administrative Expense	Benefits Paid	Finances at Year-End: Fund Assets[a]	Finances at Year-End: Contingent Liability	Finances at Year-End: Total	Reduction in Contingent Liability During Year
				Cents Per Hour					
1948	3.00	2.00	0.01	0.02	—	3.00	2.00	5.00	
1949	3.00	2.00	.03	.06	6.59	.68	4.87	5.55	
1950	3.00	2.00	.02	.05	.61	2.88	5.72	8.60	
1951	2.71	.82	.06	.05	.92	4.48	6.16	10.64	
1952	.42	—	.07	.05	1.45	4.20	6.06	10.26	1.09
1953	1.96	.47	.07	.05	1.62	4.45	6.38	10.83	
1954	.51	—	.05	.07	4.29	2.18	8.28	10.46	.29
1955	1.72	—	.03	.06	.63	2.92	7.05	9.97	
1956	2.31	.12	.07	.05	.16	4.49	5.71	10.20	
Total	2.14	.86	.05	.05	1.58	—	—	—	.14

[a]Including accrued contributions to be paid in cash.

It is clear that the only years in which meeting benefits with regular contributions was a problem was in 1949-50 and 1953-54. In order to observe the effects of substantially higher benefits, two further models have been constructed. In Model B, hours of work were unchanged; benefits, as calculated for Model A, before reduction, were increased by five per cent for February 1949 to 20 per cent from August through November 1949, with the percentage of increase tapering off by 2½ per cent in each month thereafter to 0 in July 1950.

Starting with a five per cent increase in October 1953 over the benefits in Model A, there was a sharp increase by 115 per cent in July 1954, and 110 per cent in August, with lower increases thereafter as follows:

September 1954	100	January 1955	40
October	80	February	30
November	60	March	20
December	50	April	10
		May	0

Under these assumptions, benefits before reduction compared as follows:

	Model A	*Model B*
1949	$923,738	$1,074,266
1950	124,189	133,090
1953	276,674	286,128
1954	547,074	1,033,262
1955	94,177	108,623

In Model B, 1949 benefits before any reductions were increased by $150,528. The adjustment formula produces reductions in benefits in 1949 for both Models A (one month) and B (two months). Benefits after reduction were larger in Model B (Table 9) than in Model A by $105,713. In 1950, while benefits before reduction were larger in Model B than in Model A by $8901, after reductions the 1950 benefits under Model B were smaller by $11,436. Thus for the two years, as compared with an increase before reduction of $159,429 (15.2 per cent), the actual benefits in Model B were larger than in A by $94,277 (9.2 per cent). The regular contributions in 1949 and 1950 were at the maximum in Model A, and therefore could not be increased in Model B. Assets were exhausted in December 1949, and a cash contribution of $12,101 based on the contingent liability had to be made in order to cover benefits. No such contribution was required in any other month. The regular contributions in 1951 were larger in Model B as compared with Model A by $9471 in cash and $87,303 in contingent liability. The impact of the assumed increase in benefits may be summarized as follows:

	Model A	*Model B*	*Increase B Over A*
Full benefits (1949-50)	$1,047,927	$1,207,356	$159,429
Reductions	28,348	93,500	65,152
Actual benefits	1,019,579	1,113,856	94,277
Cash contributions			
Regular (1951)	525,264	534,735	9,471
On contingent (1949)	—	12,101	12,101
Contingent liability accrual (1951)	159,541	246,844	87,303

Benefit payments under Model B in 1949-50 were highest in August 1949. Benefit reductions began after three months and after benefits, before reductions, had fallen by 20 per cent.

So far as cash outlay is concerned, payment of $94,000 in additional benefits was made with an extra contribution of $21,572. But total obligations were increased by more than benefits—$96,774.

The assumed increase in benefits in 1953-55 was of much larger proportions, but no benefit reductions occurred:

1953-55 benefits

Model A	$ 917,925
Model B	1,428,013
Increase	510,088

Cash contributions for the three years were larger, by $338,254 under Model B, and contingent liability accrual by $141,726. The adjustment provisions operated to keep actual contributions to cover higher benefit expenditures substantially lower than extra benefits.

The nine-year period as a whole compared as follows for the two models:

	Model A	*Model B*	*Excess B Over A*
Cash contributions	$3,239,646	$3,592,069	$352,423
Net contingent liability	1,078,598	1,346,508[a]	267,910
Benefits paid	2,389,093	2,993,458	604,365
Excess of trustee's fee over investment income	3,192	19,775	16,583
Total finances, end of period	1,925,959	1,925,344	—615

[a] Amount is $12,101 above the net contingent liability shown in Table 9. See footnote[c] of that table for explanation of this item.

TABLE 9

Contributions, Investment Income and Expenditures During the Year and Finances at Year-End 1949-1956

Model B

Year	*Hours Worked*	*Contributions*		*Investment Income*	*Administrative Expense*
		Cash	*Contingent Liability Accruals*		
1948	19,811,329	$ 594,337	$ 396,228	$ 2,631	$ 3,600
1949	13,796,724	413,901	275,936	4,278	8,100
1950	18,053,344	541,600	361,066	2,006	9,000
1951	19,374,234	534,735	246,844	9,626	9,000
1952	16,682,962	71,046	—	11,159	9,000
1953	17,131,329	336,261	86,448	11,220	9,000
1954	12,756,718	361,573	136,483	4,706	9,000
1955	14,975,960	298,797	—	1,122	9,000
1956	18,878,166	439,819	24,242	8,177	9,000
Total	151,460,766	3,592,069	1,527,247	54,925	74,700

TABLE 9 (Cont'd)

Year	Benefits Paid	Finances at Year-End: Fund Assets[a]	Finances at Year-End: Contingent Liability	Finances at Year-End: Total	Reduction in Contingent Liability During Year
1948	—	$593,368	$ 396,228	$ 989,596	—
1949	$1,015,548[b]	0[c]	660,063	660,063	$ 12,101[c]
1950	98,308[b]	436,298	1,021,129	1,457,427	—
1951	178,823	792,836	1,267,973	2,060,809	—
1952	241,908	624,133	1,087,234	1,711,367	180,739[d]
1953	286,128	676,486	1,173,682	1,850,168	—
1954	1,033,262	503	1,310,165	1,310,668	
1955	108,623	182,799	1,310,165	1,492,964	
1956	30,858	590,937	1,334,407	1,925,344	
Total	2,993,458	590,937	1,334,407	1,925,344	192,840

[a] Including accrued contributions to be paid in cash.

[b] Total benefits paid after reduction of benefits in accordance with SUB benefit reduction schedule. Benefits at the 100 per cent level would be higher than benefits paid by $58,718 in two months of 1949 and $34,782 in seven months of 1950.

[c] In order to pay benefits in one month in 1949, a contribution based on the contingent liability in the amount of $12,101 was made, and the contingent liability was reduced by the same amount.

[d] Reflects an excess of total finances over the maximum fund level for the months June-November.

Contributions, under Model B, for the period as a whole averaged 2.37 cents per hour in cash and 1.01 cents per hour in contingent liability. Benefits paid averaged 1.98 cents per hour.

In Model C, it was assumed that there would be no change from Model B for the years 1948-52, but that beginning in 1953 hours of work would be smaller and benefits larger than in Model B (see Tables 9 and 10).

For the three-year period 1953-1955, the increase in benefits, if paid in full, for Model C over Model A was $1,597,298. Benefits were reduced by $296,095, so that the increase in benefits actually paid was $1,301,203, or almost 142 per cent. Regular cash contributions in the four years increased from $1,094,086 to $1,603,205, or by $509,119. This amount, plus the fund assets at the end of 1952, was insufficient to pay for the increase in benefits, so that a contribution based on the contingent liability was required in 1954. Regular contributions in 1954 were at a low point, so that the contingent liability contribution was relatively large—over three times the regular contribution for the year.

For the four-year period 1953-56, benefit expenditures under Model C were 3.74 cents per hour as compared with 1.49 cents per hour under Model A and 2.29 cents under Model B. Under Model C the cents-per-hour benefit payment would have been 4.24 at 100% of benefit

obligations. Thus, even without any provisions for reductions in benefits, the cost of benefits in the period was less than five cents per hour. The limit of five cents per hour liability on overall contributions generally keeps the cost within the five-cent limit, on the average, over a period of time. The five-cent limit would not require adjustment if the contingent liability provision were to be eliminated.

In the three models, the year 1954 under Model C was the most critical. Benefit expenditures in cents per hour were 18.40. While regular cash contributions of three cents per hour constituted less than one-quarter of the total of required contributions, over nine cents per hour was the cash contribution from contingent liability needed for payment of benefits. The reduction of benefits in 1954 was important—2.37 cents per hour. That is, in 1954, except for the reduction of benefits, the contribution in cash, instead of 12.10 cents per hour, would have had to be 14.47 cents.

TABLE 10

Contributions, Investment Income and Expenditures During the Year and Finances at Year-End 1949-1956

Model C

Year	*Hours Worked*	*Contributions*		*Investment Income*	*Administrative Expense*
		Cash	*Contingent Liability Accruals*		
		Aggregates			
1948	19,811,329	$ 594,337	$ 396,228	$ 2,631	$ 3,600
1949	13,796,724	413,901	275,936	4,278	8,100
1950	18,053,344	541,600	361,066	2,006	9,000
1951	19,374,234	534,735	246,844	9,626	9,000
1952	16,682,962	71,046	—	11,159	9,000
1953	16,774,610	325,559	95,473	11,182	9,000
1954	9,913,000	297,390	198,260	2,683	9,000
1955	14,552,464	436,572	291,049	2,373	9,000
1956	18,878,166	543,684	281,960	13,817	9,000
Total	147,836,833	3,758,824	2,146,816	59,755	74,700

TABLE 10 (Cont'd)

Year	Benefits Paid	Finances at Year-End: Fund Assets[a]	Finances at Year-End: Contingent Liability	Finances at Year-End: Total	Reduction in Contingent Liability During Year
1948	—	$593,368	$ 396,228	$ 989,596	—
1949	$1,015,548[b]	0[c]	660,063	660,063	$ 12,101[c]
1950	98,308[b]	436,298	1,021,129	1,457,427	—
1951	178,823	792,836	1,267,973	2,060,809	—
1952	241,908	624,133	1,087,234	1,711,367	180,739[d]
1953	321,331	630,543	1,182,707	1,813,250	—
1954	1,824,055[b]	0[c]	478,528	478,528	902,439[c]
1055	73,742[b]	356,203	769,577	1,125,780	—
1956	30,217	874,487	1,051,537	1,926,024	
Total	3,783,932	874,487	1,051,537	1,926,024	1,095,279

Year	Contributions: Cash	Contributions: Contingent Liability Accruals	Investment Income	Administrative Expense	Benefits Paid	Finances at Year-End: Fund Assets[a]	Finances at Year-End: Contingent Liability	Finances at Year-End: Total	Reduction in Contingent Liability During Year
	Cents Per Hour								
1948	3.00	2.00	0.01	0.02	—	3.00	2.00	5.00	—
1949	3.00	2.00	.03	.06	7.36	0	4.78	4.78	0.09
1950	3.00	2.00	.01	.05	.54	2.42	5.66	8.07	—
1951	2.76	1.27	.05	.05	.92	4.09	6.54	10.64	—
1952	.43	—	.07	.05	1.45	3.74	6.52	10.26	1.08
1953	1.94	.57	.07	.05	1.92	3.76	7.05	10.81	—
1954	3.00	2.00	.03	.09	18.40	—	4.83	4.83	9.10
1955	3.00	2.00	.02	.06	.51	2.45	5.29	7.74	—
1956	2.88	1.49	.07	.05	.16	4.63	5.57	10.20	—
Total	2.54	1.45	.04	.05	2.56	—	—	—	.74

[a] Including accrued contributions to be paid in cash.

[b] Total benefits paid after reduction of benefits in accordance with SUB benefit reductions schedule. Benefits at 100 per cent level would be higher than benefits paid by $58,718 in two months of 1949, $34,782 in seven months of 1950, $234,523 in four months of 1954, $61,572 in all twelve months of 1955, and $641 in one month of 1956.

[c] In order to pay benefits in one month of 1949, a contribution based on the contingent liability in the amount of $12,101 was made, and the contingent liability was reduced by the same amount. Similarly, in 1954 a contribution of $902,439 was made based on the contingent liability, with a resultant reduction in the contingent liability by the same amount.

[d] Reflects an excess of total finances over the maximum fund level for the months June-November.

VI. CONCLUSIONS AS TO EFFECTIVENESS OF COST LIMITATIONS

In this statement a number of the provisions of SUB plans have been examined from the point of view of their effect in limiting the costs of paying benefits under the plans.

It has been apparent that there are wide differences as between different companies in any single year, and as between years as far as the same company is concerned, both in the level of costs and in the influence on costs of any particular factor.

The more important provisions affecting costs for a given level of benefits are:

(1) The length of service required for eligibility;

(2) The limit on contributions;

(3) The method of applying the limit;

(4) The point at which the maximum level of the fund is fixed;

(5) The method of changing maximum fund levels;

(6) The method of adjusting benefits to contributions and finances;

(7) The method of accumulating assets to meet potential liabilities;

(8) The initial eligibility requirements other than length of service;

(9) The duration of benefits;

(10) Current week-by-week eligibility requirements;

(11) Definition of layoff;

(12) Maximum limits on weekly individual benefit amounts.

(1) It is probable that the major cost factor, given a decision that benefits will be fixed at a certain level, is the decision as to what, if any, length-of-service requirement will be fixed as an overriding condition of becoming entitled to benefits. If an employer is forced, by a falling off of his work volume, to curtail the volume of his employment, and if the curtailment takes the form of layoff, those employees laid off are almost certain to be largely drawn from employees having the shortest periods of service. This is true whether employment is governed by union agreements or not.

Detailed data from the steel industry (see page 123) indicate that over a period of years something of the order of 60 per cent of the weeks of layoff are taken by employees having less than one year of service as of the date the layoffs begin. Unfortunately the data make it impossible to distinguish between the effect of a service requirement and the effect of eliminating unemployment after the first year. Since, in no year for which data are available, did persons laid off for a year or more (among those having one year or more of service)

constitute as much as eight per cent of all such employees laid off (page 143), and in view of the fact that that part of unemployment of up to one year's duration covered by the last 13 weeks of the 52 is never as much as ten percent of the total (page 142), it is certain that a minor part of the excluded unemployment is to be attributed to that part of the layoffs of eligible employees which is over one year.

(2) Given a decision to provide benefits to supplement state unemployment up to say, 60 or 65 per cent of after-tax pay, and calling the cost of benefits for all employees for the entire duration of their unemployment, without any maximum, X, the introduction of a one-year service requirement will reduce costs (generalizing from steel industry experience) by from probably 50 to 60 per cent, and a two-year service requirement probably 60 to 70 per cent. If there were to be a limit on contributions in any month of, say, one cent, the further reduction in cost might be, in relation to the 30 to 50 per cent remaining after the service requirement, more drastic than the service limitation was in relation to the 100 per cent of possible cost. No SUB plan is likely to contain any such limit. Again generalizing from steel experience, and assuming that there will be an accumulation of assets up to about two years' contributions, a five-cent per hour[34] limit on contributions in any month will result in minor cost reductions over a period of time, though such a limitation may shift the timing of the contribution from a year of serious recession to one not so serious.

(3) The effect of a cost limit is greatest if applied month by month. As the period to which it is applied is lengthened, the limit becomes less effective. In a single year, a five-cent limit, for example, might affect a third of all employers, whereas over a seven-year period ten per cent would be the order of magnitude involved. It is reasonable to suppose that almost all employers would at some point be affected by a five-cent limit applied each month.

(4) The consequences on benefits of a limit on contributions applied on a month-by-month basis will differ, depending on the size of accumulated funds and their availability for expenditure. If, during periods of large business volume, an employer were to accumulate SUB funds of substantial size, any reasonable month-by-month limit on contributions would have no perceptible effect. The indefinite accumulation of funds is not desirable, and some limit must, as a practical matter, be fixed. The initial limit fixed by the auto industry was about four years' regular contributions against two years' contributions in the steel industry. Obviously, if SUB funds are to be accumulated up to the maximum level, the lower the level, the less will be the cost to the employer.

This generalization can be carried too far. An employer cost of X

[34] No distinction will here be made between hours of work and hours for which compensation is paid, the latter currently being six to eight per cent above the former.

in a year of high activity may be quite different from an identical dollar cost in a year of recession. This is partly the result of differences in need for and inability to raise cash. The point will be discussed again at the end of these conclusions.

(5) No maximum limit on SUB funds can remain fixed indefinitely. Changing volumes of employment and changes in benefit liabilities make adjustments in maximum levels desirable. The steel and auto SUB plans use average benefits as the index of changing benefit liabilities. The steel industry measures employment in terms of hours of work in a 12-month period, while the auto plans take the numbers of employees who would be entitled to benefits if laid off as the indicator of shifting fund requirements.

The average benefit is not likely to be a satisfactory index of fund requirements. First, while there is probably a fairly high correlation between amount of benefits and average per capita benefit, the correlation is not perfect. But the correlation is probably high enough to make it reasonably certain that fund requirements (except for the fortuitous amendment of state laws) will rise in periods of recession. To be most serviceable, funds should be liquidated in periods of heavy demand, not accumulated. Both as to qualities as an index and in timing, the average benefit is defective. Substitution of a better device must be based on experience with plan operations.

The auto index of employment remains relatively level at the onset of a period of layoffs, for the numbers potentially entitled to benefits include eligible employees on layoff. Therefore, even in a period of moderate layoffs, benefits under the auto plans will be covered by current contributions. Under the steel plans, the maximum fund requirements will reflect fairly well even a slight recession. Assuming the plan to have accumulated funds to the maximum level, there will be reserves released in the recession period, limiting the need for current contributions. (For an example, see maximum fund levels, contributions and benefits for 1954 on page 148.) After the recession, fund levels reflect higher hours, and contributions then become due to recoup expenditures made during the recession.

The steel method unfortunately adjusts maximum fund levels when no benefit expenditures are involved. Thus if, instead of reducing the numbers of employees and hours of work by layoff, a short work-week is instituted, ultimate liabilities for benefits may not be affected, for employees may later on be laid off with undiminished amounts and even longer durations of benefits; but the maximum fund level indication will be otherwise. Extensive short time is, of course, an indicator of a recession; and reducing contributions during such a period is appropriate, as is done by the steel but not the auto plans. Some way needs to be found to combine this appropriate result with some other device which does not improperly indicate a fall in ultimate potential obligations.

(6) Both the steel and auto plans use the ratio between finances

(including, for the steel plans, the contingent obligation to contribute) and the maximum fund level as the index of the need for benefit adjustments. Thus in the steel plans, if finances in hand fall below 75 per cent of the maximum fund level, benefits will be reduced by 25 per cent; and under the auto plans, if fund assets are less than 85 per cent of the maximum level, the duration of benefits for some employees will be shortened.

As a device for limiting expenditures, the steel arrangement is much more effective than the auto plan provisions. But the experience raises a question as to whether the timing of the operation under the steel plan robs it of its effectiveness. Unemployment in the steel industry is clearly cyclical in character; no one has yet detected, in the basic industry, any of those regular variations in employment, hours, or output which are the hallmark of seasonality. With unemployment, and therefore benefits, concentrated in 12 to 15 months out of four or five years, the major function of a reserve fund should be to make possible full payments during substantial recessions, contributions being limited to the maximum or, in periods of modest decline and benefits, even permit the financing of benefits with contributions remaining substantially under the maximum.

The steel experience raises the question as to whether the reductions in benefits are likely to be worth while. Such reductions tend to come after the most critical unemployment is past, and the savings in contributions resulting from operation of the reduction provisions are, in relation to total benefits, usually small. One of the main motives for operating a SUB plan is that of affording additional security to employees and the resulting gain in employee goodwill and morale which that additional security will produce. The reduction of benefits could lead to loss of confidence by employees in the value of the SUB plan as a means of providing additional security. If this were the case, the small saving which appears to be the consequence of operation of the benefit reduction provisions would be minor as compared to overall loss.

This last conclusion is in part made possible by operation of hindsight. While the recessions of 1949 and 1953-54 were in progress, there was no certainty that they would not be much longer than they turned out to be. And it does not follow that, because the 1949 and 1953-54 recessions were brief, that of 1957-58 will be also. The reductions provided for under the steel plan, mistaken though they may appear to be in retrospect, are to be justified, when operative, on the ground that the further duration of recession being unknown, it is prudent to conserve.

The method of adjusting benefits to contributions under the auto plans is the relatively mild one of shortening the maximum duration of benefits; the method is mild because anyone whose unemployment does not last as long as the maximum applicable to him will not be affected. The steel method of reducing benefits applies to every beneficiary, whether unemployed for one week or 52. Each of these meth-

ods is an appropriate part of an overall scheme. In relation of benefit levels, the auto plan assets are intended to be roughly double those of the steel plans; the maximum duration of benefits is intended to be twice as long under the steel plans than under those in the auto industry. While an extension of the duration of benefits beyond 26 weeks will normally add less than one-third to total compensable unemployment, it is to be remembered that the benefit payable for the weeks beyond 26 will be at a rate double, or more than double, that paid during the state benefit period. The steel benefit adjustment provisions must therefore be much more drastic than those which are appropriate for the auto plans.

(7) The steel SUB plans accumulate assets to meet benefit obligations by the companies (a) paying a contribution in cash to their SUB funds, and (b) making promissory notes to the funds to be redeemed,[35] if and when required to pay benefits. Under the auto plans, the accumulation of assets is entirely through the payment of contributions to their SUB funds by the companies.

If the benefits under the steel plans never exceeded three cents per hour worked, the problem of making contributions on the basis of the contingent liability would never arise.[36] But it is wholly unlikely that costs will be under three cents per hour in all years, and in some companies in some periods benefit expenditures are likely to be several times three cents.[37] Under the steel SUB plans, a recession period is likely to be the period of highest cash contributions. And the period of lowest unemployment is likely to be the point at which the plan becomes one operated on a pay-as-you-go basis.

If, so far as its own books are concerned, a steel company charges contingent liability accruals to operating expenses, the accounts will never show a SUB cost higher than five cents per hour worked. If a steel company has a policy of following Internal Revenue Service practice and its books reflect as expenses only those items allowed as such by IRS, then contingent liability will be reflected as a cost only when contributed. In that case, the highest expense will occur at the bottom of the depression, subject to some shift in timing as a result of operation of the benefit reduction provisions.

In all steel cases, however, the largest cash drain, both on the company and on the fund, will occur in a recession period. Under the auto plans, the cash drain on the company will fall in a period of recession

[35] The agreement with the Union specifies that these "notes," referred to in the preceding description by the term "contingent liability," used in the plans are to be cancelled upon expiration of the agreement. There will no doubt be a renewal of the "notes" upon renewal of the agreement itself.

[36] Under the companies' interpretation of the plan that all contributions are to be divided in a six to four ratio between cash and contingent liability, the need for making contributions based on contingent liability could arise with any low average cost.

[37] Current indications are that the first half of 1958 will be such a period for most steel SUB plans.

because of the reduction in hours; the cash drain on the plans will, of course, be at a maximum.

That part of the steel plans which imposes the greatest strain during periods of recession is the weakest point in the steel plans.

(8) The main requirements for initial eligibility for supplemental benefits, other than length of service, have to do with the cause of layoff: (1) Layoffs resulting from most labor disputes affecting any workers or operations at a plant where a layoff occurs, or involving employees anywhere who are members of the union concerned in the SUB plan will not be compensable under SUB; (2) layoffs caused by war, hostile acts of foreign governments, sabotage, insurrections or acts of God are not compensable; and (3) in the steel industry, layoffs arising out of (a) strikes which interfere with production at the plant, or the ingress or egress of product or material there, or (b) government regulations or control over the kind or amount of material which the company may sell or use is not compensable.

These are probably more useful in preventing benefits for catastrophic unemployment than for any effect on day-to-day operation. In the nature of the case, it has been impossible to secure past records which would indicate the quantitative importance of any of these restrictions. In this area only experience can indicate the degree of cost limitation which these provisions produce.

It can reasonably be expected that the concepts underlying these limitations will need to be refined so as to confine the limitations to those appropriate to the exclusion of purely catastrophic risk. For example, cases have recently come up in which extreme cold coupled with failure of the usual fuel supply made work in a plant impossible and layoffs necessary. Additional fuel was available but at a higher cost than the regular supply. Are the layoffs due to the unprecedentedly extreme cold or to a man-decision not to buy available fuel because of the cost? The former is clearly an act of God, which the latter just as clearly is not. Or, to take another example: a manufacturer of tin cans has for many years bought a large extra supply of tin plate just before the expiration date of contracts between the basic steel companies and the United Steelworkers of America. On such an occasion in the future, the manufacturer concludes there will be no strike and, on the basis of his conclusion, orders no extra tin plate. A strike occurs and employees are laid off because of exhaustion of all tin plate stocks everywhere. Are these layoffs to be attributed to the strike or to a change in long followed management policy?

It is not necessary to be able to measure catastrophic risk even by approximation to be certain that the exclusion of such risks from SUB plans with reserves of the order thus far provided for are essential for reasonably secure plan operation. Sharpening definitions so as to eliminate, from the definition of catastrophic, layoffs which are not properly so classified is an appropriate development of the plans.

(9) The data relating to durations of layoff in the steel industry

(see pages 142 and 143) suggest that the average duration of layoffs lasting for more than one year is probably not longer than 80 weeks and probably shorter. If 80 weeks is such average duration, weeks in excess of 52 would account for a little more than seven per cent of all weeks of layoff in the period 1949-55. If all weeks of layoff were weeks of benefit, the increase in benefits would, on the average, be raised by 14 per cent.

In cost calculations for steel SUB it was assumed that, with minor exceptions, weeks of layoff were weeks of benefit, and under that assumption it would follow that the cost of a plan without limitation on the duration of benefits would be about 14 per cent more than a plan with a limitation of benefits to 52 weeks. Such a conclusion would probably be wide of the mark.

The cost assumption as to substantial identity between weeks of layoff and benefits might have validity but for two considerations: a safety factor for experience worse than any in the 1949-55 period is needed, and the volume of employment secured by those on layoff may not be the same under SUB as before SUB plans were initiated. Employees frequently take jobs which are classified as "unsuitable"; in such a case unsuitable includes, among other things, wages lower than those which the employee has been earning. Such jobs are taken because they mean some additional income as compared with state benefits (or in periods after state benefits are exhausted, as compared with no income). The receipt of supplemental benefits will normally lead employees on layoff to reject unsuitable jobs. Very little information is available on part-time employment by persons who could be entitled to state and supplemental benefits. The proportion of the persons receiving state benefits who are partially employed ranges usually from about 6 to 9½ per cent. Many others are partially employed but, unfortunately, the data do not show how many of the partially unemployed do not desire full-time employment. Further, while the data suggest substantial employment with layoff periods, there is no way to determine how much of the employment is marginal and likely to be eliminated by supplemental benefits—at least insofar as the beneficiaries are concerned—and how much is in the "suitable" category which would not be affected.

Supplemental benefits do have a limited duration; work may be accepted in view of the certainty that benefits will necessarily run out which might be rejected if the benefits were to continue indefinitely. The unlimited duration of benefits is therefore to be rejected, primarily because of its impact on motivation. On the cost limitation side, the confinement of compensable unemployment to unemployment resulting from a layoff is the major factor. Only the employer can initiate or terminate a layoff, and the employer's decision will be based on his need for workers. This is not to say that limitation of duration to 52 weeks is without important cost effects but rather that, irrespective of cost extension, may be undesirable on other grounds.

There is widespread opinion to the effect that extension of benefits beyond 26 weeks will constitute an undesirable inhibition on the desire for employment. The numbers holding this view, and the intensity with which it has been held, have both experienced a sharp decline in the past year. It can probably be said that for those concerned with SUB plans, the point at which, up to 52 weeks, the line of maximum duration is drawn will depend primarily on cost. If, as seems possible, state benefit maximum durations are increased to 39 weeks in a benefit year in most of the important industrial states, SUB durations, where now less than 52, are likely to be raised to 52.

This is not to imply that increases in the duration of state benefits make it possible for the employer to increase SUB durations without cost. Or to put it the other way, the total cost of unemployment benefits for an employer who has instituted a 52-week SUB plan will be raised by an increase in the duration of state benefits. For while such an increase in duration will lower SUB costs, the increase in state benefit costs will be much more than SUB savings because those laid-off employees, usually a majority, who are not entitled to SUB will receive more state benefits, a fact which, under the experience rating provisions of most state unemployment compensation laws (unless already at the maximum state contribution rate—and steel companies usually aren't) will result in the employer paying for extra state benefit costs.

The belief that maximum benefit durations in most SUB plans will go to 52 weeks is based on the obvious widespread weakening of the belief that duration of benefits beyond 26 weeks constitutes undue encouragement of malingering.

There is one final matter to be referred to: the extent to which durations will be curtailed by failure of employees to have credit units. A steel employee who completes two years of service will normally have 52 credit units. During his first two years of service an employee will accumulate credit units for all hours paid for, for illness or disability for which he was paid a benefit (which means substantially all illness or disability up to 26 weeks per spell), and for time lost from the company because of union duty. Generally, immediately prior to years of substantial layoff such as in 1949 and 1953-54 (and 1958) there has been a period of at least two years of extremely intense employment activity. Thus at the critical point, the main factor which cuts down credit units—layoffs—will have been at a minimum, and most employees, at two years of service, will have 52 credit units. The main exceptions will be persons who, having been in the armed services for two years, and who, having received service credit for armed service time, get no credit units because of not having hours of pay, union duty or disability benefits during their time in the service.

For the same reason that most employees at two years of service will have 52 credit units, most employees of longer than two years of service will come to any period of layoff with 52 credit units.

(10) The major part of the week-by-week eligibility requirements for supplementary benefits are the same as those for receipt of state benefits. Under the state laws, in 1957, disqualifications of employees applying anew for unemployment benefits were applied in about five per cent of the cases. No benefits under SUB plans are payable to employees whose unemployment begins with a quit or discharge for misconduct. In terms of aggregate impact, all disqualifications ran to about two per cent of claimant contacts, i.e., new plus continued claims. The two most important disqualifications applicable to SUB plans—inability to or unavailability for work—applied to less than one per cent of the total claimant contacts. There are substantial variations between states as to disqualification experience, and since SUB application of some of the more important tests may be independent of state agency decisions on the same sets of facts, differences between state and SUB experience may also be substantial. While a difference between one per cent and two per cent of "claimant contacts" is a large relative difference, in terms of claim payments the one case is only one per cent larger than the other.

There seems no reason to expect that the week-to-week eligibility requirements will have a different impact when state benefits are not payable than when they are. The specifications that, in order to become entitled to supplemental benefits, (a) an employee must meet the ability and availability tests, (b) he may not, without good cause, refuse suitable employment, (c) he must maintain a live registration at a state employment office, (d) he must apply for other employment when so directed, and (e) he may not voluntarily leave other suitable employment will continue to apply. Unless administered in a way fundamentally different from the way in which they are administered by the states, and such is improbable, the results should be about the same as current state experience.

There are other requirements independent of those in state systems which must be met by applicants for supplemental benefits: failing to follow up on jobs to which the company, independently of the state employment service, has directed an applicant; failing to report promptly upon recall from layoff; failure to accept an unsuitable job if such is required by the collective bargaining agreement; and, in certain cases, where vacation pay is paid in lieu of an actual vacation, the payment may be deemed to have been made during a subsequent period of layoff. Except for the requirement of accepting an unsuitable job, these requirements are analogous to provisions in state laws or regulations—even in treatment of vacation pay. The sanction for acceptance of the job which the collective bargaining agreement calls for is very powerful. While all these provisions are important for the orderly administration of supplemental benefits, for elimination of claimants not genuinely unemployed, and for the systematic maintenance of the status of employees laid off as active participants in the labor market, they are not likely to show up in any statistics as constituting important limitations on benefit costs.

(11) An employee is not on layoff from his employer when he quits work voluntarily, or is dismissed for some reason other than lack of work, or if he has been recalled to work. He may, after quit or dismissal, be unemployed and, under some state systems, after a disqualification period, he may become entitled to state benefits. An employee on layoff from Company A may secure employment at Company B, and for the best of reasons quit his work at the latter. This latter quit will not necessarily[38] have an effect on supplemental benefit payments from Company A, for with respect to that company he will still be on layoff.

Except in recessions, voluntary quits greatly outnumber layoffs. While in most cases unemployment does not follow quits, the strict definition of layoff in SUB plans undoubtedly has a major effect in limiting benefit costs.

Perhaps some SUB plan at some future time will provide supplemental benefits for former employees unemployed following a quit or discharge. If such were to be the case, it might be possible to gain some idea of the cost-limiting effect of the restriction of benefits to employees on layoff. In the absence of experience under some such plan—and at this time the possibility that any such plan will be adopted appears highly remote—all that can be said is that the restriction of benefits paid under a company SUB plan to employees on layoff from that company has important cost-limiting effects.

In the steel but not in the auto plans, an employee working a short week—less than 32 hours—is deemed to be on layoff. If his wages are less than his gross supplemental benefit (in states such as Pennsylvania, less than his gross supplemental benefit plus disregarded wages), he will be entitled to a supplemental benefit, even though the wages are such as to disqualify for the state benefit. In other words, partial unemployment is tantamount to layoff.

Under the auto plans, apparently, layoff is so narrowly defined as to exclude an employee doing any work for a company. In both steel and auto plans, partial employment (or, indeed, full-time employment) for another company does not interrupt the layoff status as far as the first company is concerned. Steel benefits are calculated in the same way as if the partial employment were with the first company. The auto plans treat the employee partially employed by a second employer somewhat more liberally than if partially employed by the first: he can receive a supplemental benefit if a state benefit is payable. Supplemental benefits and state benefits cease simultaneously. The auto provisions have much stronger cost-limiting effect than do those of the steel plans—an effect which can be expected to influence

[38] Whether he is entitled to supplemental benefits from Company A immediately will depend in part on whether the state law eliminates the disqualification for a voluntary quit only if the "good cause" for the action is attributable to the employer, or whether the "good cause" is sufficient; the period for which a disqualification, if any, runs; whether the disqualification takes the form of postponement or reduction of benefits; and whether state benefits can be paid in the absence of additional covered employment.

unfavorably the desire of beneficiaries to work. However, since the available evidence seems to indicate that partial employment during benefit periods is relatively uncommon, these cost-limiting effects appear to be minor.

(12) The maximum limits on benefits are important in states in which state benefits are low. (See the appendix tables.) In the major industrial states, the costs, if there were to be no maximum during the period in which state benefits are paid, would be different from what they are at present to only a minor degree. This is because, in general, employees in the top wage brackets have not been laid off. In the case of catastrophic unemployment where all or substantially all of the employees in a plant are laid off, including the highest paid, the maximum benefit could be important. Further, the maxima during state benefits may become important if, because of long periods of short-time employment, state benefits are reduced. For companies employing the bulk of steel and auto workers, low state benefits from this cause have not been important since World War II. If the present recession should be extended, the situation could be very different.

The steel maxima for the period after exhaustion of state benefits will be applicable more often than not, since the wage rate levels at which the maxima are operative are substantially under the average (from $2.16 for an employee without dependents to $2.25 for one with four.) The auto maximum of $25 is applicable both before and after exhaustion of state benefits; it will operate in all cases after such exhaustion. Since the maximum duration of auto benefits is 26 weeks and since most state benefits are payable for the same maximum period, the cost-limiting effect of the low maximum is not substantial.

This statement has dealt primarily with unemployment which is cyclical in character. While most of the devices for limiting benefit costs would apply in principle and be effective in connection with seasonal unemployment, this might well not be true of the methods of fixing the maximum fund levels. In the steelworker plans at least a repetitive pattern of hours at 12-month or approximately 12-month intervals would interfere with the release of reserves and upset one of the main aims of the timing of the several calculations. The steel plans, and perhaps the auto as well, have not been constructed with seasonal unemployment in mind.

There is an implicit assumption in this statement that a level of cost of X cents per hour in one year is exactly the same as an identical level in another year. This is patently not true. A device which limits cost to an average of five cents per hour, with nothing or a very small amount, say, in a year like 1956, and eight cents or 10 cents or 20 cents in a year like 1954, may not be as desirable from the point of view of either employer or beneficiaries as one which limits costs to an average of six or seven cents per hour, with eight cents or 10 cents in a highly prosperous year and little or nothing during recession.

The auto plans come closer than the steel in proportioning costs to

varying ability to pay. The steel plans may duplicate the auto in cost impact, on a purely accounting level, if the contingent liability is accounted for as a cost when it accrues. If contingent liability is treated as cost only when it forms the basis for a contribution, and under all the steel plans on the financing levels, there is a tendency for the costs to be light in good years and heavy in bad.

The problem of devising a different type of cost limitation involves many difficult problems. This statement has concerned itself with a description and analysis of devices in being. But it is appropriate to close by pointing out that what exists clearly needs improvement. The tests to which the SUB plans are being subjected by the present recession will, one may confidently predict, bring this out clearly when the records for their operations become available for analysis.

TABLE A

Weekly Benefit for Total Unemployment
Under Selected State Laws
For Specified Wage Base
April 1958

State	*Number of Dependents*[1]						
	0	*1*	*2*	*3*	*4*	*5*	*6*
	Benefit based on: $1.975 per hour for 32-hour week[2]						
Alabama	$28	$28	$28	$28	$28	$28	$28
California	32	32	32	32	32	32	32
Colorado	33	33	33	33	33	33	33
Connecticut	32	32	36	40	44	48	48
Illinois	30	33	36	36	36	36	36
Maryland	34	34	36	38	40	42	42
Michigan	28	30	35	37	38	38	38
New York	33	33	33	33	33	33	33
Pennsylvania	33	33	33	33	33	33	33
	Benefit based on: $1.975 per hour for 40-hour week[2] $2.475 per hour for 32-hour week[2]						
Alabama	$28	$28	$28	$28	$28	$28	$28
California	37	37	37	37	37	37	37
Colorado	35	35	35	35	35	35	35
Connecticut	40	40	44	48	52	56	60
Illinois	30	33	36	39	42	42	42
Maryland	35	35	37	39	41	43	43
Michigan	30	34	40	40[3]	41	41	41
New York	40	40	40	40	40	40	40
Pennsylvania	35	35	35	35	35	35	35

(Footnotes on next page.)

TABLE A (Cont'd)

State	Number of Dependents[1] 0	1	2	3	4	5	6
	Benefit based on: $2.475 per hour for 40-hour week[2]						
Alabama	$28	$28	$28	$28	$28	$28	$28
California	40	40	40	40	40	40	40
Colorado	35	35	35	35	35	35	35
Connecticut	40	40	44	48	52	56	60
Illinois	30	33	36	39	42	45	45
Maryland	35	35	37	39	41	43	43
Michigan	30	34	43	49	50	50	50
New York	45	45	45	45	45	45	45
Pennsylvania	35	35	35	35	35	35	35

[1] One dependent is assumed to be a wife; all dependents in excess of one are assumed to be minor children.

[2] It is assumed that 13 weeks were worked in each quarter of the base period.

[3] The amount based on an hourly wage of $2.475 for 32 hours in a week is $41.

TABLE B

Illustrative Weekly Supplemental Benefit Amounts
For Total Unemployment Under Steel and Auto Plans
In Nine Selected States
Average Hourly Earnings: $1.975 ($79 Per Week)
State Benefit Based on 32-Hour Weeks in Base Period

State	Number of Dependents[a] 0	1	2	3	4	5	6
Alabama							
Steel	$15.63	$17.15	$18.67	$20.19	$21.71	$23.23	$23.35
Auto[1]	14.46	15.95	17.45	18.94	20.44	21.93	22.19
Auto[2]	11.19	12.57	13.95	15.33	16.71	18.09	18.33
California							
Steel	11.63	13.15	14.67	16.19	17.71	19.23	19.35
Auto[1]	10.46	11.95	13.45	14.94	16.44	17.93	18.19
Auto[2]	7.19	8.57	9.95	11.33	12.71	14.09	14.33
Colorado, New York and Pennsylvania							
Steel	10.63	12.15	13.67	15.29	16.71	18.23	18.35
Auto[1]	9.46	10.95	12.45	13.94	15.44	16.93	17.19
Auto[2]	6.19	7.57	8.95	10.33	11.71	13.09	13.33

(See next page for footnotes.)

TABLE B (Cont'd)

State	*Number of Dependents*[a]						
	0	*1*	*2*	*3*	*4*	*5*	*6*
Connecticut							
Steel	11.63	13.15	10.67	8.19	5.71	3.23	3.35
Auto[1]	10.46	11.95	9.45	6.94	4.44	0	2.19
Auto[2]	7.19	8.57	5.95	3.33	0	0	0
Illinois							
Steel	13.63	12.15	10.67	12.19	13.71	15.23	15.35
Auto[1]	12.46	10.95	9.45	10.94	12.44	13.93	14.19
Auto[2]	9.19	7.57	5.95	7.33	8.71	10.09	10.33
Maryland							
Steel	9.63	11.15	10.67	10.19	9.71	9.23	9.35
Auto[1]	8.46	9.95	9.45	8.94	8.44	7.93	8.19
Auto[2]	5.19	6.57	5.95	5.33	4.71	4.09	4.33
Michigan							
Steel	15.63	15.15	11.67	11.19	11.71	13.23	13.35
Auto[1]	14.46	13.95	10.45	9.94	10.44	11.93	12.19
Auto[2]	11.19	10.57	6.95	6.33	6.71	8.09	8.33

[a] The first dependent is assumed to be a wife, the others dependent children as defined in the appropriate law.

[1] First 4 weeks of layoff.

[2] After first 4 weeks of layoff.

TABLE C

Illustrative Weekly Supplemental Benefit Amounts
For Total Unemployment Under Steel and Auto Plans
In Nine Selected States
Average Hourly Earnings: $1.975 ($79 Per Week)
State Benefit Based on 40-Hour Weeks in Base Period

State	*Number of Dependents*[a]						
	0	*1*	*2*	*3*	*4*	*5*	*6*
Alabama							
Steel	$15.63	$17.15	$18.67	$20.19	$21.71	$23.23	$23.35
Auto[1]	14.46	15.95	17.45	18.94	20.44	21.93	22.19
Auto[2]	11.19	12.57	13.95	15.33	16.71	18.09	18.33
California							
Steel	6.63	8.15	9.67	11.19	12.71	14.23	14.35
Auto[1]	5.46	6.95	8.45	9.94	11.44	12.93	13.19
Auto[2]	2.19	3.57	4.95	6.33	7.71	9.09	9.33
Colorado and Pennsylvania							
Steel	8.63	10.15	11.67	13.19	14.71	16.23	16.35
Auto[1]	7.46	8.95	10.45	11.94	13.44	14.93	15.19
Auto[2]	4.19	5.57	6.95	8.33	9.71	11.09	11.33
Connecticut							
Steel	3.63	5.15	2.67	0.19	0	0	0
Auto[1]	2.46	3.95	0	0	0	0	0
Auto[2]	0	0	0	0	0	0	0
Illinois							
Steel	13.63	12.15	10.67	9.19	7.71	9.23	9.35
Auto[1]	12.46	10.95	9.45	7.94	6.44	7.93	8.19
Auto[2]	9.19	7.57	5.95	4.33	2.71	4.09	4.33
Maryland							
Steel	8.63	10.15	9.67	9.19	8.71	8.23	8.35
Auto[1]	7.46	8.95	8.45	7.94	7.44	6.93	7.19
Auto[2]	4.19	5.57	4.95	4.33	3.71	3.09	3.33
Michigan							
Steel	13.63	11.15	6.67	8.19	8.71	10.23	10.35
Auto[1]	12.46	9.95	5.45	6.94	7.44	8.93	9.19
Auto[2]	9.19	6.57	0[3]	3.33	3.71	5.09	5.33
New York							
Steel	3.63	5.15	6.67	8.19	9.71	11.23	11.35
Auto[1]	2.46	3.95	5.45	6.94	8.44	9.93	10.19
Auto[2]	0	0	0	3.33	4.71	6.09	6.33

[a] The first dependent is assumed to be a wife, the others dependent children as defined in the appropriate law.
[1] First 4 weeks of layoff.
[2] After first 4 weeks of layoff.
[3] Gross benefit less state benefit is less than $2.00 so no supplemental benefit is payable.

TABLE D

Illustrative Weekly Supplemental Benefit Amounts For Total Unemployment Under Steel and Auto Plans In Nine Selected States

Average Hourly Earnings: $2.475 ($99 Per Week)
State Benefit Based on 32-Hour Weeks in Base Period

	Number of Dependents[a]							
State	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Alabama								
Steel	$25.00	$27.00	$29.00	$30.85	$32.37	$33.00	$33.00	$33.00
Auto[1]	24.83	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Auto[2]	20.76	22.14	23.52	24.90	25.00	25.00	25.00	25.00
California								
Steel	17.29	18.81	20.33	21.85	23.37	24.89	26.41	27.35
Auto[1]	15.83	17.32	18.82	20.31	21.81	23.30	24.80	25.00
Auto[2]	11.76	13.14	14.52	15.90	17.28	18.66	20.04	21.06
Colorado and Pennsylvania								
Steel	19.29	20.81	22.33	23.85	25.37	26.89	28.41	29.35
Auto[1]	17.83	19.32	20.82	22.31	23.81	25.00	25.00	25.00
Auto[2]	13.76	15.14	16.52	17.90	19.28	20.66	22.04	23.06
Connecticut								
Steel	14.29	15.81	13.33	10.85	8.37	5.89	3.41	4.35
Auto[1]	12.83	14.32	11.82	9.31	6.81	4.30	0[3]	2.90
Auto[2]	8.76	10.14	7.52	4.90	2.28	0	0	0
Illinois								
Steel	24.29	22.81	21.33	19.85	18.37	19.89	21.41	22.35
Auto[1]	22.83	21.32	19.82	18.31	16.81	18.30	19.80	20.90
Auto[2]	18.76	17.14	15.52	13.90	12.28	13.66	15.04	16.06
Maryland								
Steel	19.29	20.81	20.33	19.85	19.37	18.89	20.41	21.35
Auto[1]	17.83	19.32	18.82	18.31	17.81	17.30	18.80	19.90
Auto[2]	13.76	15.14	14.52	13.90	13.28	12.66	14.04	15.06
Michigan								
Steel	24.29	21.81	17.33	17.85	19.37	20.89	22.41	23.35
Auto[1]	22.83	20.32	15.82	16.31	17.81	19.30	20.80	21.90
Auto[2]	18.76	16.14	11.52	11.90	13.28	14.66	16.04	17.06
New York								
Steel	14.29	15.81	17.33	18.85	20.37	21.89	23.41	24.35
Auto[1]	12.83	14.32	15.82	17.31	18.81	20.30	21.80	22.90
Auto[2]	8.76	10.14	11.52	12.90	14.28	15.66	17.04	18.06

[a] The first dependent is assumed to be a wife, the others dependent children as defined in the appropriate law.
[1] First 4 weeks of layoff.
[2] After first 4 weeks of layoff.
[3] Gross benefit less state benefit is less than $2.00 so no supplemental benefit is payable.

TABLE E

Illustrative Weekly Supplemental Benefit Amounts
For Total Unemployment Under Steel and Auto Plans
In Nine Selected States
Average Hourly Earnings: $2.475 ($99 Per Week)
State Benefit Based on 40-Hour Weeks in Base Period

	Number of Dependents[a]							
State	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Alabama								
Steel	$25.00	$27.00	$29.00	$30.85	$32.37	$33.00	$33.00	$33.00
Auto[1]	24.83	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Auto[2]	20.76	22.14	23.52	24.90	25.00	25.00	25.00	25.00
California								
Steel	14.29	15.81	17.33	18.85	20.37	21.89	23.41	24.35
Auto[1]	12.83	14.32	15.82	17.31	18.81	20.30	21.80	22.90
Auto[2]	8.76	10.14	11.52	12.90	14.28	15.66	17.04	18.06
Colorado and Pennsylvania								
Steel	19.29	20.81	22.33	23.85	25.37	26.89	28.41	29.35
Auto[1]	17.83	19.32	20.82	22.31	23.81	25.00	25.00	25.00
Auto[2]	13.76	15.14	16.52	17.90	19.28	20.66	22.04	23.06
Connecticut								
Steel	14.29	15.81	13.33	10.85	8.37	5.89	3.41	4.35
Auto[1]	12.83	14.32	11.82	9.31	6.81	4.30	0[3]	2.90
Auto[2]	8.76	10.14	7.52	4.90	2.28	0	0	0
Illinois								
Steel	24.29	22.81	21.33	19.85	18.37	16.89	18.41	19.35
Auto[1]	22.83	21.32	19.82	18.31	16.81	15.30	16.80	17.90
Auto[2]	18.76	17.14	15.52	13.90	12.28	10.66	12.04	13.06
Maryland								
Steel	19.29	20.81	20.33	19.85	19.37	18.89	20.41	21.35
Auto[1]	17.83	19.32	18.82	18.31	17.81	17.30	18.80	19.90
Auto[2]	13.76	15.14	14.52	13.90	13.28	12.66	14.04	15.06
Michigan								
Steel	24.29	21.81	14.33	9.85	10.37	11.89	13.41	14.35
Auto[1]	22.83	20.32	12.82	8.31	8.81	10.30	11.80	12.90
Auto[2]	18.76	16.14	8.52	3.90	4.28	5.66	7.04	8.06
New York								
Steel	9.29	10.81	12.33	13.85	15.37	16.89	18.41	19.35
Auto[1]	7.83	9.32	10.82	12.31	13.81	15.30	16.80	17.90
Auto[2]	3.76	5.14	6.52	7.90	9.28	10.66	12.04	13.06

[a] The first dependent is assumed to be a wife, the others dependent children as defined in the appropriate law.
[1] First 4 weeks of layoff.
[2] After first 4 weeks of layoff.
[3] Gross benefit less state benefit is less than $2.00 so no supplemental benefit is payable.

TABLE F

Illustrative Supplemental Benefits Under Steel and Auto Plans In Weeks of Partial Unemployment

Employees with Two Dependents

(Both Supplemental and State Benefits Based on Full-Time Employment in Base Period at $1.975 Per Hour)

	Wages for Current Partial Employment at $1.50 Per Hour Employed in Week				*Wages for Current Partial Employment at $1.975 Per Hour Employed in Week*		
	1 day ($12)	*2 days ($24)*	*3 days ($36)*	*4 days ($48)*	*1 day ($15.80)*	*2 days ($31.60)*	*3 days ($47.40)*
Alabama							
Steel	$18.67	$18.67	$16.67	$ 4.67	$18.67	$21.07	$ 5.27
Auto[1]	11.45	11.45	0	0	11.65	0	0
Auto[2]	7.95	7.95	0	0	8.15	0	0
California							
Steel	9.67	9.67	9.67	1.67	9.67	9.67	2.27
Auto[1]	5.45	5.45	5.45	0	4.65	4.85	0
Auto[2]	[3]	[3]	[3]	0	[3]	[3]	0
Colorado							
Steel	11.67	11.67	13.67	1.67	11.67	11.67	2.27
Auto[1]	7.45	7.45	0	0	7.15	7.35	0
Auto[2]	3.95	3.95	0	0	3.65	3.85	0
Connecticut							
Steel	2.67	2.67	2.67	1.67	2.67	2.67	2.27
Auto[1]	0	0	0	0	0	0	0
Auto[2]	0	0	0	0	0	0	0
Illinois							
Steel	10.67	10.67	17.67	5.67	10.67	10.67	6.27
Auto[1]	2.45	2.45	0	0	[3]	[3]	0
Auto[2]	0	0	0	0	0	0	0

(Footnotes see next page.)

TABLE F (Cont'd)

	Wages for Current Partial Employment at $1.50 Per Hour Employed in Week				*Wages for Current Partial Employment at $1.975 Per Hour Employed in Week*		
	1 day ($12)	*2 days ($24)*	*3 days ($36)*	*4 days ($48)*	*1 day ($15.80)*	*2 days ($31.60)*	*3 days ($47.40)*
Maryland							
Steel	9.67	9.67	9.67	5.67	9.67	9.67	6.27
Auto[1]	[3]	[3]	[3]	0	[3]	[3]	0
Auto[2]	0	0	0	0	0	0	0
Michigan							
Steel	6.67	6.67	6.67	8.67[4]	6.67	6.67	9.27[4]
Auto[1]	0	[3]	0	0	0	0	0
Auto[2]	0	0	0	0	0	0	0
New York							
Steel	6.67	6.67	6.67	8.67[4]	6.67	6.67	9.27[4]
Auto[1]	3.45	[3]	0	0	0	0	0
Auto[2]	0	0	0	0	0	0	0
Pennsylvania							
Steel	11.67	11.67	11.67	4.67	11.67	11.67	5.27
Auto[1]	4.45	4.45	4.45	0	3.65	3.85	0
Auto[2]	[3]	[3]	[3]	0	[3]	[3]	0

[1] First 4 weeks of layoff.

[2] After first 4 weeks of layoff.

[3] The excess of the gross benefit over the state benefit is less than $2.00, so no supplemental benefit is payable.

[4] It is assumed that $10 of wages are disregarded in calculating the benefit amount.

TABLE G

Illustrative Supplemental Benefits Under Steel and Auto Plans In Weeks of Partial Unemployment

Employees with Two Dependents

(Both Supplemental and State Benefits Based on Full-Time Employment in Base Period at $2.475 Per Hour)

	Wages for Current Partial Employment at						
	$1.50 Per Hour Employed in Week				*$2.475 Per Hour Employed in Week*		
	1 day ($12)	*2 days ($24)*	*3 days ($36)*	*4 days ($48)*	*1 day ($19.80)*	*2 days ($39.60)*	*3 days ($59.40)*
Alabama							
Steel	$29.00	$29.00	$27.33	$15.33	$29.00	$23.73	$ 3.93
Auto[1]	21.82	21.82	0	0	22.02	0	0
Auto[2]	17.52	17.52	0	0	17.72	0	0
California							
Steel	17.33	17.33	17.33	12.33	17.33	17.33	0.93
Auto[1]	12.82	12.82	12.82	0	12.02	12.22	0
Auto[2]	8.52	8.52	8.52	0	7.72	7.92	0
Colorado							
Steel	22.33	22.33	24.33	12.33	22.33	20.73	0.93
Auto[1]	17.82	17.82	0	0	17.52	0	0
Auto[2]	13.52	13.52	0	0	13.22	0	0
Connecticut							
Steel	13.33	13.33	13.33	12.33	13.33	13.33	0.93
Auto[1]	8.82	8.82	8.82	0	8.02	8.22	0
Auto[2]	4.52	4.52	4.52	0	3.72	3.92	0
Illinois							
Steel	21.33	21.33	28.33	16.33	21.33	24.73	4.93
Auto[1]	12.82	12.82	0	0	12.02	0	0
Auto[2]	8.52	8.52	0	0	7.72	0	0

(Footnotes see next page.)

TABLE G (Cont'd)

	Wages for Current Partial Employment at						
	$1.50 Per Hour Employed in Week				*$2.475 Per Hour Employed in Week*		
	1 day ($12)	*2 days ($24)*	*3 days ($36)*	*4 days ($48)*	*1 day ($19.80)*	*2 days ($39.60)*	*3 days ($59.40)*
Maryland							
Steel	20.33	20.33	20.33	16.33	20.33	24.73	4.93
Auto[1]	11.82	11.82	11.82	0	12.02	0	0
Auto[2]	7.52	7.52	7.52	0	7.72	0	0
Michigan							
Steel	14.33	14.33	14.33	19.33[3]	14.33	14.33	7.93[3]
Auto[1]	[4]	10.32	0	0	0	0	0
Auto[2]	0	6.02	0	0	0	0	0
New York							
Steel	12.33	12.33	12.33	19.33[3]	12.33	12.33	7.93[3]
Auto[1]	10.07	9.32	8.57	0	2.27	0	0
Auto[2]	5.77	5.02	4.27	0	0	0	0
Pennsylvania							
Steel	22.33	22.33	22.33	15.33	22.33	22.33	3.93
Auto[1]	14.82	14.82	14.82	0	14.02	14.22	0
Auto[2]	10.52	10.52	10.52	0	9.72	9.92	0

[1] First 4 weeks of layoff.

[2] After first 4 weeks of layoff.

[3] It is assumed that $10 of wages are disregarded in calculating the benefit amount.

[4] The excess of the gross benefit over the state benefit is less than $2.00 so no supplemental benefit is payable.

RATEMAKING FOR FIRE INSURANCE

BY

JOSEPH J. MAGRATH

The fire insurance business is reasonably well implemented to perform the task of ratemaking and has in fact made rates according to a normally good formula. While there is not a complete and formal set of adopted standards, substantial progress has been made in that direction. The materials and plans in current use will be discussed here.

The Standard Profit Formula, originally adopted in 1921 and revised in 1949, forms the cornerstone for the measurement of the adequacy of fire insurance rate levels. The Standard Classification of Occupancy Hazards, as originally adopted in 1914 and last basically amended in 1946 as to classes and 1949 as to policy term and outstanding losses, is a competent plan for recording classified premium and loss experience by states. The Statistical Plan for Expenses which was put into effect in 1951 provides for the reporting of expenses by classification of expense and where possible by state.

Early in 1955 Inter-Regional Insurance Conference developed a statement of principles designed to assist rate committees and the staffs of rating organizations on revisions. The statement follows:

1. The principle of a 6% underwriting profit factor (5% profit plus 1% catastrophe) as set forth in the 1921 Profit Formula of the National Board of Fire Underwriters as modified in the 1949 Sub-Committe Report of the NAIC shall be maintained. No over-all rate level adjustment shall be made if the indicated profit is within a tolerance zone of two percentage points above or below such 6% factor.
2. Review of over-all rate level shall be annual; however, it is not the intent to require annual adjustment of rate levels.
3. Underwriting profit as refered to above shall be determined with use of direct earned premiums and incurred loss and incurred expense figures without regard to reinsurance.
4. As to loss experience, all available and relevant premium and loss statistics, including loss adjustment expenses, shall be used, to include both member and subscriber (including deviating) Company figures adjusted to reflect current rate levels. Due consideration shall also be given to other available and relevant statistics in the interest of securing the widest possible base of loss experience. In the case of fire rate levels, the loss experience of not less than the most recent five-year period shall be used, while in the case of windstorm or extended coverages including the windstorm peril, the loss experience of not less than the most recent ten-year period shall be used.

5. As to expenses other than loss adjustment expenses, only the experience of member and subscriber stock Companies during the most recent period of years shall be used, reflecting comparable methods of operation and acquisition costs. Such expense figures shall not be separated as between commissions and premium taxes and all other expenses.
6. Due consideration shall be given to loss experience, expenses and to credibility and all other relevant factors within and outside the State, including the important element of informed judgment in reflection of economic trends, social conditions, new processes and inventions and other factors which may affect prospective loss experience and expenses.

A plan for reporting catastrophe losses, those aggregating $1,000,000. or more in a single event, was inaugurated in 1949. The use to which this information will be put is still under study.

THE STANDARD PROFIT FORMULA

Simply stated the original Standard Profit Formula read as follows:

Earned Premiums (Net)			———
Incurred Losses (Net)		———	
Expenses Incurred:			
Specific	———		
General	———		
Departmental	———		
Total Expenses		———	
Allowance for Conflagration Hazard		———	———
Underwriting profit or loss			———

The factor for underwriting profit to be achieved was and still is 5%. The allowance for conflagration hazard originally was 3% but was reduced to 1% in 1949. The minimum period of time for dependable experience was indicated as five years.

To arrive at the earned premiums for each year, it was recommended that to net premiums written less all reinsurance there be added the unearned premium reserve at the end of the preceding year and that there be subtracted the unearned premium reserve at the end of the year under study. Where a study is undertaken for a single state and the reporting company does not have premium reserves by state, it was recommended that the reserve be estimated by taking that proportion of the total reserve that the net written premiums in the state bear to the net written premiums countrywide by the company for the year in question.

Losses incurred were to include all losses less amounts recovered or recoverable on reinsurance.

Specific expenses were identified as commissions and other agency expense, taxes, licenses, fees, bureau assessments and loss adjustment fees. This expense group would include all expenses assignable to a particular state.

General expenses such as salaries, rent and overhead of home office, postage, telephone and stationery would be apportioned to each state in proportion to its premium volume.

Departmental expenses contemplated those involving a branch office which handles business in more than one state. These were to be apportioned in the same manner as general expenses but over only the states covered by the branch.

A significant point in the formula treatment of general expenses is the inclusion therein of "federal government taxes". The profit objective is, therefore, 5% net profit after income tax. Additionally no attempt is made to recognize prepaid expenses such as commissions and premium taxes as available for the adjustment of indicated expense costs.

All expenses are to be treated on an incurred basis and the program specifically provides for adding to paid expenses increases in expense reserves and deducting decreases.

Dealing with the subject of expenses, the Special Sub-Committee on Underwriting Profit or Loss of the Fire and Marine Committee of the National Association of Insurance Commissioners made the following comment in its report at a June 9, 1949 meeting:

> "A rising or falling volume of written premiums will affect the ratio of incurred expenses to earned premiums even though the actual proportion of the premium dollar absorbed by expenses remains constant. Permissible loss ratios or flat expense allowances should not be altered solely because of a change in the incurred expense earned premium ratio caused by a rising or falling written premium volume unless there is other evidence of a real percentage increase or decrease in the expense of doing business."

The allowance for conflagration hazards as a percentage of earned premium although deductible before arriving at underwriting profit or loss is not required to be set aside as a specific reserve. No conclusion has yet been reached concerning the treatment of conflagrations from the loss standpoint in the application of the Standard Underwriting Profit Formula.

Among the suggested methods of spreading a conflagration loss have been that a fixed amount be charged to the state of origin, viz., $1,000,000., and the balance spread over all states including the state of origin on a premium proportion basis; or alternatively that the state of origin be charged not more of the loss than a fixed percentage of its annual premiums and the balance spread as in the first case.

The underwriting profit or loss which the original formula produced did not agree with the reports of the companies as submitted

since the allowance for conflagration hazard would not appear in the individual reports. The subsequent action in 1949 of combining the allowance for conflagration hazard with the provision for underwriting profit changed that condition. At the time of the change in 1949, the allowance for conflagration hazard was reduced from 3% to 1% and merged with the underwriting profit allowance of 5% to produce a combined rate of 6%.

There has been and still is no item in the formula for investment income on policy reserves. The insurance industry vigorously maintains that there should be no such factor. It might very well add that if there were to be an investment factor included in the formula income, the profit factor in the formula should be substantially increased as an offset.

The National Board of Fire Underwriters refers to the Standard Profit Formula as "a practical working yardstick", in a report prepared by its Committee on Laws dated June 3, 1948. It is, of course, a means of measuring what the underwriting profit or loss has been and a possible means of determining whether the level should be raised or lowered if there have been no interim changes of consequence.

As a measurement of results, the formula reports should be examined not merely for the aggregate of a period such as five years, but for the separate years to detect a trend when one exists. An extreme example might be one where the underwriting profit declined from 20% in the earliest year to none in the latest year and yet averaged at 10%, and if taken as a yardstick, call for a reduction in rates that have already become profitless.

THE STANDARD CLASSIFICATION OF OCCUPANCY HAZARDS

The original classification list of occupancy hazards was adopted in 1914 by the National Board of Fire Underwriters and approved by the National Association of Insurance Commissioners. The list underwent periodic revisions as theories changed between the desire for greater analysis between classes and the realization that a credible class needed a substantial volume of like units.

The fundamental revision approved in 1946 was an orderly presentation of a statistical plan for the analysis of fire insurance premium and loss experience. This revision was approved by the National Association of Insurance Commissioners at its meeting of June 1946.

The new plan called for 5 occupancy groups containing a total of 115 classes.

Residential Risks	11 classes
Mercantile Risks	9 classes
Non-Manufacturing Risks	24 classes
Manufacturing Risks	65 classes
Sprinklered Risks	6 classes
Total	115 classes

These classes were further subdivided according to Fire Department protection as "Protected" or "Unprotected" and as to class of construction between "Fire Resistive", "Brick" and "Frame". Each state is separately reported with two states, Illinois and New York, having a separate reporting of Cook County and New York City respectively.

The National Board of Fire Underwriters provides member and subscriber companies with recommended codes to be followed in compiling the classified reports and offers an alphabetical index of codes for various occupancies.

Premiums and losses are reported on the basis of direct premium writings and losses incurred which is different than the basis of the Standard Profit Formula which is on the net premiums earned and losses incurred after deducting reinsurance.

Commencing January 1, 1949, companies were required to report premiums by policy term so that earned premiums could be computed by classification. Previous reports on a written and paid basis are still available as well as the earned and incurred classified reports.

USES OF CLASSIFIED EXPERIENCE

In a statement of principles adopted by the National Board of Fire Underwriters are the following comments:

"Classified underwriting experience serves a three-fold purpose in that it assists:

(a) underwriters in the determination of the lines to be carried by their companies;

(b) rating experts in reviewing past experience; and

(c) the public through making available statistics that can be readily understood."

The report of the National Association of Insurance Commissioners of June 1946 is quoted below:

> "No exact standard for credibility of fire insurance experience has ever been established. Any exact yardsticks established at this time, either as to the number of risks or the premium volume that would provide credibility, would be arbitrary, and only after this classification system has been in operation for some time will it be possible to give consideration to the development of such standards.
>
> "While in many states the classified fire experience over a five-year period will possess credibility, particularly in the residential and mercantile classes, there may be conditions when the use of a longer period may be considered desirable. It should be emphasized that in perhaps an equal or larger number of states and classes single state credibility will not exist. With this thought in mind the classification plan here proposed will make available consolidated experience over broader territories by groups

of states and nationally and also by groupings of similar classes of risks."

THE STATISTICAL PLAN FOR EXPENSES

The next step in the development of ratemaking statistics was the adoption by the National Board of Fire Underwriters of the plan in caption effective as of January 1, 1951. The most important function of the new plan was the separation of expenses between those "specifically assignable by state" and those "not specifically assignable by state".

Prior to this program the only useful statistics on expenses came from the "Insurance Expense Exhibit" which showed expenses by kind of business and kind of expense, but did not reflect differences by state.

The expenses which are specifically assignable by state are:

1. Commissions and brokerage (excluding contingent).
2. Loss adjustment expenses directly identified with individual losses.
3. Taxes, licenses and fees at state and local level.
4. Board and bureau expenses at the state level.
5. Unusual expenses assignable by state.

After the foregoing expenses are allocated to the states to which they are chargeable, the balance of expense not specifically assignable is related to direct premiums written and then assigned on that basis to the individual states.

Federal Income Taxes are not included in the Statistical Plan for Expenses even though the Standard Profit Formula specifically includes such expense in arriving at underwriting profit.

The following comment on taxes appears in the declaration of the National Board in a brochure dated 1920 entitled, "What Constitutes a Reasonable Underwriting Profit and The Method of Determining Same".

> "Federal income and excess profits taxes are among the heaviest burdens as to expense under which the companies labor.— It is clear that no determination of profit can be made which ignores these very heavy items of expense. It is idle, as well as unjust, to compute a paper profit from which further deductions must be made before an actual profit is available as a result of doing business, to the parties whose capital is hazarded in the enterprise. All deductions of losses and expenses should be made before the production of any figure regarded as profit.
>
> "No corporation organized for profit and depending for its existence upon a reasonable return to its stockholders from its operations could continue if due credit were not given for all costs of operation which go to reduce the amount of its net income, upon which its return to stockholders is predicated."

INTER-REGIONAL INSURANCE CONFERENCE

The Statement of Principles adopted by this conference contains some specific and some general recommendations. It reiterates the profit provision of the Standard Profit Formula, but adds a suggestion of a tolerance zone in each direction of two percentage points. If the 6% factor for profit does not, in the recorded experience, drop below 4% or rise above 8%, no rate level adjustment is to be made.

The statement identifies the underwriting profit as determined with the use of direct earned premiums and incurred losses. This differs from the Standard Profit Formula which is based upon net premiums and losses after reinsurance.

The loss experience is to include all available and relevant premium and loss statistics, including loss adjustment expenses with premiums adjusted to reflect current rate levels. The plan thus recognizes that the experience must be examined on the basis of current rate level and not the mixed rate levels of an experience period.

The expenses, excluding loss adjustment expenses, are to include only the experience of member and subscriber stock companies during the most recent period of years and reflecting comparable methods of operation and acquisition costs. Since the period of time is not specified, it would seem to be left to the discretion of the rate making committee, but presumably would not exceed five years and might be as little as two years.

The statement goes on to say that "Such expense figures shall not be separated as between commissions and premium taxes and all other expenses." The apparent significance of this injunction is that the authors did not want any distinction made between fixed and variable expenses. The reports made to the National Board show the separation.

Broad discretion is given in the part of the statement which provides that "Due consideration shall be given to loss experience, expenses and to credibility and all other relevant factors within and outside the state, including the important element of informed judgment, etc."

The statement is silent on the subject of Federal Income Tax as an expense.

NEW YORK 1958 REVISION

Acting to a large extent within the framework of the industry program, a committee of the rating organization studied the experience indications and endeavored to apply an "element of informed judgment".

An adverse experience trend was apparent, so it seemed desirable to use the latest possible experience and use a weighting factor emphasizing the more recent years. The 1957 classified experience would not be available until the fall of 1958 so it was decided to include the calendar year experience of New York as reflected in the annual statements for 1957.

For rate level purposes, the Industry Committee added the 1957 statement figures to the five previous years classified experience adjusted to current rate level. This was then weighted on the following basis:

1952	10%
1953	10%
1954	10%
1955	15%
1956	25%
1957	30%

The regulatory authorities agreed to the inclusion of the 1957 aggregate results, but suggested the use of a total of five years weighted as follows:

1953	15%
1954	15%
1955	15%
1956	25%
1957	30%

This change was accepted for purposes of harmony.

EXPENSE LOADING—1958 REVISION

For a period of years an expense loading in New York rates on the basis of the standard profit was 46.5% as follows:

Expense Loading	46.5%
Profit Loading	6.0
Normal Loss Ratio	47.5
Total	100.

After examining the experience of the more recent years, it appeared that a reasonable expense factor would be 47.1%. The 1958 revision was, therefore, based upon this loading:

Expense Loading	47.1%
Profit Loading	6.0
Normal Loss Ratio	46.9
Total	100.

The increase allowed for expenses in the 1958 revision recognizes the higher costs incurred on fire insurance business. The original industry proposal was for an allowance of 48% based upon a rounding out of the countrywide average stock company expenses of the latest three years' results available at the time when the filing was

initiated. These were 47.4% (1954), 47.9% (1955), 49.0% (1956), made up as follows:

	1956	*1955*	*1954*
Loss Adjustment	3.4	3.0	3.0
Commission	25.8	25.7	25.1
Other Acquisition	7.1	6.9	6.9
General	9.2	8.9	9.0
Taxes and Fees	3.5	3.4	3.4
Total	49.0	47.9	47.4

The rising trend of expenses continued and the reports for 1957 showed the following:

Loss Adjustment	3.7
Commission	25.7
Other Acquisition	7.1
General	9.5
Taxes and Fees	3.7
Total	49.7

Subsequent to the original proposal of the rating organization, an expense analysis by the National Board of Fire Underwriters showing the results of the reports under The Statistical Plan for Expenses indicated that for New York State based upon an analysis of 1956 results a total of 47.1% would be proper, and this was adopted. The difference is accounted for by the separation into expense specifically chargeable to New York and those allocated from expenses not specifically allocable. These are not broken down by expense class in the reports released to the rating organization or otherwise. It is the policy of the National Board to supply such results only as a total expense provision.

LOSS ADJUSTMENT EXPENSE

The industry proposal to transfer loss adjustment expense out of the expense loading to apply with the loss factor was not approved by the State regulatory authority. It was left as a part of total expense loading as heretofore.

The plan of Inter-Regional for the treatment of this subject is not entirely clear. Loss adjustment expense is made up of general loss expense as well as specific costs and while the latter could be programmed for allocation to classified experience, the former could not. It must, therefore, be assumed that it would be added to classified loss ratios as a ratio of earned premiums or a ratio of incurred losses.

Assuming an over-all loss ratio of 50% of earned premiums and a loss adjustment expense ratio of 3% of earned premiums, the latter becomes 6% of losses. The results vary with the manner of loading, viz:

Loss Ratio of Class	*Loss Expense Loaded as Ratio of Premium*	*Loss Expense Loaded as Ratio of Loss*
20	3.	1.2
30	3.	1.8
45	3.	2.7
60	3.	3.6

The use of loss adjustment expense as a percentage of loss would seem to be a more logical treatment and less of a change from the present method of including it in the general loading.

CREDIBILITY

The credibility formula that had been used in the past in New York was continued as a basis for developing the indicated rate changes. This set of values which is based upon the judgment of the authors is as follows:

5-Year Premiums	*Credibility*
Under $50,000.	5%
$ 50,000. to $ 200,000.	10%
200,000. to 450,000.	20%
450,000. to 800,000.	30%
800,000. to 1,250,000.	40%
1,250,000. to 1,800,000.	50%
1,800,000. to 2,500,000.	60%
2,500,000. to 3,200,000.	70%
3,200,000. to 4,000,000.	80%
4,000,000. to 5,000,000.	90%
5,000,000. and over	100%

The formula further provided that the five-year loss ratio would not be affected more than 10 percentage points by the experience of any one year. Most rate changes would be limited to a maximum of 25%.

A typical rate development for a class would be as follows:

Class 09 Premiums (as adjusted to rate level)

$1,500,000. Loss ratio 60% ÷ Normal loss ratio 46.9% = 1.28 indicating a gross increase of 28%, but as credibility for that premium volume is 50%, the selected increase would be 14%.

THE CREDIBILITY PROBLEM

At the advisory organization level the following plan was suggested for a formula treatment of credibility differing from the New York Standard.

"CREDIBILITY—

(a) Many of the specifically coded classes in the Classified Underwriting Experience exhibit will not qualify under any text for credibility. In some instances such classes may be combined with similar or affiliated classes and the combined experience measured against the minimum requirements for credibility.

(b) Where an integration of these classes with others is not practicable, the necessity for and the extent of any rate adjustment of a specific class can only be determined by considered appraisement of the available experience, and analysis of the rate level in relation to that of classes having comparable hazards and the rate structure as a whole.

(c) In some cases specifically coded classes may have a sufficiently broad experience base to justify independent treatment, but may be so allied and interwoven with other occupancies in the rate structure to warrant their consolidation.

(d) For purposes of adjustment under present rating methods, it has been found impractical to make separate percentage adjustments for brick and frame construction and for protected and unprotected risks within a single occupancy class; or for fire-resistive construction within the class when the five year premium fails to meet the minimum requirements of credibility. Adjustments under the proposed Class Adjustment Formulae shall, accordingly, be made on a group basis of all construction, protected and unprotected, unless otherwise specifically provided.

(e) MINIMUM REQUIREMENTS FOR CREDIBILITY: A single or grouped occupancy classification shall be subject to the application of the Class Adjustment Formula only when the Premiums on the class within the state is of sufficient volume and the loss experience within the state has been relatively stable over the five year period under review.

(f) For a given State, it is considered that a five year written paid premium of $2,000,000 for all construction is a reasonable minimum premium requirement.

(g) As a reasonable measure of the relative stability of the loss experience of a class over the five year period, it is proposed to use the ratio that the lowest annual loss ratio of the class bears to its highest annual loss ratio. If the Credibility Grading thus established is 50% or more and the Minimum Premium Requirement has been met, a class or class group shall be considered as CREDIBLE and eligible for application of the Class Adjustment Formula. If the five year Premium of a class or class group is less than the Minimum Premium Requirement *OR* if its Credibility Grading is less than 50%, it shall be con-

sidered as NOT CREDIBLE and no independent rate adjustment of the class or class group shall be made by the Class Adjustment Formula.

(h) DEGREE OF CREDIBILITY: The number of classes meeting the Minimum Requirements will embrace a wide range of premium volume and considerable variation in their degree of credibility. To establish an inflexible single standard of credibility would preclude classes that may properly qualify although lacking in the stability exhibited by the largest classes.

For this reason the following Credibility Adjustment Table embracing modified applications of the Underwriting Profit Formula and scaled limited adjustments reflecting degree of credibility, is proposed.

The modification of the Underwriting Profit Formula is accomplished by establishing an expanded zone of tolerance above the standard of two percentage points, thus increasing the degree of tolerance in the ratio of descending credibility within prescribed limits.

CREDIBILITY ADJUSTMENT TABLE

Credibility Grading	*Points of Tolerance*	**Tolerance Range* REDUCTION *If Ratio Less Than*	**Tolerance Range* INCREASE *If Ratio More Than*	*Limits of Rate Adjustment*
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%

Class is not credible and table is not applicable when Credibility Grading is less than 50%.

* Note: Figures under Tolerance Range to be based upon Projected Loss Ratio as determined by the Aggregate Adjustment Formula. For purpose of illustration a Projected Loss Ratio of 49 has been assumed in the above table.

Comparing the two plans it will be found that the proposed plan contemplates the very sensible combination of like classes for purposes of improved credibility, while the New York plan is silent on that score. It also introduces the element of stability in a different but not necessarily superior method to the New York plan, since the latter plan uses a limit in the effect of any one year on the rate level.

The table of credibilities although more liberal in the illustration of allowing full credibility to a premium volume of $2,000,000 if the experience from year to year is stable, as compared with a $5,000,000

premium volume in the New York plan, it lacks formal treatment for premium volumes of less than the minimum for full credibility. The New York plan allows credibilities as low as 5% on volumes of less than $50,000. On the other hand, the proposed plan would limit rate adjustments to as little as 5% where annual loss ratios fluctuate as much as from 30% to 60%, or 50% to 100%. It would seem more realistic to key the adjustment to a percentage of the indicated change than to an absolute maximum, other than the general maximum of say 25%. It would also seem desirable to adopt a rule of thumb for the treatment of classes having less than the prescribed minimum of $2,000,000 particularly where they are not subject to relatively high catastrophe potential.

The expanded zone of tolerance for the classes having a credibility grading of 50% to 70% further diminishes the opportunity for rate adjustments even to the limited degree the proposed plan allows. Thus a class of business with a 5 year loss ratio of 59% with a credibility grading 54% would not have a rate adjustment. Even a class with a $1,000,000 annual volume and bad results in 4 out of 5 of the experience years would go unadjusted under the proposed formula for credibility viz:

1st year	66% loss ratio
2nd year	33% loss ratio
3rd year	65% loss ratio
4th year	66% loss ratio
5th year	65% loss ratio
5-year average	59% loss ratio

RATE LEVEL CHANGES

Inasmuch as the rate level factor for the whole 1958 revision resulted from a weighting and included a later and unclassified year, the classified indications were slightly modified on a judgment basis to achieve the over-all result of a 4.2% rate level increase. In the 1957 revision, rates were increased 3%.

The 1957 incurred loss ratio on fire business of stock companies was 54.9%, for New York State and the countrywide expense ratio was 49.7% or a total of 104.6%. From this it would seem that the rates earned in 1957 were 10.6% short of producing the 6% profit goal of the Standard Profit Formula. Fire insurance ratemaking being linked to a five-year standard makes for difficulty in achieving a timely correction.

TERM FACTORS

The adjustment of the term factor from 75% to 85% for each year after the first was an objective of the industry which could not be accomplished because of the impossibility of reconciling the views of

the regulatory authorities of the State with those of industry representatives. Industry wished to recognize the increase at a value of 3.12% on the basis that this was all that would be realized during the first two years. The regulatory authorities insisted on valuing the change at the full ultimate value of 6.65% which would have resulted in a reduction in the class rates as a companion to the modified term factor. The proposal was, therefore, dropped for the present.

EVALUATION OF TERM FACTORS

The difference in values advocated by the Rating Organization and the State Insurance Department attributable to the proposed modification of term factors from 75% to 85% arises from the approach to the subject rather than a disagreement on the values per se. The industry agrees that the full ultimate value after 5 years will be 6.65%, but contends that current rates should not be reduced 6.65% in recognition of a change which will not be fully effective until 5 years has elapsed.

A study made by Inter-Regional of term business in force indicates that during the first two years that the new term rule is in force the rate level would benefit to the extent of 3.12% out of the proposed new term rule and offered to recognize that value with the balance of the benefit deferred for consideration until that time has elapsed. The Insurance Department was apparently influenced by the fact that in the 1957 revision when classes previously denied the term factor discounts were granted them, the Rating Organization took credit for the full effect of the reduction aspect of the change. The situation here was different, however, since the change applied to annual business which could take advantage of the change within the first year the revision was in effect.

Early in 1958 Inter-Regional Insurance Conference revised the basic principles described earlier and issued a recommended procedure for rating bureau review of the over all fire rate level by state. Basic principle 4 has been broken up into two parts 4 and 5 and modified; principles 5 and 6 become 6 and 7 and are changed a little.

A discussion of the program and some practical use to which it was put follows:

1958
INTER-REGIONAL INSURANCE CONFERENCE
BASIC PRINCIPLES—RATE LEVEL ADJUSTMENTS

To a very considerable extent and insofar as it was practicable to do so, the 1958 New York fire rate revision followed the adopted recom-

mendations of Inter-Regional Insurance Conference. These recommendations and a commentary on them follow:

1. The principle of a 6% underwriting profit factor as set forth in the 1921 Profit Formula of the National Board of Fire Underwriters as modified in the 1949 Subcommittee Report of the NAIC shall be maintained. No over-all rate level adjustment shall be made if the indicated profit is within a tolerance zone of two percentage points above or below such 6% factor.
2. Review of over-all rate level shall be annual; however, it is not the intent to require annual adjustment of rate levels.
3. Underwriting profit as referred to above shall be determined with use of direct earned premiums and incurred loss and incurred expense figures without regard to reinsurance.
4. All available and relevant premium and loss statistics, including loss adjustment expenses, of member and subscribing stock companies, adjusted to reflect current tariff rate levels, shall be used. Loss adjustment expenses shall be included with loss statistics. The premium and loss statistics of other companies may be included in the determination of actual and adjusted loss ratios to the extent that the use of such loss experience is necessary and pertinent.
5. In the case of fire rate levels the loss experience of not less than the most recent 5-year period shall be used, while in the case of windstorm or extended coverages which involve the windstorm peril the loss experience of not less than the most recent 10-year period shall be used.
6. As to expenses other than loss adjustment expenses, only the experience of member and subscribing stock companies reflecting comparable methods of operation and acquisition costs during the most recent available year shall be used. Such expense figures shall be treated as a unit and shall not be separated into their several components.
7. Due consideration shall be given to loss experience, expenses and all other relevant factors within and outside the State, including the important element of informed judgment and the reflection of all developments and trends which may affect prospective loss experience and expenses.

In the formula calculation of the rates, the provision of 6% for underwriting profit (and catastrophe loading) was allowed. It should be noted that the basic principles fail to show the intention to include in this provision the catastrophe provision which was part of the 1949 amendment of the Profit Formula.

With regard to item 3, the results were examined on the basis of direct business. The classified premium and loss experience was so reported, and the expenses were adjusted to exclude the effect of re-

insurance on commissions and loss adjustment expenses in the reports compiled by the National Board of Fire Underwriters. The experience of all member and subscriber companies on premiums and losses were included and adjusted to present rate levels, but the experience of only stock companies was included for expense loading. If direct writer stock companies become a factor on this class of business the expense loading practice may need to be modified in this respect to recognize their different expense needs.

As to item 5, the most recent 5-year experience was considered but the latest year used for rate level purposes was not yet available on a classified basis, but considered on a total basis. This seemed the only practical basis for including the most recent years results.

The recommendation under item 6 could not be fully implemented because the Insurance Department would not agree to the separate treatment of loss adjustment expenses. While the expense figure was treated as a unit it was capable of comparison with the classified expense results reported in the Insurance Expense Exhibits. The National Board of Fire Underwriters analysis for 1956 was used, as this was the latest available at the time the revision was processed.

The item 7 recommendation was followed particularly in the selection of class modifications as against the formula indications. Some indicated small reductions were not applied and some indicated large increases were moderated.

RECOMMENDED PROCEDURE FOR RATING BUREAU REVIEW OF THE OVERALL FIRE RATE LEVEL BY STATE

To implement its "Basic Principles", Inter-Regional suggests the weighting of earned fire premiums adjusted to reflect current rate levels. A six-year period is proposed with the weighting to enhance the effect of the experience of the more recent years. The same weighting would be applied to the incurred losses for the same purpose. This seems very reasonable particularly since for early use it will be necessary to use the latest unclassified year for rate level purposes along with the five latest years' classified experience.

The Inter-Regional report calls attention to the fact that earned premiums and incurred losses are now available by state on a classified basis for a full five-year period and that for the immediate past year ratios can be provided by the National Board for converting written premiums to earned and paid losses to incurred. These latter results may also be compared with the estimated earned premiums and incurred losses reported on page 14 of the annual statements filed with insurance departments.

The report states that from the Insurance Expense Exhibits of subscribers the National Board will provide the countrywide allocated fire loss adjustment expense ratio to earned premiums for the most recent year. The word "allocated" used here must be interpreted as meaning expenses allocated to fire loss adjustment expense since there is no separate reporting of unallocated loss adjustment expense.

The composite total of expense data available from the National Board to the rating bureaus is computed for the same reporting companies.

The report refers to experience of other member and subscriber companies not included in the National Board statistics being obtainable from other statistical agencies. This contemplates obtaining from the National Association of Independent Insurers and the Mutual Insurance Advisory Association the statistical data of rating bureau subscribers who report through them. The use of non-stock experience is qualified by the phrase "if necessary and pertinent".

The report recommends as a first step after the assembly of the six year experience data that the written premiums be adjusted to reflect current rate levels. The example given follows:

Effective Jan. 1, 1954—3.4% reduction
Effective July 1, 1954—3.1% reduction
Effective April 1, 1955—4.0% reduction

	Direct Written Premiums		*Factor*		*Adjusted Direct Written Premiums*
1952	$74,654,852	×	89.9%	=	$ 67,114,712
1953	75,792,260	×	89.9	=	68,137,242
1954	74,426,189	×	94.5	=	70,332,749
1955	75,294,532	×	99.0	=	74,541,587
1956	70,933,741	×	100.0	=	70,933,741
1957	72,107,291	×	100.0	=	72,107,291
					$423,167,322

Explanation of Factors

1955: The 4% reduction effective April 1, 1955 requires adjustment of the actual written premiums for the first 3 months of that year; i.e.

Factor = 100% — (3/12 × 4%) = 99%.

1954: (a) The 4% reduction effective April 1, 1955 requires adjustment of the 1954 premium; and (b) the 3.1% reduction effective July 1, 1954 requires adjustment of the first 6 months of 1954; i.e.

Factor = (a) 100% — 4% = 96%;
(b) 96% — (6/12 × 3.1% × 96%) = 94.5%.

1953: (a) The 4% reduction effective April 1, 1955 requires adjustment of the 1953 premiums; (b) the 3.1% reduction effective July 1, 1954 requires adjustment of the 1953 premium; and (c) the 3.4% reduction effective January 1, 1954 also requires adjustment of the 1953 premium; i.e.

Factor = (a) 100% — 4% = 96%;
(b) 96% — (3.1% × 96%) = 93%; and
(c) 93% — (3.4% × 93%) = 89.9%.

1952: Factor same as calculated for 1953.

The description of the steps for deriving the earned premium and incurred loss figures from the premiums written and losses paid figures becomes somewhat superfluous now that the National Board gets these in the Classified reports and can get the same figures for the latest unclassified year from the annual statements. The chief value remains in the use of these ratios in converting the written premiums as adjusted to current rate levels to an earned basis. The conversion of paid losses to an incurred basis is a necessary counterpart. Caution is advised that experience of the same companies is used throughout.

The application of the ratios is illustrated as follows:

Calculation of Adjusted Earned-Incurred Experience:

	Adjusted Direct Written Premiums		*Earned to Written Ratios*		*Adjusted Direct Earned Premiums*
1952	$67,114,712	×	96.3%	=	$ 64,631,468
1953	68,137,242	×	98.7	=	67,251,458
1954	70,332,749	×	100.9	=	70,965,744
1955	74,541,587	×	99.7	=	74,317,962
1956	70,933,741	×	103.7	=	73,558,289
1957	72,107,291	×	105.2	=	75,856,870
					$426,581,791

	Direct Paid Losses		*Incurred to Paid Ratios*		*Direct Incurred Losses*
1952	$30,330,463	×	102.7%	=	$ 31,149,385
1953	31,102,116	×	102.7	=	31,941,873
1954	31,382,792	×	98.9	=	31,037,581
1955	37,004,640	×	101.8	=	37,670,724
1956	37,635,173	×	106.7	=	40,156,730
1957	40,746,226	×	108.2	=	44,087,417
					$216,043,710

$\frac{\$216,043,710}{\$426,581,791}$ = 50.6% Adjusted Earned-Incurred Loss Ratio (*not* including Loss Adjustment Expenses)

If the adjustment to current rate level were applied to earned premiums, some distortion would result in that premium writings and earnings do not follow a parallel course.

The step for the derivation of "Weighted Loss Ratio" involves a judgment emphasis on more recent experience with the same factors applied to adjusted direct earned premiums and direct incurred losses to secure weighted adjusted earned premiums and weighted direct incurred losses. An illustration follows:

Derivation of "Weighted Loss Ratio" Calculated from Overall Adjusted Direct Earned Premiums and Incurred Losses:

	Adjusted Direct Earned Premiums		*Factor*		*Weighted Adjusted Direct Earned Premiums*
1952	$64,631,468	×	10%	=	$ 6,463,147
1953	67,251,458	×	10	=	6,725,146
1954	70,965,744	×	10	=	7,096,574
1955	74,317,962	×	15	=	11,147,694
1956	73,558,289	×	25	=	18,389,572
1957	75,856,870	×	30	=	22,757,061
					$72,579,194

	Direct Incurred Losses		*Factor*		*Weighted Direct Incurred Losses*
1952	$31,149,385	×	10%	=	$ 3,114,939
1953	31,941,873	×	10	=	3,194,187
1954	31,037,581	×	10	=	3,103,758
1955	37,670,724	×	15	=	5,650,609
1956	40,156,730	×	25	=	10,039,183
1957	44,087,417	×	30	=	13,226,225
					$38,328,901

$$\frac{\$38,328,901}{\$72,579,194} = 52.8\% + 3.4\%^{*} = 56.2\%$$

Weighted Adjusted Earned-Incurred Loss Ratio (*including* Loss Adjustment Expense Ratio)

**NOTE*: Allocated Loss Adjustment Expense Ratio of 3.4% derived from the countrywide Insurance Expense Exhibit compiled by the National Board for the most recent year available (in this example, 1956) related to Earned Premiums.

It should be noted that the addition of 3.4% to the loss ratio to reflect loss adjustment expenses is not accepted by New York State regulatory authorities.

The calculation of the expense loading as recommended involves taking the State ratio of expenses to direct written premiums for the latest year as furnished by the National Board and adjusting it by a factor representing the ratio of unweighted adjusted written premiums to unweighted adjusted earned premiums. This is designed to adjust the written expense ratio to an earned expense ratio. Where the loss adjustment expense is treated as part of loss ratio, it would be deducted from expense ratio for such purpose.

Many rate makers prefer to split expenses between fixed and vari-

able so that the variable expenses can be applied as a final loading on the losses and fixed expenses. Others will combine the ratios of expenses to earned premiums for all but commissions and premium taxes with the latter on a ratio of expenses to written premiums. The Inter-Regional Plan adopts neither of these methods.

The final step in the Inter-Regional Plan for rate level adjustment involves adding together the indicated expense ratio factor and the profit factor. This is subtracted from 100% to produce a "balance point" loss ratio (sometimes called the "permissible" loss ratio). The remainder of the calculation is fairly standard. It involves dividing the weighted adjusted earned-incurred loss ratio by the so-called "Balance Point" loss ratio to produce the indicated rate level adjustment as shown in the example below:

Calculation of the State Indicated Overall Fire Rate Level Adjustment:

(a) Stock Company Earned Expense Ratio

(excl. Loss Adj. Exp. Ratio) = 44.0%
Underwriting Profit Factor = 6.0%
Combined Total = 50.0%

(b) "Balance Point" Loss Ratio = 100.0% — 50.0% = 50.0%

(c) Weighted Adjusted Earned-Incurred Loss Ratio

$$\frac{\text{(incl. Loss Adj. Expense Ratio)} = 56.2\%}{\text{"Balance Point" Loss Ratio} = 50.0\%} \times 100 = 112.4\%$$

and,

The Indicated Overall Fire Rate Level Adjustment is:

112.4% — 100% = +12.4% (Increase)

To determine the dollar amount of the adjustment it is suggested that the percentage change be applied to the latest years actual written premium total from the classified experience. An alternative method might be to use the latest years unclassified written premiums which would be one year later and, therefore, more current.

CONCLUSION

Fire insurance ratemaking as exemplified by the New York revision has been improved by the inclusion in the rate level study of the results of the latest year. The adverse trend has been taken into account in the use of weighted experience results.

The expense allowance should prove adequate for a well managed business. Profit and conflagration factors totalling 6% have been allowed as requested by industry.

Should the adverse loss trend continue, it is to be hoped that the authorities will consent to the use of the modified term factors leaving the results to work themselves out in subsequent revisions.

RATE REVISION ADJUSTMENT FACTORS

BY

LEROY J. SIMON

INTRODUCTION

Any line of insurance which uses the loss ratio method in rate making relies very heavily on an accurate premium base. If exposure data were available, a pure premium method would most likely be used but in the absence of proper exposure data, the rate revision adjustment factor is vital to the determination of the premium base. Without it, this valuable rate making method based upon loss ratios would be impractical. Rate revision adjustment factors are also useful for individual companies in evaluating their loss experience, projecting premium volumes, establishing comparative statistics under varying rate levels and in budgeting problems where the available amount of expense loading is desired. With so many uses, one would expect to find some literature on the subject, but our Proceedings has never had such a paper presented. Of course, it would be unnecessary to devote much space to a subject if no problems presented themselves or if the solutions to the problems were obvious. Neither is true in this instance, since problems do exist in this area and the solutions are at times difficult and the results surprising.

A rate revision adjustment factor is defined as a number which, when multiplied by a set of collected premiums, will revise or correct these premiums to reflect a new or current set of rates. The definition of a rate revision adjustment factor implies: (a) the existence of a set of rates which are applied to exposures over a period of time; (b) this set of rates is changed; and (c) the new rates are applied to other exposures for a second period of time. The sum of the two sets of premiums produces the collected premium for the entire period. As an example, between January 1 and May 1, five risks are written at $100. each and between May 1 and December 31, seven similar risks are written at the revised rate of $110. each. The collected premium of $1270. can be corrected to a premium at current rates by a rate revision adjustment factor of 1.0394 (i.e., $\frac{1320}{1270}$) to produce the revised premium of $1320. In actual practice we will be given the $100. rate, the $110. rate, the May 1 date of change, and the collected premium of $1270. In some lines of insurance the full year's written exposure of 12 risks will also be known, but in other lines it will not. In either event, it will be our task to determine the rate revision adjustment factor by the appropriate mathematical means, apply it to the collected premium and thus obtain the premium adjusted to current rates.

The object of this paper is to develop a sound approach to obtaining rate revision adjustment factors (hereafter called F) and to compare and discuss various phases of the problem. The paper will (a) treat the

most restrictive and simplest case, (b) discuss at length the problem of installment payment of term policies under the annual reporting method of recording installments, (c) relax the restriction requiring a constant volume of business and study its effect, and (d) as a corollary, treat the comparison of two different rate levels to find an "average difference factor" or more familiarly an average deviation. The paper will be confined to consideration of the rate revision adjustment factor necessitated by a single rate change. When it is desired in actual practice to modify premiums to reflect a number of rate changes, a combination factor may be developed by multiplication. For example, a 10% increase followed by a second 10% increase would be equivalent to a 21% increase when adjusting premiums prior to the first increase up to the current level. Finally, it should also be noted that the scope of the paper will be confined to these factors as they apply to a set of written premiums. Results might be quite different if proper factors for application to earned premiums were developed.

The conclusions at the end of the paper are supported by the mathematical development in the next section. For the reader who wants to examine the conclusions immediately, the numbers in parentheses refer to formulas in the next section; the definitions of symbols are presented in Appendix A. Let us now proceed with the development of the formulas.

MATHEMATICAL DEVELOPMENT

Case A is that of a number of exposure units or sum insured of S which are written during the course of a year. Part of these S units are written at a premium rate of r per unit during the first part of the year (1-a). A new rate r′ becomes effective and applies to that part of the S units written during the remaining portion of the year (a). Define d as the rate change expressed as a decimal number from which it follows that

$$d = \frac{r'}{r} - 1 \qquad (1)$$

For future use this may be rewritten as

$$r = \frac{r'}{1 + d} \qquad (2)$$

P will be the premium collected during the year, P′ is the premium P corrected by the rate revision adjustment factor F to the amount which would have been collected if the r′ rates had been in effect for the full year. From this definition we have

$$P' = FP \qquad (3)$$

$$\text{and } P' = Sr' \qquad (4)$$

Under the assumption that S is evenly distributed throughout the year, the collected premium may be expressed as follows:

$$P = [S(1\text{-}a)]\, r + [Sa]\, r' \quad \ldots\ldots (5)$$

By substituting (2), rearranging terms and substituting (4)

$$P = S\left[(1\text{-}a)\frac{r'}{1+d} + ar'\right]$$

$$= Sr'\left[\frac{1+ad}{1+d}\right]$$

$$= P'\left[\frac{1+ad}{1+d}\right]$$

From (3) we thus conclude that

$$F = \frac{P'}{P} = \frac{1+d}{1+ad} \quad \ldots\ldots (6)$$

This is a very general and useful form in that the period under study can be of any length* as long as "a" is the portion on the new rate level, the factor can be used equally well on policy year or calendar year data, and the rate change d may be for a very small subdivision of a line or may be an average change covering a large number of classes or territories. The formula is also applicable in fire where annual renewal business and where prepaid term business is involved. When term business paid on an installment plan is recorded on the company books as a single entry at the inception of the policy (called the full term reporting method) this formula applies equally well. As will be discussed under Case B, this formula is not applicable when installment payment business is recorded on the books only as each installment becomes due—the so-called annual reporting method for installment payment of term business.

Consider for a moment the effect of adopting the intuitive approach to F. This might lead to the use of an erroneous adjusted premium, P'_e, by use of the following formula:

$$P'_e = P \times (1\text{-}a)\,(1+d) + P \times a \times 1.00$$

Or perhaps the reasoning runs

$$P'_e = P + P \times (1\text{-}a) \times d$$

In either event, the equation simplifies to:

$$P'_e = P\,(1 + d - ad) \quad \ldots\ldots (7$$

*Ordinarily, it would be one year.

If we define the erroneous rate revision adjustment factor as F_e, then from (7),

$$F_e = \frac{P'_e}{P} = (1 + d - ad) \quad \ldots\ldots (8)$$

To compare the factor F from (6) with F_e from (8), define

$$C = \frac{F}{F_e} \quad \ldots\ldots (9)$$

That is, C is a correction factor necessary to correct F_e to the proper factor, F. Substituting (6) and (8) in (9) we have

$$C = \frac{1 + d}{(1 + ad)(1 + d - ad)} = \frac{1 + d}{1 + d + ad^2(1 - a)}$$

$$\text{or } C = \frac{1}{1 + \dfrac{ad^2(1 - a)}{1 + d}} \quad \ldots\ldots (10)$$

The most interesting fact about this equation is that the fraction in the denominator is always positive, thus making $C < 1$ under all circumstances (except $d = 0$ which is trivial). This, of course, means that P'_e is too large a number and rates made by the loss ratio method will consistently include an element of inadequacy. Fortunately, the error is small, ranging up to about 1¼% under a 20% rate reduction, but when we are only dealing with a 5% profit margin, even small errors become important and especially so when they are always in one direction.

Appendix B has been calculated to illustrate the magnitude of the various factors under selected rate revisions when they are made effective in midyear ($a = \frac{1}{2}$). The first section is designated $w = o$ and relates to the equations currently being considered. For example, if a 20% rate increase is made at midyear, the proper rate revision adjustment factor is 1.0909; the one commonly used is 1.1000; the error in using the wrong factor is 0.83%. These interpretations are obtained from the first three entries in the first column of figures in Appendix B. The inadequacy of formula (7) is clearly shown by values of C which reach an inadequacy of 1.23% for a 20% rate reduction.

Case B will be that of a five-year installment payment policy using the annual reporting method of recording the business. Under this system, the policy is written for a five-year term, but the premium is recorded on the company books each year for five years as it is collected. If the year in which the rate revision is made is designated year 0, then the premiums collected on five-year installment business during year 0, denoted ${}_5P_o$, will be made up of premiums from policies written during years 0, -1, -2, -3 and -4.

Define ${}_5S_i$ as the sum insured under such policies written during year i. When a rate revision is made we will collect $r\ {}_5S_{-4}$ from installments on policies written in year -4 plus similar elements of $r\ {}_5S_{-3}$, $r\ {}_5S_{-2}$ and $r\ {}_5S_{-1}$. The premium collected on policies written in year 0 will be $r\ {}_5S_0\ (1\text{-}a) + r'\ {}_5S_0\ a$. Adding up the five segments we have

$${}_5P_0 = r({}_5S_{-4} + {}_5S_{-3} + {}_5S_{-2} + {}_5S_{-1} + {}_5S_0 - {}_5S_0 a + {}_5S_0\, a\, \frac{r'}{r}) \quad \ldots (11)$$

To simplify the evaluation of this equation, two key assumptions are made: (a) ${}_5S_i$ is constant and equal to $(\Sigma_5 S_i)/5$ for each year during the period (this is equivalent to saying that the total exposure insured under five-year installment policies is $\Sigma\ {}_5S_i$ and it is evenly spread over the period) and (b) installments are recorded under the annual reporting method in equal amounts of .20 in each of the five years instead of the actual .22 the first year and .195 for each of the next four years.* This latter assumption will, in fact, be exactly fulfilled under the formula introduced in certain states which sets the installment premium at 35% of the three-year term premium for each of the five years.

Define ${}_5P'_i$ as the collected premium in year i under five-year installment policies and ${}_5F_i = {}_5P'_i/{}_5P_i$. Then (11) may be simplified by use of (2), (4), and the foregoing assumptions and definitions:

$${}_5P_0 = \frac{r'}{1+d}\left[\frac{\Sigma\ {}_5S_i}{5}(5) - \frac{\Sigma\ {}_5S_i}{5}\,a + \frac{\Sigma\ {}_5S_i}{5}(a + ad)\right]$$

$${}_5P_0 = {}_5P'_0\left[\frac{1 + \frac{a}{5}\,d}{1+d}\right] \quad \ldots (12)$$

$${}_5F_0 = \frac{1+d}{1 + \frac{a}{5}\,d} \quad \ldots (13)$$

Similar reasoning can be applied to each of the years 1, 2, 3 and 4 which result in successively dropping off $r\ {}_5S_{-4}$, $r\ {}_5S_{-3}$, etc. while successively adding $r'\ {}_5S_1$, $r'\ {}_5S_2$, etc. The resulting solutions form a pattern which may be generalized:

$${}_5F_i = \frac{1+d}{1 + \frac{a+i}{5}\cdot d} \quad (i = 0, 1, 2, 3, 4) \quad \ldots (14)$$

*This latter system of annual recording introduces a further distortion in the rate making process. Since the premium is earned too fast because of the .22 element being used the first year, we again have an overstatement of the premium base and, hence, an inadequacy in the rates made on this basis. See also Proceedings of the National Association of Insurance Commissioners, Eighty-third Session, 1952, pp. 45–46.

We see from (14) that a rate change should be reflected in each of the five years following its effective date if business can be written under an installment plan and recorded on the annual reporting method. Under any system that ignores the consequences of five-year business we would only get the effect of applying (6) to year 0. This formula makes it necessary to investigate the rate levels over nine years if a rate change is to be based on five years of experience. This is necessitated because the earliest one of the five years has its income affected by installments collected on policies written four years earlier —hence, if there were a rate change during this fourth previous year, strict accuracy would require that part of its effect be reflected in the earliest year. With high speed electronic equipment containing large storage capacity, such a program could possibly be carried out. Some simplification would be desirable under present conditions which usually employ desk calculators and this leads us to the next case.

Case C will "telescope" the five-year effect of a rate change on installment business into the initial year 0. The reasoning here is that the full effect of a rate change will be reflected immediately in the premium and it is hoped the distortion produced by not using (14) will be small enough to be offset by the computational savings. To accomplish this "telescoping" we add to ${}_5P_0$ only the increment of change from each of the years 1 through 4. Define ${}_5P''_0$ as the premium of year 0 under installment policies recorded on the annual reporting method which has been adjusted to reflect the changes in premium over each of five years due to a rate change made in 0.

$$\begin{aligned} {}_5P''_0 &= {}_5P_0 + ({}_5P'_0 - {}_5P_0) + ({}_5P'_1 - {}_5P_1) + ({}_5P'_2 - {}_5P_2) \\ &\quad + ({}_5P'_3 - {}_5P_3) + ({}_5P'_4 - {}_5P_4) \\ &= {}_5P_0 + \sum_{i=0}^{4} ({}_5P'_i - {}_5P_i) \\ &= {}_5P_0 + \sum_{i=0}^{4} \left(1 - \frac{{}_5P_i}{{}_5P'_i}\right) {}_5P'_i \end{aligned}$$

Under our assumption of an even distribution of exposure over the five-year period, all the ${}_5P'_i$ will be equal, so we substitute ${}_5P'_0$ for the term outside the parenthesis and then substitute (12). Simultaneously, (14) will be substituted inside the parenthesis.

$${}_5P''_0 = {}_5P_0 + {}_5P_0 \left[\frac{1+d}{1+\frac{a}{5}\cdot d}\right] \sum_{i=0}^{4} \left[1 - \frac{1+\frac{a+i}{5}\cdot d}{1+d}\right]$$

Upon simplification, this becomes

$$ {}_5P''_0 = {}_5P_0\left[1 + \frac{15d - 5ad}{5 + ad}\right] \quad \ldots\ldots\ldots\ldots\ldots\ldots (15) $$

Then if ${}_5F''_0$ is defined as $\frac{{}_5P''_0}{{}_5P_0}$ we have

$$ {}_5F''_0 = 1 + \frac{15d - 5ad}{5 + ad} \quad \ldots\ldots\ldots\ldots\ldots\ldots (16) $$

Now let us study the effect of using (6) on the year 0 premium for five-year installment business when we should use (16). Define a correction factor

$$ {}_5C'' = \frac{{}_5F''_0}{F} $$

$$ {}_5C'' = \frac{(5 - 4ad + 15d)\,(1 + ad)}{(5 + ad)\,(1 + d)} $$

or

$$ {}_5C'' = 1 + \frac{d(10 - 4a^2d + 14ad)}{(5 + ad)\,(1 + d)} \quad \ldots\ldots\ldots\ldots\ldots\ldots (17) $$

The second term has its sign controlled by the sign of d. So, if $d > 0$, ${}_5C'' > 1$ which means that (6) will produce too small a premium (and would need a correction factor in excess of 1 to rectify it). This means that if the rate trend has been generally upward, (6) would tend to continue this trend beyond the time true experience would call for a downturn. Conversely, if a rate trend has been downward, (6) tends to perpetuate the trend even after the true experience would call for an upward revision. Rate increases are often hard to come by—it would be unfortunate if we continued a practice that gives us more rate decreases than the truth warrants.

Appendix B illustrates the values taken by the various formulae.

Throughout the discussion thus far we have always assumed the exposure to be written evenly over the period. Let us instead now define ${}_0\phi$ as the exposure in force at the beginning of the year and ϕ_1 as exposure in force at the end of the year. In Case D we treat annual policies as we did in Case A but now they will have a continuous rate of growth of w (corresponding to the investment concept of interest convertible continuously). Define $\overline{P}$ and $\overline{P'}$ as before but now a continuous rate of growth is involved in our assumptions. The premium at revised rates will be

$$ \overline{P'} = \int_0^1 \phi_0\, r'\, (1 + w)^t dt $$

where t is an increment of time between the beginning and the end of the year. This reduces to

$$\overline{P'} = \frac{\phi_o r' w}{\log(1 + w)} \quad \ldots\ldots (18)$$

where the abbreviation "log" is the base e logarithm.

The collected premium may be expressed as

$$\overline{P} = \phi_o r \int_o^{1-a} (1 + w)^t dt + \phi_o r' \int_{1-a}^{1} (1 + w)^t dt$$

Integrating, evaluating and substituting (2) we have

$$\overline{P} = \frac{\phi_o r'}{\log (1 + w)} \left[(1 + w)^{1-a} \left(\frac{-d}{1 + d}\right) + \frac{d + w(1 + d)}{1 + d} \right] \ldots (19)$$

By (18), substitute $\frac{\overline{P'}}{w}$ for the term outside the brackets and at the same time define $\overline{F} = \frac{\overline{P'}}{\overline{P}}$. This results in

$$\overline{F} = \frac{(1 + d)w}{(1 + d)w + d - d(1 + w)^{1-a}} \quad \ldots\ldots (20)^*$$

or

$$\overline{F} = \frac{1}{1 + \frac{d[1 - (1 + w)^{1-a}]}{(1 + d)w}} \quad \ldots\ldots (21)$$

As shown in Appendix C, w can be calculated from observed data as

$$w = \log \frac{\phi_1}{\phi_o} \quad \ldots\ldots (22)$$

To compare (21) with our assumption of a constant volume in (6), define $\overline{C}$ as the correction factor necessary to change F (which is based on an otherwise correct calculation) to $\overline{F}$. That is,

$$\overline{C} = \frac{\overline{F}}{F} = \frac{1 + ad}{1 + d + \frac{d}{w}[1 - (1+w)^{1-a}]} \quad \ldots\ldots (23)$$

*If $w = o$, $\overline{F}$ becomes the indeterminate form $\frac{o}{o}$. Upon differentiating both numerator and denominator, $\overline{F}_{w=o} = \frac{1+d}{1+ad}$. This is the same as (6), which it should be.

In search of an approximation,

$$1-(1+w)^{1-a} = 1 - \left[1 + (1-a)w + \frac{(1-a)(-a)}{2!}w^2 + \frac{(1-a)(-a)(-a-1)}{3!}w^3 + \cdots\right]$$

$$= -\left[(1-a)w - \frac{(1-a)(a)}{2}w^2 + \frac{(1-a)(a)(a+1)}{6}w^3 - \cdots\right]$$

Thus

$$\overline{C} = \frac{1 + ad}{(1+d) - (1-a)d + \frac{d(1-a)(a)w}{2} - \frac{d(1-a)(a)(a+1)}{6}w^2 + \cdots} \quad (24)$$

While w can theoretically reach values in excess of 1.00, it seems that a practical working limit would be between + .20 and — .20. A reasonable figure for d might be ± .15 and a is selected at ½ as a typical figure. Under these conditions, the maximum error in the $\overline{C}$ caused by omitting the last term and all subsequent terms in the denominator of (24) is given by

$$\frac{d(1-a)(a)(a+1)}{6(1+ad)}w^2$$

Under the conditions outlined, this is on the order of .0004. This is sufficiently small that (24) may be written as

$$\overline{C}_x = \frac{1 + ad}{1+ad + \frac{adw(1-a)}{2}}$$

where $\overline{C}_x$ indicates an approximation of $\overline{C}$.

$$\overline{C}_x = \frac{1}{1 + \frac{adw(1-a)}{2(1+ad)}} \quad (25)$$

In the light of (25) we can better judge whether the effect of increasing volume is sufficient to warrant the use of the more complicated (21) in lieu of (6). Equation (21) can be simplified by using the series expansion employed in arriving at (25) if the user is willing to waive the possible effect of a maximum error in $\overline{F}$ of

$$\frac{d(1-a)(a)(a+1)}{6(1+ad)}w^2$$

This approximation of $\overline{F}$, called $\overline{F}_x$ is

$$\overline{F}_x = \frac{1}{1 - \frac{d(1-a)(2-aw)}{2(1+d)}} \quad \ldots\ldots\ldots\ldots\ldots\ldots (26)$$

As we look at (25) the effect can clearly be seen of assuming a constant volume of business when it is in fact changing over the year. If d and w are both positive or both negative, then assuming a constant volume will produce too high a revised premium and, hence, too low a rate. Thus, in an expanding economy and in a time of generally rising rates, a constant volume assumption will put an element of inadequacy in the rates. When combined with the element of inadequacy from equation (10), we may be reaching serious proportions. If d and w are of opposite sign, rates produced on the constant volume assumption would contain an element of excessiveness which would be somewhat counterbalanced by the inadequacy from (10). When installment business is involved, (17) introduces another element which will sometimes increase and sometimes decrease the rates. Appendix B contains a section for $w = +.10$ and one for $w = -.10$. It can be seen that the approximations are very good for the selected values. Another interesting observation is that for a given value of d, the values for $w = +.10$ and for $w = -.10$ multiply to 1.000. This is a case then where an increase followed by a decrease of the same percentage are offsetting. Finally, in the opinion of the author, $\overline{C}$ is sufficiently close to 1.000 that for most practical purposes it can be ignored up to values of $w = \pm .10$ if computational simplicity is desired. This will then permit the use of (6).

Case E (corresponding to Case B) will study five-year installment business under an assumption of a continuous rate of growth W. Define ${}_5\phi_t$ as the five-year installment exposure in force at the beginning of the year "i" which will be rewritten during the year at the rates then in effect. (Note: The total exposure in force for all the policies would be roughly five times this amount, but only one-fifth of all policies will be up for rewriting during any year. This definition corresponds to the definition of ${}_5S_t$). Corresponding to equation (11) we may now write:

$$\begin{aligned}
{}_5\overline{P}_o \quad &= \int_{-4}^{-3} r\,{}_5\phi_o\,(1+W)^t\,dt \quad + \int_{-3}^{-2} r\,{}_5\phi_o\,(1+W)^t\,dt \\
&+ \int_{-2}^{-1} r\,{}_5\phi_o\,(1+W)^t\,dt \quad + \int_{-1}^{0} r\,{}_5\phi_o\,(1+W)^t\,dt \\
&+ \int_{0}^{1-a} r\,{}_5\phi_o\,(1+W)^t\,dt \quad + \int_{1-a}^{1} r'\,{}_5\phi_o\,(1+W)^t\,dt
\end{aligned}$$

This may be compressed into one integral involving r and one integral involving r′ and generalized to

$$ {}_5\overline{P}_i = \int_{-4+i}^{1-a} r\ {}_5\phi_o\ (1+W)^t\ dt + \int_{1-a}^{1+i} r'\ {}_5\phi_o\ (1+W)^t\ dt \quad \ldots\ldots (27) $$

Evaluating and putting in terms of r′:

$$ {}_5\overline{P}_i = \frac{{}_5\phi_o\ r'}{(1+d)\log(1+W)} \left\{ (1+W)^{1+i}\left[1 + d - (1+W)^{-5}\right] - d\,(1+W)^{1-a} \right\} \quad (28) $$

Using similar reasoning

$$ {}_5\overline{P}'_i = \int_{-4+1}^{1+i} {}_5\phi_o\ r'\ (1+W)^t\ dt $$

or:

$$ {}_5\overline{P}'_i = \frac{{}_5\phi_o\ r'}{\log(1+W)}\left[1 - (1+W)^{-5}\right](1+W)^{i+1} \quad \ldots\ldots (29) $$

Define:

$$ {}_5\overline{F}_i = \frac{{}_5\overline{P}'_i}{{}_5\overline{P}_i} $$

Substituting (28) and (29) and simplifying

$$ {}_5\overline{F}_i = \frac{1+d}{1 + \left[\dfrac{1-(1+W)^{-a-i}}{1-(1+W)^{-5}}\right] \cdot d} \quad \ldots\ldots (30) $$

Although (1+W) could be obtained from the observation of ${}_5\phi_o$ and ${}_5\phi_1$, it would be more practical to measure it as a function of (a) ${}_5\phi_{-4}$ and ${}_5\phi_1$ thus covering the most recently expired five-year period, (b) ${}_5\phi_{-4}$ and ${}_5\phi_5$ thus covering the entire period of time involved in (27) or (c) ${}_5\phi_{-2}$ to ${}_5\phi_3$ thus covering the centermost five years. The author's preference is for (a) since it will be always available whereas (b) and (c) may reach into the future. Then, by analogy with (22),

$$ (1+W) = \left[1 + \log \frac{{}_5\phi_1}{{}_5\phi_{-4}}\right]^{1/5} \quad \ldots\ldots (31) $$

Following a process similar to that that produced (15), we may "telescope" the effect of the five-years under (30) by writing the telescoped premium as

$$ {}_5\overline{P}''_o = {}_5\overline{P}_o + \sum_{i=o}^{4} \left({}_5\overline{P}'_i - {}_5\overline{P}_i\right) $$

Substituting (28) and (29) and simplifying:

$$ {}_5\overline{P}''_o = {}_5\overline{P}_o \left\{ 1 + \frac{5(1+W)^{-a} - \sum_{i=o}^{4} (1+W)^{i-5}}{1 - (1+W)^{-a} + \frac{1}{d}[1 - (1+W)^{-5}]} \right\} \qquad W \neq 0 $$

The quantity following the summation sign may be further simplified since it is a geometric progression and becomes:

$$ {}_5\overline{P}''_o = {}_5\overline{P}_o \left\{ 1 + \frac{5(1+W)^{-a} - \frac{1}{W}[1 - (1+W)^{-5}]}{1 - (1+W)^{-a} + \frac{1}{d}[1 - (1+W)^{-5}]} \right\} \quad W \neq 0 \quad \ldots(32) $$

Define:

$$ {}_5\overline{F}''_o = \frac{{}_5\overline{P}''_o}{{}_5\overline{P}_o} $$

Then

$$ {}_5F''_o = 1 + \frac{5(1+W)^{-a} - \frac{1}{W}[1 - (1+W)^{-5}]}{1 - (1+W)^{-a} + \frac{1}{d}[1 - (1+W)^{-5}]} \quad W \neq 0 \quad \ldots\ldots(33) $$

Finally, define

$$ {}_5\overline{C}'' = \frac{{}_5\overline{F}''_o}{\overline{F}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(34) $$

and

$$ {}_5\overline{C} = \frac{{}_5\overline{F}''_o}{{}_5F''_o} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(34a) $$

Appendix B gives numerical examples of equations (30), (33), (34) and (34a). In the author's opinion ${}_5\overline{C}$ does not come close enough to 1.000 to permit an assumption of $W = 0$ unless W in itself is quite small (say, $\pm .02$). The error caused by ignoring the effect of five-year installment business if it is recorded under the annual reporting system is quite large, even under small values of d as shown by ${}_5\overline{C}''$.

The next natural development which suggests itself is that of more than one rate change within the one year period. Since this rarely happens and since the formulae will follow from the general pattern laid down, their development will be left to those forced to use them. If the changes are small, the repeated application of the formulae developed will not introduce much error.

As a corollary to the main subject, it has also been observed that certain intuitive reactions can lead to erroneous results in the matter of comparing rate levels between two organizations. This is most commonly done in comparing a company rate per unit of exposure, K, with a bureau rate per unit of exposure, B, where S is the exposure as before. Also, let $p = SK$; that is, the company premium, and let j be used as a subscript to identify the finest breakdown of the data with which we are working. R_j is the ratio of the company rate to the bureau rate; i.e., $R_j = \frac{K_j}{B_j}$ and μ is the composite or average ratio of rate levels which we are seeking. Finally, V_j is the proportion of volume in the j^{th} classification and equals $\frac{p_j}{\Sigma p_j}$. (Since all summations will be over j, this will be omitted from Σ). Intuition seems to lead to an erroneous μ, called μ_e by the following reasoning: To get a weighted average deviation, apply the weights to the individual deviations. This sounds innocent enough and leads to the following:

$$\mu_e - 1 = \Sigma[V_j(R_j - 1)]$$

Of course, $\Sigma V_j = 1.00$ which leads to

$$\mu_e = \Sigma V_j R_j = \Sigma \frac{V_j K_j}{B_j} \qquad \text{.....(35)}$$

The true comparison of composite rate levels is arrived at by extending exposures, in their finest breakdown, first at one set of rates and then at the other set of rates; thus obtaining the total premium for the entire group of business at each rate level. Then the ratio of the two totals would give the composite ratio of rate levels. In terms of our definitions:

$$\mu = \frac{\Sigma S_j K_j}{\Sigma S_j B_j} = \frac{\Sigma p_j}{\Sigma S_j B_j} \qquad \text{.....(36)}$$

This is a perfectly good form for the equation, provided the statistical breakdown of S is fine enough to identify unique manual rates. If this is not the case, or if S is not a coded item (as in fire insurance), other means of getting at the results must be obtained. From the definitions $S = \frac{p}{K}$, so substituting this in (36) and rearranging,

$$\mu = \frac{\Sigma p_j}{\Sigma \frac{p_j}{K_j} \cdot B_j}$$

Therefore

$$\mu = \frac{1}{\Sigma \frac{V_j}{R_j}} = \frac{1}{\Sigma V_j \frac{B_j}{K_j}} \qquad \text{.....(37)}$$

Thus, it is the harmonic mean that is correct to use instead of the more usual arithmetic mean. It can be shown that $\mu_e > \mu$ under all cases where the formula would be used.* Care must be exercised in ascertaining V_j which is a weighting system based on the company's premium volume and not on its exposure units.

CONCLUSIONS

From the definition of the rate revision adjustment factor and from a cursory examination of it, there does not seem to be anything too complex or mysterious about what it is, how it should be calculated or how it should be applied. Intuition would lead us to calculate the rate revision adjustment factor as based on pro rata of the number of months involved at each rate level. This results in (8) which is not correct and the error caused by such reasoning consistently produces inadequate rates. If the assumptions are met of a level volume of business evenly distributed over the period and the recording of all premiums (both term and installment) is made at the time the contract is entered into, then equation (6) is the only correct one to use. This formula is sufficiently accurate if the volume is rising or falling slightly (say, 10% or less per year), but when the rate of growth (or decline) is very large, such as in the early years of a new line of business, equation (21) would have to be used despite its calculating complexity. Equation (26) is an approximation to (21) which may be used when the rate of growth is moderate and judgment indicates its appropriateness. When installment payment term business is recorded annually as each installment falls due, the proper evaluation of the rate revision adjustment factor becomes quite tedious as shown by both equation (14) which assumes a level volume of business and equation (30) which recognizes a rate of growth in the volume. Short cut equations (16) and (33) "telescope" the effect of a rate change into the original year it becomes effective and save a great deal of difficulty when compared to (14) and (30).

In applying these formulae to specific cases, the full ingenuity of the actuary must be used to adapt them to the prevailing conditions. For example, if both the annual reporting method and the full term reporting method are permitted, it may be necessary to use some form of a composite formula which takes this into consideration. It may also be a problem to ascertain the true date on which rates were revised. For example, if rates on policies written to be effective 45 days after the effective date of a rate change are allowed to remain on the old basis, then the true effective date of the change from the viewpoint of the actuary may have to be modified. Care must also be exercised if substantial rate decreases are made at any one time in such a manner that it is advantageous to cancel short rate and rewrite the policy.

*This is the usual proof that the arithmetic mean is larger than the harmonic mean and is not shown here.

This would not likely occur on small personal lines but is a definite possibility in any class generating a large premium per risk. Here the rate change could introduce other considerations not reflected in the formulas.

The final section of the paper established (37) as the proper means of obtaining the average deviation of a company's rates from those of a bureau (or other similar comparisons) when detailed exposure data is not available. If the erroneous formula (35) were used, the ratio of rate levels would be stated too high and thus the deviation of the company would be understated.

Perhaps the outstanding lesson to be learned from the analyses presented is that intuitive reasoning can often lead to seriously defective results. Sound conclusions can be reached only by solid reasoning from the firm foundation of fundamental principles. In this way, the limitations as well as the area of application will be known.

APPENDIX A

SYMBOL DEFINITIONS

In general, P represents premium, r rate, F factor, S and ϕ are amounts insured or exposures in force and C is a correction or comparison factor.

S	Exposure units or sum insured.
1-a	Portion of the period prior to the rate change.
a	Portion of the period after the rate change.
r	Rate per unit of exposure prior to the rate change.
r′	Rate per unit of exposure after the rate change.
d	Rate change expressed as a decimal number; positive sign indicates a rate increase; negative sign indicates a rate decrease.
P	Premium actually collected or recorded on the company books during the year.
P′	Premium which would have been collected if all business during the year had been written at the r′ rates.
F	Rate revision adjustment factor to adjust P to P′.
P_e	An erroneously calculated value of P′.
F_e	An erroneously calculated value of F.
C	A factor to compare P'_e with P′, or to compare F with F_e.
i	Used as a subscript to identify various years with 0 designating the year in which the rate change is made; negative numbers designate prior years; positive numbers designate subsequent years.

5	Used as a subscript preceding symbols such as P and F to indicate they deal with 5-year term business written on an installment basis and recorded on the company books as each installment is collected.
$''$	Double primes indicate a quantity based on "telescoping" the five-year effect of a rate change on installment business into one year.
${}_5C''$	A factor to compare ${}_5F''_0$ with F; that is, a measurement of the error introduced if five year installment payment term business recorded annually is treated the same as annual business.
ϕ_i	The exposure in force at the beginning of year i.
w	The continuous rate of growth at which policies are being written.
—	A bar over a symbol indicates that a continuous rate of growth is involved in the assumptions.
t	An increment of time between the beginning and end of the year.
log	Natural or base e logarithms.
$\overline{C}$	A factor to compare $\overline{F}$ with F; that is, a measurement of the error introduced by assuming business is written evenly throughout a year when, in fact, it is written at a changing rate w.
$\overline{C}_x$	An approximation to $\overline{C}$.
$\overline{F}_x$	An approximation to $\overline{F}$.
W	The continuous rate of growth at which policies are being written under five-year installment payment plans, subject to annual recording on the company books. This symbol is used in lieu of ${}_5w$ for simplicity of notation.
${}_5\overline{C}''$	A factor to compare ${}_5\overline{F}''_0$ with $\overline{F}$; that is the same as ${}_5C''$ except it involves a continuous rate of growth.
${}_5\overline{C}$	A factor to compare ${}_5\overline{F}''_0$ with ${}_5F''_0$; that is, the same as $\overline{C}$ except involving five-year installment business recorded annually.
K	A company rate per unit of exposure.
B	A Bureau rate or base rate per unit of exposure.
j	A subscript to designate the finest breakdown of the data with which we are working. Usually the breakdown would be to the point of unique manual rates.
p	Company premium.
V_j	The proportion of volume in the j^{th} cell.
μ	The composite or average ratio of rate levels, $(\mu-1)$ is the average deviation of company rates from Bureau rates.
μ_e	An erroneous μ.

APPENDIX B

Evaluation of Formulae When a = ½ and d Assumes Various Values

Section	Symbol	Equation	d = .20	.10	.05	−.05	−.10	−.20
	F	(6)	1.0909	1.0476	1.0244	.9744	.9474	.8889
	F_e	(8)	1.1000	1.0500	1.0250	.9750	.9500	.9000
	C	(10)	.9917	.9977	.9994	.9993	.9972	.9877
	${}_5F_0$	(14)	1.1765	1.0891	1.0448	.9548	.9091	.8163
w = 0	${}_5F_1$	(14)	1.1321	1.0680	1.0345	.9645	.9278	.8511
	${}_5F_2$	(14)	1.0909	1.0476	1.0244	.9744	.9474	.8889
	${}_5F_3$	(14)	1.0526	1.0280	1.0145	.9845	.9677	.9302
	${}_5F_4$	(14)	1.0169	1.0092	1.0048	.9948	.9890	.9756
	${}_5F_0''$	(16)	1.4902	1.2475	1.1244	.8744	.7475	.4898
	${}_5C''$	(17)	1.3660	1.1908	1.0976	.8974	.7890	.5510
	$\overline{F}$	(21)	1.0886	1.0464	1.0238	.9750	.9486	.8912
	$\overline{F}_x$	(26)	1.0884	1.0464	1.0238	.9750	.9486	.8914
	$\overline{C}$	(23)	.9978	.9989	.9994	1.0006	1.0013	1.0027
	$\overline{C}_x$	(25)	.9977	.9988	.9994	1.0006	1.0013	1.0028
	${}_5\overline{F}_0$	(30)	1.1712	1.0867	1.0436	.9559	.9112	.8201
w or	${}_5\overline{F}_1$	(30)	1.1212	1.0627	1.0319	.9670	.9328	.8605
W = +.10	${}_5\overline{F}_2$	(30)	1.0793	1.0417	1.0214	.9773	.9533	.9008
	${}_5\overline{F}_3$	(30)	1.0438	1.0234	1.0121	.9869	.9728	.9408
	${}_5\overline{F}_4$	(30)	1.0135	1.0073	1.0038	.9958	.9912	.9804
	${}_5\overline{F}_0''$	(33)	1.5029	1.2545	1.1280	.8704	.7392	.4718
	${}_5\overline{C}''$	(34)	1.3806	1.1989	1.1018	.8927	.7793	.5294
	${}_5\overline{C}$	(34a)	1.0085	1.0056	1.0032	.9954	.9889	.9633
	$\overline{F}$	(21)	1.0935	1.0489	1.0250	.9737	.9461	.8863
	$\overline{F}_x$	(26)	1.0934	1.0489	1.0250	.9737	.9461	.8864
	$\overline{C}$	(23)	1.0024	1.0013	1.0006	.9993	.9986	.9971
	$\overline{C}_x$	(25)	1.0023	1.0012	1.0006	.9994	.9987	.9972
	${}_5\overline{F}_0$	(30)	1.1816	1.0915	1.0459	.9537	.9071	.8127
w or	${}_5\overline{F}_1$	(30)	1.1435	1.0735	1.0372	.9619	.9228	.8416
W = −.10	${}_5\overline{F}_2$	(30)	1.1041	1.0542	1.0277	.9711	.9409	.8761
	${}_5\overline{F}_3$	(30)	1.0633	1.0335	1.0173	.9816	.9618	.9181
	${}_5\overline{F}_4$	(30)	1.0213	1.0115	1.0060	.9934	.9863	.9696
	${}_5\overline{F}_0''$	(33)	1.4727	1.2382	1.1195	.8795	.7581	.5123
	${}_5\overline{C}''$	(34)	1.3468	1.1805	1.0922	.9033	.8013	.5780
	${}_5\overline{C}$	(34a)	.9883	.9925	.9956	1.0058	1.0142	1.0459

APPENDIX C

To evaluate w, the continuous rate of increase, consider the function

$$(1 + \frac{w}{t})^t$$

As t increases from 1, we are dividing the interval into more and more subdivisions as we go from ϕ_0 to ϕ_1. The continuous rate of growth is when t becomes infinite. So,

$$\frac{\phi_1}{\phi_0} = \lim_{t \to \infty} \quad (1 + \frac{w}{t})^t$$

This limit is the very common one involved in the base of natural logarithms and equals e^w.

Hence

$$\frac{\phi_1}{\phi_0} = e^w$$

$$w = \log \frac{\phi_1}{\phi_0}$$

THE CANADIAN MERIT RATING PLAN FOR INDIVIDUAL AUTOMOBILE RISKS

BY

HERBERT E. WITTICK

The practise of merit rating individual automobile risks is now in its sixth year of successful operation in Canada.

Merit rating of individual automobile risks is not new for it has been used successfully in the British Isles and in some European countries for many years. In North America it has been tried under various circumstances; however, only in Canada has the programme become almost universal, and consequently only here have adequate statistics been produced.

The present Canadian rules read as follows:

PRIVATE PASSENGER AUTOMOBILES — (Except those fleet rated)

In addition to being rated by age of operators and use, individual private passenger automobiles are further rated according to claims experience and driving experience of operators as follows:

A RISKS are those where the following conditions apply:

The Insured and/or principal operator has been licensed in North America or the British Isles or Dominions throughout the past *three years,* and within that period no operator has sustained any accident with any private passenger automobile (whether insurance carried or not) out of which a payment has been made as respects Third Party Liability or Collision or out of which such a claim is pending and there has been no conviction requiring the filing of a Financial Responsibility Certificate.

Note: A Third Party Liability claim does not affect the rating of Collision coverage nor does a Collision loss affect the rating of Third Party Liability. However it should be remembered that uninsured losses do affect rates so that when a policyholder purchases Collision *after* an accident the loss must be charged for in the Collision rating. Collision losses where full recovery is made do not affect the rating.

X RISKS are those where the following condition applies:

The requirements are the same as those for A risks except that the period of licensing and claim free operation is *two years* instead of three.

Y RISKS are those where the following conditions apply:

The requirements are the same as those for A risks except that the period of licensing and claim free operation is *one year* instead of three.

B RISKS are those where one or more of the following conditions apply:

Either some operator has been involved in an accident or has had a conviction within the past *year,* or the Named Insured and/or principal operator has been licensed in North America or the British Isles or Dominions less than the *year* just preceding.

COMMERCIAL AUTOMOBILES — (Except those fleet rated)

A RISKS — Commercial risks other than those included in fleets which can qualify under the following conditions:

(a) The insured has owned a similar commercial type automobile throughout the past three years.

(b) Within the past three years no accident has occurred with any such vehicle out of which a payment has been made as respects Third Party Liability or Collision, (whether insurance carried or not), or out of which such a claim is pending and there has been no conviction requiring the filing of a financial responsibility certificate.

Note: If the Insured has owned more than one commercial type automobile for three years, the claim free rate applies separately to the vehicles (including substitutions therefor) which have been owned for three years and which have not been involved in accidents. Third Party Liability accidents do not affect the rating of Collision coverage nor do Collision only accidents affect the rating of Third Party Liability.

X RISKS —

The requirements are the same as those for A risks except that the period of ownership and claim free operation is *two years* instead of three.

Y RISKS —

The requirements are the same as those for A risks except that the period of ownership and claim free operation is *one year* instead of three.

B RISKS —

Commercial automobiles which do not qualify under Class A, X or Y.

I believe that there are still many automobile underwriters in the United States who feel that merit rating of individual automobile risks is not justified because they say there is little credibility in the experience of a single automobile. Experience in Canada has definitely proved that this is not the case. Undoubtedly this is so because automobile accidents are not a matter of pure chance, but are instead a factor of the driving habits of the operators. The Canadian experience is so conclusive that I think it can be said without fear of con-

tradiction that merit rating of individual automobile risks is not only desirable, but necessary if the companies are to spread insurance costs equitably.

It may be of interest to sketch the historical background of automobile merit rating in Canada. It was first tried in the middle 1930's, but because many companies did not follow it, the programme was abandoned. However, by the early 1950's it seemed obvious to underwriters in Canada that it had become necessary to rate individual risks as respects their claim producing record. Thus, in April of 1953 the Canadian Automobile Underwriters introduced the original merit rating programme, and this programme was followed by most independent agency company underwriters. The programme divided risks into two classes, Class A which had no Third Party Liability claims within the past three years, and Class B, those which had produced a claim. A claim was deemed to be one which had involved a payment other than adjusting expenses. The original programme applied only to Third Party Liability, but within a few months it was extended to Collision coverage, and at that time a loss under either Third Party Liability or Collision nullified the preferred rates as respects both coverages. In addition to the claim free requirement, it was required that the insured had owned an automobile for three years. The discount for a Class A Risk was 20%.

The 1953 plan applied only to Class 1 risks, that is pleasure use vehicles without any male operators under 25 years of age. In 1954 the programme was extended to all classes of private passenger automobile risks. Also the ownership requirement was dropped, and instead it was required that the Insured must have had three years' driving experience in North America or the British Isles. Later in 1954 the programme was extended to individual Commercial automobiles. In 1956 Class X was established for those risks which were claim free for two years, but not three. It was also provided that a Third Party Liability claim did not affect the Collision rate, nor a Collision claim the Third Party Liability rate. In 1957 another modification was made, establishing Class Y for those risks which were claim free for one year, but not two. The program thus now provides four classes. The differentials used are 100% for a B Risk, 90% for a Y Risk, 80% for an X Risk, and 65% for an A Risk. Statistics are being produced for each one of the merit rating classes for each one of the five Age and Use classes.

In Canada we have compulsory filing of statistics by all insurers according to a uniform statistical plan. This is done under Government regulation, and consequently complete statistics are available. The latest figures available are those for 1957 policy year developed on an 18 months basis, that is to June 30th, 1958. The number of cars insured varies from over a million and a half for Class 1 for

Third Party Liability to less than twenty thousand for Class 5 for Collision. This exhibit shows the following frequency figures on a countrywide basis:

PRIVATE PASSENGER RISKS— CLASS 1 — Pleasure Use, no male operators under age 25.

	THIRD PARTY LIABILITY			COLLISION— $100 Deductible		
Merit Rating	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*
A	7.8	56%	90%	7.0	59%	93%
X	10.4	74%	121%	8.0	67%	107%
Y	11.7	84%	136%	9.0	76%	120%
B	14.0	100%	163%	11.9	100%	159%
Combined	8.6	61%	100%	7.5	63%	100%

PRIVATE PASSENGER RISKS — CLASS 2 — Pleasure use, non-principal male operator under age 25.

	THIRD PARTY LIABILITY			COLLISION— $100 Deductible		
Merit Rating	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*
A	12.1	74%	93%	10.8	87%	97%
X	15.0	92%	115%	13.5	109%	122%
Y	15.4	95%	118%	13.3	107%	120%
B	16.3	100%	125%	12.4	100%	
Combined	13.0	80%	100%	11.1		100%

Note:—The difference from Class 1 in relative frequency may be due to the fact that risks with 16 year old and other *new* under age drivers have been allowed A rating.

PRIVATE PASSENGER RISKS — CLASS 3 — BUSINESS USE

	THIRD PARTY LIABILITY			COLLISION— $100 Deductible		
Merit Rating	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*
A	12.7	64%	90%	9.8	67%	92%
X	16.8	84%	119%	12.3	84%	115%
Y	17.3	87%	123%	12.3	84%	115%
B	19.9	100%	141%	14.6	100%	136%
Combined	14.1	71%	100%	10.7	73%	100%

PRIVATE PASSENGER RISKS — CLASS 4 — Unmarried
Principal male operator under age 25.

	THIRD PARTY LIABILITY			COLLISION— $100 Deductible		
Merit Rating	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*
A	15.1	71%	85%	18.4	90%	98%
X	18.4	86%	103%	17.2	84%	92%
Y	17.0	80%	96%	17.7	86%	95%
B	21.3	100%	120%	20.5	100%	110%
Combined	17.8	83%	100%	18.7	91%	100%

Note:—This class would probably show relative frequencies closer to Class 1 if there was a three year ownership requirement for A rating.

PRIVATE PASSENGER RISKS — CLASS 5 — Married
Principal male operator under age 25.

	THIRD PARTY LIABILITY			COLLISION— $100 Deductible		
Merit Rating	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*
A	10.3	70%	94%	16.2	86%	100%
X	11.5	78%	105%	14.0	74%	86%
Y	12.1	82%	111%	11.5	61%	71%
B	14.7	100%	135%	18.8	100%	116%
Combined	10.9	74%	100%	16.2	86%	100%

COMMERCIAL RISKS — ALL TYPES COMBINED

	THIRD PARTY LIABILITY			COLLISION— $100 Deductible		
Merit Rating	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*	*Claim Frequency*	*% of B Frequency*	*% of Combined Frequency*
A	8.2	40%	78%			
X	13.9	68%				
Y	15.2	74%		NOT AVAILABLE		
B	20.5	100%				
Combined	10.5	51%	100%			

Note:—The figures are for *all classes combined,* and the higher normal frequency on heavy trucks probably makes Class B results appear more unsatisfactory than they actually would be if experience were available separately by type of commercial vehicle.

The actual experience is somewhat at variance with the percentage being used in the rating and the relativity used is somewhat inaccurate. No doubt the formula will be amended some time in the near future. However, it is obvious that the principle is sound, and that those risks which have produced claims are much more likely to have further losses than those which are claim free. A Class 1 risk which has been claim free for three years is only 56% as apt to have a claim within the next year as a risk which has produced a claim during the immediate preceding year. Risks with a claim free period of one or two years are better to an intermediate degree. It can be argued that risks with four year and five year claim free periods are better than those with only three and perhaps something will be done to increase the discounts for longer claim free periods. Added difficulty arises in the disclosure of claims as the period is extended and although this is not insurmountable, there is a limit to the length of experience period which it is practical to use.

The advantages of the merit rating system offset the minor disadvantages and difficulties that exist in the application of the plan. To begin with, it permits a low rate for the select risk, and that is what the insuring public demands. The man who has a good record resents paying the same rate as the man who is constantly having losses. It also provides the companies with a rate which will carry the risk of those insureds who have had claims. This does not mean, of course, that there are not risks which are completely unacceptable because of their severity and frequency of losses, and such risks are probably properly written only in an Assigned Risk Plan. It does provide a rate which is sufficient to carry measurably substandard automobile risks.

The worst problem in a merit rating plan is that the companies are under constant pressure to forget small losses and this pressure must be ignored if the plan is to be successful. At first we had a great deal of difficulty but now the insuring public has accepted the system and are paying small property damage claims themselves in order to protect their merit rating. The effect is that of a deductible coverage and the companies are benefiting by reduced claim adjustment expenses.

With a merit rating programme it is essential that automobile applications and automobile policies state clearly the claims record of the risk. We have always had such a statutory requirement in Canada, and consequently this does not present a problem to us. Also a record of losses must be maintained on the company's copy of the policy so that the proper rates can be applied on renewal. On new business there is probably some inaccuracy in the reporting of losses, but we do not find it of major importance. Few people are willing to jeopardize their insurance by making a deliberately false statement.

To summarize, the Canadian experience indicates that merit rating of individual automobile risks is not only desirable, but practical. It is actuarially sound and is popular with the great segment of the insuring public who have few, if any, claims. The system keeps rates lower on good business and provides higher rates for the less satisfactory driver. The practical problems are not too difficult and the cost of making the system work is not excessive. A rating plan that does all these things is undoubtedly worthwhile, and represents a real advance over a plan which ignores the claim record of individual risks. In Canada, automobile underwriters generally would not wish to operate without the merit rating plan.

DISCUSSION OF PAPERS READ AT THE NOVEMBER 1957 MEETING

AUTOMOBILE BODILY INJURY LIABILITY RATE-MAKING ON A PROSPECTIVE BASIS

J. EDWARD FAUST, JR.

Volume XLIV, Page 11

DISCUSSION BY R. J. WOLFRUM

The paper presented by Mr. Faust is a very timely one. In this period of unsatisfactory automobile liability loss ratios, there has been considerable discussion in the industry about how to reduce the lag between the past loss experience used as a basis of ratemaking and the actual loss conditions which will exist during the time that the proposed rates will be effective. In many cases, criticism has been directed at the ratemakers, particularly the Countrywide Rating Bureaus, indicating that they are not reflecting to a suitable degree the increasing inflationary effects on both cost and frequency. It is asserted that, because of this failure, they are thereby producing outmoded and unrealistic rates.

Anyone who has had any direct knowledge of the problems of these National Rating Bureaus, however, realizes that there are two facets to the problem involved when the ratemaker departs from the indication of a solid base of past matured experience.

1. First a sound and unbiased program has to be developed which will reflect past and prospective trends or projections and which will produce trend and projection factors which appear reasonable for the future.
2. The program which has been developed has to be reduced to laymen's language in order that the state supervisory officials can be convinced that the formula is both sound and unbiased.

More and more papers of this sort, I believe, will help to bring out the considerations involved in both facets of this problem, and I am not saying this because I happen to be Chairman of the Committee on Development of Papers, *and we need more papers.* There is no doubt in my mind that short articles like this start people to think about the problem, help them to understand the scope of the problem, tempt them to present their solutions to the problem, and add to the acceptance of such procedures being applied to the regular ratemaking procedures by those people in the state supervisory officials' office responsible for the administration of final rates.

Mr. Faust indicates that his suggested method must be used separately on a carrier-to-carrier basis. It would seem to me that such a

basis would therefore be limited to only the very large independent carriers making their rates on their own experience since sufficient data must be available to make rates on a state-by-state basis. This is necessary since, to develop a formula acceptable to a state, such a formula must use state data since very few states will allow their rates to reflect trends which are not at least peculiar to their own state. However, it would appear that since the elements used in his method involved only paid losses during a year, paid claims during a year, and outstanding claims at the end of each year, sufficient information is being reported to Countrywide Rating Organizations to supply or test his method if they so desire on a state-by-state basis.

Mr. Faust's method essentially breaks down into the following steps, assuming we are looking at the problem at December 31, 1955 and all data through this date are available.

1. He forecasts an average paid claim cost for 1956 by analyzing such cost over a period of the past few years, (1952-1955) and by correlating the data with the Average Consumer's Price Index developed for these same years after finding other economic indices did not work out too well.
2. He forecasts a paid claim frequency for 1956 by an analysis of the trends in such frequency over the period 1952-1955, finally deciding that a straight-line relationship is as good as any other.
3. Multiplying (1) by (2), he develops a calendar year paid pure premium for 1956.
4. Although he points out that one might be willing to stop at this point, he indicates that a more accurate incurred pure premium can also be forecasted by developing the changes in the reserve values at the beginning and end of calendar year 1956. In this step, he ignores the reserves which might actually be carried on a case-by-case basis, and manufactures his reserves by building up the accident year components of the reserves from (a) the number of outstanding cases in each accident year as of December 31, 1955, and (b) the average paid claim cost determined above. In this process, he handles the current 1955 accident year in a somewhat different manner than the accident years prior to 1955.
5. In determining such reserves, he takes the following factors into consideration:
   (a) The past rate of liquidation of each accident year claims.
   (b) The estimated average values of claims outstanding by accident year, all in relationship to the forecasted average paid claim cost for the calendar year 1957, using past experience results as a basis of this relationship.
   (c) The increase in policies during 1957, on a purely estimated basis.

6. By adding these forecasted changes in reserve values for 1956, he converts these changes to a pure policy change and adds them to the forecasted average paid pure premium computed in (3) above. In this manner he develops a forecasted incurred pure premium for 1957.

The approach, method, and results are quite interesting and really very fascinating from an actuarial point of view. Unfortunately, Mr. Faust did not accompany his paper with any exhibits, graphs, or explanatory material which I believe could have been helpful, at least to me, in following the developments of many of his formula relationships. For instance, he indicates that the accident year 1956 reserves as of December 31, 1956 could be developed by multiplying the ratio of the projected 1957 average claim cost to the 1956 reported claim frequency by the following factor $36.1453\ (1.052)^5$. This is quite interesting, but there is no explanation of the fundamental reasoning behind such a factor nor the basis of the development of the factor.

In his apparent quest for brevity and conciseness, Mr. Faust has passed rather quickly over two points which particularly bothered me. I believe that somewhat more detailed treatment would enhance the value of the paper.

1. First, in his development of a correlation of the trend line for average paid claim costs with various indices, he first had to eliminate 4 odd years of experience to "improve the method". Finally, only 4 years out of 18 years of experience was actually used. I have no doubt that this choice of experience was justified, but I believe that some additional justification should have been given for the choice. I have always found that there is always a bit of suspicion raised in the public's mind when certain data is discarded, unless accompanied by a complete and plausible explanation of the election of only part of the data.
2. Secondly, since Mr. Faust manufactures all the reserve values and does not take the case values as set up by the company claims adjusters, it is not clear to me why there should be any change in reserve value for one accident year from one reserve date to the next, since he attempts to accurately forecast the reserve value at the first crack. I may have been confused by the symbols used, but it appears that a built-in upward development factor is assumed. This is like forecasting a certain value of the reserve and then saying in the next breath that the values forecasted are wrong. Possibly, all this could be cleared up if a series of values were actually developed in exhibit form for particular years, rather than leaving everything in a generalized form.

There are certain other indices which are quoted in the paper without any detailed development shown. I thought that it might be worthwhile to compare some of these relationships with certain fig-

ures on Massachusetts Compulsory Insurance, since both sets of experience can be studied on an accident year basis. The basis of the Massachusetts figures is attached as an exhibit. First, in his build-up of the reserve at the end of a calendar year, Mr. Faust indicates that the following relationship exists between the average paid claim cost of the first following year and the average reserve cost per open case held by accident year. I have shown the corresponding relationship for Massachusetts Compulsory Coverage.

Accident Year	*% of 1957 Average Paid Claim Cost*	*Mass. Compulsory Factor**
1955 1st Preceding	3.2965	2.140
1954 2nd Preceding	3.0943	2.330
1953 3rd Preceding	2.7363	2.240
1952 4th & Later	2.5616	2.100

*Based upon reserves held at end of 12/31/56

Although the figures necessarily are of a different magnitude since the compulsory losses are pure losses only on a basis-limit basis, it is surprising to see that the Massachusetts figures confirm that once the current accident year reserves are taken care of, the reserves on open cases of the preceding accident years have relatively uniform average values. Normally, it would be expected that the older the age of the open cases, the higher the average value. Inflationary influences, of course, would tend to distort the "expected" relationship because of higher cost on the more recent accident years.

Also, increased limits losses have a very definite effect on outstanding losses, particularly on the older cases. Hence, I would expect that, if increased limit losses were added to the basic limit losses in Massachusetts (they were not readily available in the required breakdown), the average reserve values would increase as the open cases became older and remained open.

In the paper, the following percent of claims outstanding at the beginning of a calendar year were considered to be oustanding at the end of the same calendar year. Again, I have shown comparable Massachusetts Compulsory figures:

Accident Year	*%*	*Mass. Compulsory %*
1955 1st Preceding	20	44
1954 2nd Preceding	35	53
1953 3rd Preceding	40	48
1952 4th Preceding	60	30

It will be noticed that the pattern of Massachusetts closings do not follow the experience that Mr. Faust has found in his company.

Another set of figures quoted by Mr. Faust is that 70% of the accident year reserves are paid out in the ensuing calendar year and about 90% are paid out in the ensuing two calendar years. The Massachusetts Compulsory figures indicate that only 40% of the accident year reserves are paid out in the first ensuing calendar year and 60% are paid out in the first two ensuing calendar years. It is only after the accident years are five years old that close to 90% of the first year reserve is disposed of by payments.

While these comparisons obviously are crude and not adjusted for differences in the data, it does point up the necessity of having detailed state data to recognize the obvious differences and variations by state from broad countrywide trends. Moreover, there has to be a logical explanation for these trends or satisfactory reasons why they do not jibe with what is normally expected and those which cannot be explained in logical terms.

Summarizing, Mr. Faust's paper shows a great deal of ingenuity and presents very interesting new techniques in approaching this problem of trending and projecting past experience to be more indicative of current and prospective conditions. I believe, that from an actuarial and technical basis, it is sound and worthy of serious consideration by people who understand how to apply these techniques.

From a practical standpoint, however, I believe that his formula relationships have to be reduced to more understandable terms in order to be readily accepted by insurance departments' personnel, who are somewhat influenced by the public suspicion of actuarial terminology that rears its ugly head at public hearings. However, I have always felt that, in this actuarial area of "crystal ball gazing", it is well to have several formula approaches, some technical and some non-technical, and then come to a reasonable conclusion, understandable to the public, which can be supported in large extents by all approaches. It should not always be necessary to follow to the fourth decimal place any approach that is patently a device to come to some judgment prediction of future happenings. Therefore, I sincerely hope that more and more contributions of papers of this sort will be forthcoming on this problem which will always be with us as long as our economy continues to fluctuate as it does.

MEMORANDUM NO. 5 - COMPILED JUNE 1957

EXHIBIT (b)

DEVELOPMENT OF COMPULSORY LOSSES BY YEAR OF REPORTING - ALL CLASSES

	PAID		OUTSTANDING		INCURRED		Index of Amount Incurred to 1st Report	Ratio of Amount Incurred to Previous Report	Ratio of Amount Paid to Incurred Latest Report
	No. of Claims	Amount	No. of Claims	Amount	No. of Claims	Amount			
1956									
1st Report	71,493	25,281,448	37,021	32,099,897	108,514	57,381,345	1.000	1.000	44.1
1955									
1st Report	62,734	19,923,320	34,071	27,857,576	96,805	47,780,896	1.000	1.000	41.2
2nd Report	79,200	31,112,984	14,922	17,233,541	94,122	48,346,525	1.012	1.012	64.4
1954									
1st Report	57,145	16,724,162	29,796	23,969,423	86,941	40,693,585	1.000	1.000	41.8
2nd Report	71,657	25,838,954	13,282	15,029,598	84,939	40,868,552	1.004	1.004	64.6
3rd Report	76,906	31,157,172	7,078	8,869,695	83,984	40,026,867	.984	.979	77.8
1953									
1st Report	56,228	15,185,078	28,690	21,569,742	84,918	36,754,820	1.000	1.000	42.1
2nd Report	69,807	23,120,430	13,093	13,995,437	82,900	37,115,867	1.010	1.010	64.1
3rd Report	74,440	27,634,095	7,829	9,263,365	82,269	36,897,460	1.004	.994	76.7
4th Report	78,064	31,538,641	3,762	4,509,120	81,826	36,047,761	.981	.977	87.5
1952									
1st Report	57,749	14,988,968	29,924	20,827,196	87,673	35,816,164	1.000	1.000	43.5
2nd Report	72,802	22,972,872	13,056	13,366,423	85,858	36,339,295	1.015	1.015	66.6
3rd Report	77,499	27,226,388	7,565	8,619,503	85,064	35,845,891	1.001	.986	79.0
4th Report	80,685	30,518,594	4,003	4,716,669	84,688	35,235,263	.984	.983	88.5
5th Report	83,024	33,031,860	1,275	1,440,037	84,299	34,471,897	.962	.978	95.8

AUTHOR'S REVIEW OF DISCUSSION

J. EDWARD FAUST, JR.

It is a pleasure to review Mr. R. J. Wolfrum's discussion.

Mr. Wolfrum, of course, correctly points out that there are two facets to the problem. First, a sound basis for forecasting must be developed and secondly, it must be made intelligible to supervisory officials.

I would also agree with his order of importance. I am sure Mr. Wolfrum will agree that our first duty as actuaries is to present technically competent answers to problems, within the framework of our Society, without regard to how understandable they will be to the layman. If that were not true, progress would be paced by the layman rather than by those who are technically competent. The success in being able to make any technical solution intelligible depends to a large degree on the knowledge and background of the so-called layman. It is, of course, difficult, if not impossible, to teach a course in Differential Equations to one who has no knowledge of Calculus or Algebra but that does not lessen the value of Differential Equations.

A physician may have little success in explaining to some people how the Salk Polio vaccine prevents Polio. This, of course, does not lessen the value of the vaccine nor did it stop Dr. Salk from proceeding with and concluding his research.

Mr. Wolfrum comments on my statement that this method must be applied to each carrier separately. I will agree that the use of the word "must" is rather strong.

Since the underwriting and claim practices of a given carrier could alter the value of the statistics which are developed, it does seem to me that it would be best to develop them on the basis of a carrier's own experience instead of using averages developed from several companies.

Since the factors would apply to a carrier's total Automobile Bodily Injury Liability writings, it would seem that many companies would have a sufficient volume of data to produce credible results.

Mr. Wolfrum states that rates must be made on a state-to-state basis. I wonder, however, if this requirement relates to trend or projection factors since many casualty rating laws contain the phrase "Due consideration shall be given to past and prospective loss experience within and outside this state. . . ."

If a carrier has a sufficient volume of data there is the possibility that it can determine state projection factors although this does not seem to be a necessary qualification for using this approach.

Mr. Wolfrum expressed the desire for an explanation of the factor "$36.1453\ (1.052)^5$" which when multiplied by the ratio of the forecasted average paid claim cost next year to the reported claim frequency this year gives the average reserve per outstanding claim for the current accident year.

Although this relationship was developed empirically it does have some logical basis.

It was observed that the average reserve need for the current accident year does vary as follows:

(1) Directly with the average claim cost next year; and,

(2) Inversely with the reported claim frequency for the current accident year.

It was found that a high reported claim frequency was usually caused by a larger number of not-too-serious claims which were settled in a relatively short time which, of course, reduces the average reserve need for current accident year claims.

Mr. Wolfrum points out that ultimately certain data was discarded in the development of a correlation of the trend line for average paid claim costs with various indices.

As was pointed out in the paper, 18 years of experience was used first and the degree of correlation found established that there was a significant relationship between the average paid claim cost one year hence and the Wholesale and Consumer Price Indices taken either separately or jointly. I didn't want to burden the reader with the details of the computation of these simple straight line correlation coefficients. Actually, the regression line produced by using all 18 years would give satisfactory results.

Having established the validity of the correlation between the average paid claim cost and these indices, I thought the results could be refined to give better results by eliminating the four years and this was confirmed by an increase in correlation. Although these results were satisfactory, I had knowledge of an operational change in claim practice which I know would have an effect on the average sized claim.

The thing that seemed significant to me was that whether or not 18 years, 14 years or 4 years of experience was used, the high degree of correlation between the average paid claim cost one year hence and the current levels of the economic indices used was established.

I am puzzled by Mr. Wolfrum's statment, "it is not clear why there should be any change in reserve value for one accident year from one reserve date to the next—". I am sure he didn't mean this for it would be very unusual if an accident year reserve didn't change from one date to another. Perhaps Mr. Wolfrum had in mind the value of Incurred Losses rather than reserves.

I thought Mr. Wolfrum's insertion of Massachusetts Compulsory experience was very instructive. I was delighted to find that this experience confirms my results in that the average reserve need in terms of open claims decreases with age.

This seems to me to be an entirely logical possibility. While it is true that the average paid claim will tend to increase with age, it is also true that a higher percent of open claims will be closed without payment as they age. I found that the combination of these two op-

posing factors produced the results that the average reserve need as expressed in terms of open claims actually decreases with age.

My figures for the percent of claims outstanding at the beginning of the year which were incurred in the "nth" preceding calendar year, which still remain unpaid at year end, were also established empirically. This item is really of minor importance in the proposed method. My results would tend to indicate that the rate of disposing claims tends to decrease with the age of the claims.

With the data used to prepare my paper I developed a Loss Development table which shows the expected value of paid claims as a percent of incurred losses.

The following is the table:

Year in which Accident Year Incurred Losses are Paid	*Percent of IncurredLosses Paid In Indicated Year*
Current	33%
1st succeeding	42
2nd succeeding	16
3rd succeeding	6
4th succeeding	2
5th succeeding	1

In order to determine the average length of time it takes to pay a dollar of incurred claims we need only to take the first moment, as follows, under the assumption that claims are paid on the average in the middle of the year and are incurred in the middle of the accident year:

Percent of Incurred Claims (a)	*Average length of time for payment in years after they are incurred (b)*	*First Moment (C) = (a) x (b)*
33%	0	0.00
42	1	0.42
16	2	0.32
6	3	0.18
2	4	0.08
1	5	0.05
	Total	1.05

On the average, therefore, a dollar of incurred loss is paid about a year after it is incurred.

Therefore, since the cost of claims which is governed by the level of wages, medical cost, etc., is on the average determined a year before they are paid, it is logical that it was found that the change in value of the average paid claim cost is accurately measured by the change in the price levels as measured by the Consumer Price Index for the previous year.

PRINCIPLES AND PRACTICES IN CONNECTION WITH CLASSIFICATION RATING SYSTEMS FOR LIABILITY INSURANCE AS APPLIED TO PRIVATE PASSENGER AUTOMOBILES

JOSEPH M. MUIR

Volume XLIV, Page 19

DISCUSSION BY G. R. LIVINGSTON & T. O. CARLSON

Mr. Muir's paper presents a very useful and interesting historical discussion of rating systems for automobile liability insurance coverage on private passenger cars over a span of approximately three decades. Such information has not been readily available previously for the benefit of students and the younger members of our Society, however familiar it may be to the old guard.

In connection with the present rating plan, Mr. Muir makes the observation: "It would appear that a distinction between large city areas and rural and small city areas is not particularly significant and that a more realistic analysis would be on the basis of zones constructed to give recognition to the comparable operating conditions in various sections of the country." Presumably, this comment refers to geographical distinctions without regard to the rural or urban character of the areas. It might be noted that throughout the 1930's the experience used in determination of classification differentials for commercial cars was tabulated in five population groups; that the experience outside of New York City was so similar that, except for emergency trucks, a single set of differentials was established; and that when tabulations were resumed after the war the idea of geographical distinctions outside of New York City was abandoned. Perhaps a study of this sort for private passenger cars would be desirable but the experience of the commercial car study may be taken as indicating that in the present extreme pressure of other important considerations in the private passenger car field this may be one of the lesser problems. In addition, we can envision difficulties with supervisory authorities, producers' organizations, and the public generally on grounds of dissimilarity in driving conditions between the states being combined, if we make certain combinations of states rather than maintaining our use of countrywide differentials outside of New York; in all likelihood we would be reduced to a different set of differentials for every state. On the other hand, the present variation between large city and rural or small city areas is in the main recognized as a logical split by the people affected.

In speaking to safety measures generally, Mr. Muir says: "Classification Rating for private passenger automobiles could be synchronized with such insurance to emphasize the beneficial results which would accrue to policyholders as a result of safer operating conditions."

This is a few cautious steps short of the stand taken by our old leader, Mr. Whitney, in an article entitled "The Future Development of Casualty Insurance" back in 1933: ". . . giving reductions for good conditions is the natural medium through which the companies should make their contribution to the public for accident prevention work. . . . a matter for instance that should be given serious study is the possibility of schedule rating cities for traffic conditions". And in May of 1941 in an article that appears in Volume XXVII in the Proceedings of this Society, Mr. Whitney elaborated his 1933 idea for exploring the possible application of schedule rating principles to territorial rating of automobile liability insurance on private passenger cars. Perhaps some concrete suggestions on the rather general point that Mr. Muir is making would be of value.

Mr. Muir goes on to discuss such topics as "Merit and Demerit", "Driver Education", and "Classification of Safety Devices", reviewing developments to date, and going into the reasons why these features have or have not been reflected in the classification rating system. In connection with his discussion of safety devices he points that there is no evidence to show that they will necessarily improve liability experience, but he makes no mention of the possible effect of certain types of devices on medical payments claims. As respects seat belts, for example, the immediate benefit is to the occupants of the car equipped with seat belts, so that unless all cars are so equipped any reduced costs for this safety feature could not be reflected in the indemnity portion but could only be reflected in the medical payments portion of the rates for bodily injury liability coverage.

Mr. Muir includes in his discussion reference to the consideration that the industry has given to rating automobile liability insurance on a "per operator" rather than on a "per car" basis; certainly no one is better qualified to discuss this particular aspect of the entire subject, which is the cause of so much misunderstanding among insurance department personnel as well as the insuring public today.

The very interesting subject of occupational rating is not mentioned. Studies made as far back as the early 1930's revealed that loss costs varied materially by occupation. In the earliest study that we have, ministers, salesmen, and students were the most hazardous "occupations" in that order. By 1932 students had moved to the top of the list, and ministers were apparently driving with improved circumspection. These studies, with groupings of occupations using cars for business purposes and occupations not so using cars, were the foundation for the original "business use" differentiations, and also for the differentiation of the younger drivers, although this latter differentiation was supported by the "Accident Involvement by Age" data obtained from the Motor Vehicle Department records in certain states. In recent years one of the larger companies made a study of risk by occupation for policy years 1950-1952 and the three most hazardous groups were "military—enlisted personnel", "unemployed"

and "students" in that order; "church men and church workers" are below entertainers, traveling salesmen, and liquor industry personnel are only slightly more hazardous than the legal profession and insurance agents.

In the discussion of young drivers the figures recited are presumably averages, and it must be remembered that they will vary considerably from state to state according to the minimum licensing age, although any figures available indicate clearly the general fact that drivers under age 25 as a group are considerably more accident-prone than drivers over 25 years of age as a group. In referring to assigned risks, the statement is made that all 48 states have adopted plans, but it would be somewhat clearer to emphasize that such plans are voluntary agreements that have been made effective. Perhaps this is a matter of idle semantics.

Although the paper is primarily historical in nature, Mr. Muir has subdivided his subject in a clear and orderly manner and what he has produced is obviously the result of diligent and exhaustive research that has been well directed by his rich experience.

GRADUATION OF EXCESS RATIO DISTRIBUTIONS BY THE METHOD OF MOMENTS

LEWIS H. ROBERTS

Volume XLIV, Page 45

DISCUSSION BY L. H. LONGLEY-COOK

Mr. Lewis Roberts' paper on Graduation of Excess Ratio Distributions by the Method of Moments is not light reading. The paper is highly technical and it is most tempting to set such papers aside for that later study, which never somehow gets done. Nearly all of us are so engaged in the day-to-day practical problems of insurance that we have little time for fundamental research, but it is only by such fundamental research, by the careful consideration of the theoretical justification of our methods, that our Society can carry out the objects set forth in its Constitution.

The problems of the graduation of crude experience data so that it can be presented as a smooth table or tables, which can form the basis of premium rates or charges, is fundamental to actuarial work, is a major feature of the development of a new mortality table and has many applications in the fire and casualty fields, probably none of which is so important as the development of "excess pure premium ratios." As the author points out, previous papers on the subject have appeared in our Proceedings from such authorities as Dorweiler, Bailey and Carleton. The present paper provides a careful development of the appropriate formulae for the variance, skewness and kurtosis of the distribution, taking into account the grouping used in the original data and sampling error.

There is practically nothing on the treatment of sampling error in our Proceedings and the author is to be congratulated for drawing attention to the necessity of taking sampling error into accord in actuarial work, because this is so often overlooked. It might be well to mention that where a mathematical model is available, the mathematical approach based on the model is more statisfactory than the empirical one used by the author.

There are many methods of graduating data and the selection of the most appropriate method is an actuarial skill which can be acquired only by experience. The reading set for our Examination is, perhaps, somewhat deficient in giving instruction in this respect and probably accounts for the frequency with which Pearson type curves are used over other methods. My own view is that an excess table is likely to follow a logarithm curve and a graduation performed in this manner is likely to be more simple and provide a better fit than any other.

In graduation as in all other actuarial work, the use of judgment is most important, and in our concern with the technical details of our work we must never allow this to be forgotten.

Mr. Roberts is to be congratulated on an excellent, painstaking paper which is a valuable addition to our Proceedings.

REVISION OF RATES APPLICABLE TO A CLASS OF PROPERTY FIRE INSURANCE

C. OTIS SHAVER

Volume XLIV, Page 63

DISCUSSION BY R. M. BECKWITH

A review of Mr. Shaver's paper entitled "Revision of Rates Applicable to a Class of Property Fire Insurance" must be predicated on an appreciation of the point that because of their recent adoption he was not informed, at the time his paper was prepared, of the basic principles and methods of fire rate level adjustments, recommended nationwide fairly recently by Inter-Regional Insurance Conference.

With an appreciation of this point in mind it is understandable that his paper diverges in a number of respects (some matters of detail, some matters of serious moment) from the basic principles and method now recomended generally to fire rating organizations.

In reviewing Mr. Shaver's paper we were struck by a number of rather positive statements, the tone of which implies a certain authenticity for the view expressed, whereas those statments in fact can only represent the views of the author.

Rather than attempting to pinpoint the divergencies mentioned above it occurs to this reviewer that a more constructive course to pursue would be to append the newly adopted Basic Principles for

Rate Level Adjustments as recommended to rating organizations nationwide by Inter-Regional Insurance Conference, together with a detailed statement showing the procedure recommended in the application of those basic principles. That material follows:

INTER-REGIONAL INSURANCE CONFERENCE

BASIC PRINCIPLES—RATE LEVEL ADJUSTMENTS

1. The principle of a 6% underwriting profit factor as set forth in the 1921 Profit Formula of the National Board of Fire Underwriters as modified in the 1949 Subcommittee Report of the NAIC shall be maintained. No over-all rate level adjustment shall be made if the indicated profit is within a tolerance zone of two percentage points above or below such 6% factor.

2. Review of over-all rate level shall be annual; however, it is not the intent to require annual adjustment of rate levels.

3. Underwriting profit as referred to above shall be determined with use of direct earned premiums and incurred loss and incurred expense figures without regard to reinsurance.

4. All available and relevant premium and loss statistics, including loss adjustment expenses, of member and subscribing stock companies, adjusted to reflect current tariff rate levels, shall be used. Loss adjustment expenses shall be included with loss statistics. The premium and loss statistics of other companies may be included in the determination of actual and adjusted loss ratios to the extent that the use of such loss experience is necessary and pertinent.

5. In the case of fire rate levels the loss experience of not less than the most recent 5-year period shall be used, while in the case of windstorm or extended coverages which involve the windstorm peril the loss experience of not less than the most recent 10-year period shall be used.

6. As to expenses other than loss adjustment expenses, only the experience of member and subscribing stock companies reflecting comparable methods of operation and acquisition costs during the most recent available year shall be used. Such expense figures shall be treated as a unit and shall not be separated into their several components.

7. Due consideration shall be given to loss experience, expenses and all other relevant factors within and outside the State, including the important element of informed judgment and the reflection of all developments and trends which may affect prospective loss experience and expenses.

INTER-REGIONAL INSURANCE CONFERENCE

New York, New York

RECOMMENDED PROCEDURE FOR RATING BUREAU REVIEW OF THE OVERALL FIRE RATE LEVEL BY STATE

I. OBJECTIVES:

It is the purpose of this procedure to determine in a reasonable and uniform manner the overall fire underwriting experience within the State and the indicated overall fire rate level adjustment, in reflection of the nationwide recommended "Basic Principles—Rate Level Adjustments" and consistent with applicable statutory requirements. The "weighting" of the overall earned fire premiums adjusted to reflect current rate levels over a period of six years is contemplated, as well as the "weighting" of incurred losses for the same period. This "weighted loss ratio" method, previously recommended as appropriate and reasonable on the basis of considered judgment, is designed to enhance the effect of the experience of the more recent years in order to provide a more accurate reflection of the experience as of the date of the rate level review. The indicated overall fire rate level adjustment, if any, will serve as a guide to such revisions in class or schedule rate levels within the State as are felt to be appropriate and desirable in reflection of the classified experience.

It is also the purpose of this procedure to utilize to the maximum extent the pertinent and available loss and expense statistics developed by the Actuarial Bureau of the National Board of Fire Underwriters, including the early overall data newly available for the immediate past year. This latter arrangement will minimize the delay otherwise unavoidable due to the time required for development of annual classified experience.

II. STATISTICS:

This procedure contemplates use of the following fire statistical data, available by State from the Actuarial Bureau of the National Board and from other sources:

(a) *Direct Written Premiums and Paid Losses*—National Board classified experience *by year* for five years.

(b) *Direct Written Premiums and Paid Losses, Immediate Past Year*—The overall experience of the immediate past year, which in the Spring of the next year (in the absence at that time of classified data) will be furnished together with Incurred Losses by the National Board from Company Annual Statements as filed with the Several State Insurance Departments.

NOTE: As to both (a) and (b), the overall written and paid loss experience of other member or subscriber Stock Companies not included in the National Board statistical data should be obtained from other authorized statistical agencies or from Company Annual Statements; also, other member or subscriber (non-Stock) Company loss experience may be obtained, where necessary and pertinent and as available, from other authorized statistical agencies or from Company Annual Statements.

(c) *Direct Earned Premiums and Incurred Losses*—National Board classified experience *by year* for five years (first available in 1953), exclusive of the immediate past year for which classified data will not be available until later in the next year. With this data is indicated the total Written Premiums of those same Stock Companies reporting Earned-Incurred experience to the National Board, with which Earned to Written Premium ratios can be derived. The Paid Loss totals by year of those same Stock Companies reporting such Earned-Incurred experience may be secured from the National Board upon request, with which Incurred to Paid ratios can be derived.

NOTE: For the immediate past year the Incurred to Paid ratio can be derived from the overall totals of Paid and Incurred Losses which will be furnished in the Spring of the next year by the National Board; estimated Earned to Written Premium ratios for the immediate past year will also be furnished by State.

(d) *National Board Totals of Insurance Expense Exhibits of Reporting Subscribers*—This annual nationwide exhibit may be secured from the National Board upon request, from which the countrywide allocated fire Loss Adjustment Expense ratio related to Earned Premiums may be obtained for the most recent year available.

(e) *National Board Composite Totals of Expense Data*—These are annual State expense totals (including Loss Adjustment Expenses) together with the total direct premiums written by the same reporting Companies, from which the Stock Company fire expense ratio may be derived for the most recent year available, and from which an earned premium-expense ratio can be calculated as set forth in the following procedure. This data may be secured from the National Board upon request.

III. RECOMMENDED PROCEDURE:

The statistical data referred to under II above is applied as follows:

1. *Overall Stock Company Direct Written and Paid Experience—Major Peril 10:*

These are the annual totals of the National Board classified experience on a Direct Written Premium and Paid Loss basis for the 5 years

prior to the immediate past year. The similar overall Written-Paid experience for the immediate past year s compiled in the Spring of the next year by the National Board is to be included pending availability of classified experience. To these totals by year should be added the experience by year of other member or subscriber Stock Companies not included in the National Board experience, which may be obtained from other authorized statistical agencies or from Company Annual Statements.

NOTE: To the above Stock Company experience by year may be added, if necessary and pertinent, the experience of other member or subscriber (Non-Stock) Companies from Company Annual Statements or from other authorized statistical agencies.

2. *Adjustment of Overall Written Premiums to Current Rate Levels:*

The estimated overall net effect to the date of review of all class or schedule rate revisions, and other changes having rate level effect, which have been made during the six year experience period under review should be applied to the foregoing Direct Written Premiums to arrive at Adjusted Direct Written Premiums by year reflecting current rate levels. The method of calculation of the factors by year is set forth in the attached example.

3. *Derivation of Earned to Written and Incurred to Paid Ratios:*

These State ratios should be calculated *by year* from the totals of the direct Earned-Incurred classified experience compiled by the National Board for Major Perils 10 and 11, related to the indicated or available total Written Premiums and Paid Losses of the same Stock Companies reporting Earned-Incurred experience to the National Board.

NOTE: The totals of the direct Written-Paid classified experience compiled by the National Board should *not* be used in calculating these ratios inasmuch as these totals do not reflect the experience of exactly the same Companies reporting Earned-Incurred classified experience. For the immediate past year the Incurred to Paid ratio can be derived from the overall totals of Paid and Incurred Losses which will be furnished in the Spring of the next year by the National Board; estimated Earned to Written Premium ratios for the immediate past year will also be furnished by State.

NOTE: If at the time of overall rate level review the Earned-Incurred classified experience for the immediate past year is available from the National Board, the ratios calculated from this classified experience should be used in lieu of the foregoing.

4. *Calculation of Adjusted Earned-Incurred Experience:*

The State ratios derived under Step 3 should be applied against the Adjusted Direct Written Premiums and Direct Paid Losses by year

to arrive at the Adjusted Direct Earned Premiums and Direct Incurred Losses.

5. *Derivation of "Weighted Loss Ratio":*

(a) The following factors, previously recommended as appropriate and reasonable relative "weightings" on the basis of considered judgment, should be applied by year to the Adjusted Direct Earned Premiums and Direct Incurred Losses developed under Step 4:

Most recent year	30%
Preceding Year	25%
Next Preceding Year	15%
Next Preceding Year	10%
Next Preceding Year	10%
Next Preceding Year	10%

As illustrated in the attached example, the 6-year totals of Weighted Adjusted Direct Earned Premiums and Weighted Direct Incurred Losses should then be used to calculate the Weighted Adjusted Earned-Incurred Loss Ratio, which does not include Loss Adjustment Expenses.

(b) To the foregoing Loss Ratio should be added the nationwide allocated fire Loss Adjustment Expense Ratio for the most recent year available to arrive at the Weighted Adjusted Earned-Incurred Loss Ratio (including Loss Adjustment Expense Ratio). This Loss Adjustment Expense Ratio related to Earned Premiums should be obtained from the National Board annual exhibit "Totals of Insurance Expense Exhibits of Reporting Subscribers."

6. *Calculation of Stock Company Fire Expense Ratio for the Most Recent Year Available, Less Loss Adjustment Expense Ratio:*

(a) From the National Board annual exhibit of "Composite Totals of Expense Data" by State for the most recent year available, which include Loss Adjustment Expenses, calculate the State ratio of Fire Expenses to the Total Written Premiums for the same Stock Companies reporting such expenses.

NOTE: This ratio should be for the same year used in 5 (b).

(b) Calculate the ratio of *Stock Company 6-year unweighted* Adjusted Written Premiums (Step 2 above) to 6-year *unweighted* Adjusted Earned Premiums (Step 4 above).

(c) The Written Premium Expense ratio for the most recent year available calculated under (a) is adjusted to an Earned Premium basis by application of the Written-Earned Premium ratio calculated under (b).

(d) From this Earned Premium Expense ratio subtract the allocated fire Loss Adjustment Expense Ratio for the same year ((b) above) to arrive at the Earned Premium Expense ratio (excluding Loss Adjustment Expense Ratio) for the most recent year available.

7. *Calculation of the State Indicated Overall Fire Rate Level Adjustment:*

(a) To the Stock Company Earned Expense Ratio for the most recent year available (6 (d) above) add the 6% Underwriting Profit Factor.

(b) Subtract the combined ratio as determined under (a) from 100.0% to arrive at the current "Balance Point" Loss Ratio.

(c) The Weighted Adjusted Earned-Incurred Loss Ratio (including Loss Adjustment Expense Ratio), determined under 5 (b) above, divided by the foregoing "Balance Point" Loss Ratio results in the Indicated Overall Fire Rate Level Adjustment on a percentage basis, illustrated as follows from the attached example:

$$\frac{\text{Weighted Adjusted Earned-Incurred Loss Ratio (incl. Loss Adj. Exp.} = 56.2\%}{\text{"Balance Point" Loss Ratio} = 50.0\%} \times 100 = 112.4\% - 100\% = +12.4\% \text{ (Increase)}$$

NOTE: No Overall Fire Rate Level Adjustment is indicated if the Weighed Adjusted Loss Ratio is within a tolerance zone of two percentage points above or below the "Balance Point" Loss Ratio. In the event the Weighted Adjusted Loss Ratio is less than the "Balance Point" Loss Ratio, an Overall Fire Rate Level decrease would be indicated, e.g.:

$$\frac{\text{Hypothetical Weighted Adjusted Earned-Incurred Loss Ratio (incl. Loss Adj. Exp.)} = 43.5\%}{\text{"Balance Point" Loss Ratio} = 50.0\%} \times 100 = 87.0\% - 100\% = -13.0\% \text{ (Decrease)}$$

8. *Indicated Overall Annual Fire Premium Adjustment in Dollars:*

In order that the percentage Indicated Overall Fire Rate Level Adjustment (under 7 (c) above) may serve to best advantage as a guide to such revisions in class or schedule rate levels within the State as are felt to be appropriate and desirable in reflection of the classified experience, this percentage should be expressed in dollars of indicated overall annual fire premium adjustment.

Accordingly, it is suggested that the percentage Indicated Overall Fire Rate Level Adjustment be applied to the actual written premium total for the most recent year for which classified experience is available to arrive at an approximate dollar figure of indicated overall annual fire premuim adjustment on an actual written premium basis.

IV. COMMENTS:

(a) *Annual Overall Review*—As set forth in the nationwide recommended "Basic Principles—Rate Level Adjustments", a review of the overall fire experience should be made annually and in the manner outlined above. It is not, however, the intent that class or schedule rate level adjustments be required annually.

(b) *Class or Schedule Rate Level Adjustments*—The indicated overall fire rate level adjustment, arrived at in the manner outlined above, is intended to serve as a guide to such revisions in class or schedule rate levels within the State as are felt to be appropriate and desirable in reflection of the classified experience and all other relevant factors within and outside the State, including the important element of informed judgment and the reflection of all developments and trends which may affect prospective loss experience and expenses.

NOTE: Even though an overall fire rate level adjustment is not indicated, the classified experience should be reviewed to determine any class or schedule rate level revisions within the State which may be felt to be appropriate and desirable in reflection of the classified experience or to maintain rate level relativity.

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DISCUSSION OF PAPERS READ AT THE MAY 1958 MEETING

Auto B.I. Liability Rates—Use of 10/20 Experience in the Establishment of Territorial Relativities

Martin Bondy

Volume XLV, Page 1

Discussion by LeRoy J. Simon

Many times an actuary is confronted with a problem for which no exact solution exists or for which the cost, in either time or money, of obtaining an exact solution makes it prohibitive. In such cases we often have an idea of the range within which the exact solution lies or we know that we will take some positive action if the solution is

within certain bounds. To assist in making the decision, a hypothesis is advanced and then tested for "reasonableness". This hypothesis must be skillfully formulated so that the solution we arrive at for our problem has the maximum probability of being the exact solution. In testing the hypothesis, rigorous mathematical proofs will be used and the best statistical or actuarial tools will be employed. When we now reach the point of drawing a conclusion, the difference between a "reasonable" solution and an exact solution becomes apparent. If we have an exact solution, there is little difficulty because it is final, unique and not subject to argument—the conclusion to be drawn should be an obvious one. A "reasonable" solution is quite different because it is only *one* reasonable solution to the problem and it does not preclude other reasonable solutions from equal acceptance. This brings out clearly that the actuary is more than a technician applying certain mathematical developments to the data available to him. He must continually draw on a broad background of knowledge and experience so that his reports will include important judgment decisions on the most appropriate solution to a given problem. When judgment affects the final conclusion, reluctance to concede that an exact solution has not been achieved too often leads us to gloss over this fact. I feel we should instead spotlight the judgment area and indicate the line of reasoning followed. Actuarial judgment will thus emerge and be evaluated alongside our other working tools. If it is good, it will stand the test.

The problem which Mr. Bondy sets out to solve quite clearly involves this concept of a "reasonable" solution. One way of stating the problem presented in his papers is: "Will the possible range of chance error introduced by allowing rates to be made at 10/20 limits instead of 5/10 limits fall within a reasonable tolerance?" Once the confidence limits of the values have been found by employing certain statistical tools, the question of reasonableness still remains. The author concludes in the paper that his results *are* reasonable for the purpose to which they will be put. Note that this is just one of many reasonable solutions to this problem. If the results had been \$35 ± \$3, instead of \$35 ± \$1, the author's conclusion might have been the same. On the other hand, someone else may conclude that \$35 ± \$1 is not a reasonable tolerance and the use of judgment comes into play.

The practical workmanship of Mr. Bondy's paper makes it a valuable addition to the Proceedings. He had a practical problem to solve in the course of rate making deliberations and he proceeded to apply certain tools in its solution. In setting up the 90% confidence limits, there would be two alternatives with a skew distribution such as the Poisson distribution: (a) determine k such that $|-k| = |+k|$ and that 90% of the curve lies between the two points or; (b) determine a value $(+k_1)$ such that 95% of the curve lies below it and a value $(-k_2)$ such that 5% of the curve lies below it. The more usual method used is alternative (b). The table below compares the author's results

under alternative (a) with the results under alternative (b) for the four cases discussed in the body of the paper.

Number of Claims	"True" Pure Prem.	Number of Claims Used in Establishing the Limits of the 90% Confidence Interval*	
		Alternative (a)	Alternative (b)
135	$35.00	±20	−19, +21
68	32.75	±13	−13, +14
270	39.75	±27	−26, +28
26	57.00	± 8	− 8, + 9

The largest difference is only one claim and therefore will not affect the conclusions at all.

In the opening paragraphs of the paper, the author sets forth the assumption of a .03 excess loss claim frequency and a $4500. average excess loss cost. Using the letters f and A to represent frequency and excess claim amount, respectively, we realize that the pure premium for the excess limits range between 5/10 and 10/20 is given by

$$P = \frac{\Sigma A_i}{E} = \frac{n(\frac{\Sigma A_i}{n})}{E} = \frac{n\bar{A}}{E} = f\bar{A}$$

where E = exposure, n = number of claims, $\bar{A}$ = average amount and P = pure premium. The author then sets out to study the effect of chance variation on P. He does this by studying the effect of chance variation in f and multiplying by the average value $\bar{A}$. However, no consideration is given to the effect of chance variation in $\bar{A}$. Is it not the concomitant variation of f and $\bar{A}$ that causes variation in P? Unless each excess loss claim is to have its actual value replaced by some fixed value when rates are made, there is also the sampling error in $\bar{A}$ to reckon with.

A number of lines of attack seem open at this point. Mr. A. L. Bailey has considered an empirical solution to this problem.** This would probably be the best to follow using the logarithmic transformation and establishing the probability distribution directly. Extensive loss distributions are necessary for this, however, and these are not conveniently available.

A second method of measuring this concomitant variation would be to apply the formula from mathematical statistics***:

(Footnotes on next page.)

$$\left(\frac{\sigma_P}{\bar{P}}\right)^2 = \left(\frac{\sigma_n}{\bar{n}}\right)^2 + \left(\frac{\sigma_{\bar{A}}}{\bar{A}}\right)$$

where σ designates standard deviation and bars designate means. This approach would require a subdivision of the rate making data (probably into one year blocks of information) so that two or three estimates of n and $\bar{A}$ could be made. From theory, $\sigma_n = \sqrt{\bar{n}}$ and $\sigma_{\bar{A}}$ could be calculated directly from the data. The equation above could then be solved for σ_P.

It might also be possible to calculate the standard deviation of $\Sigma\bar{A}_i$ by direct reference to the subdivided data mentioned previously. The ratio of the mean value of $\Sigma\bar{A}_i$ to its standard deviation would equal σ_P the ratio of P to which could then be solved for σ_P.

In summary, I like the problem solving approach of the paper, feel that confidence interval should be asymmetrical, and fear that the intervals will be larger than the paper implies if we take into account the joint variation in the claim frequency and the size of loss.

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*Results in the two smaller cases taken from "Poisson's Exponential Binomial Limit." E. C. Molina. Van Nostrand, New York. 1945. The two larger cases utilized the formulas m upper = $\frac{1}{2}\chi^2_{.05}$ for 2(m+1) degrees of freedom and m lower = $\frac{1}{2}\chi^2_{.95}$ for 2m degrees of freedom taken from "Statistical Theory with Engineering Applications." A. Hald. 1952. John Wiley and Sons, Inc. In addition, it was necessary to use the fact that $\sqrt{2\chi^2} - \sqrt{2(\text{degrees of freedom}) - 1}$ is distributed normally with a unit variance.

**Sampling Theory in Casualty Insurance, Arthur L. Bailey. P.C.A.S. XXIX page 50 and XXX page 31.

***Statistical Theory with Engineering Applications. A. Hald. 1952. John Wiley and Sons, Inc.

REPORTS OF THE SEMINARS HELD IN SKYTOP AT THE 1958 SPRING MEETING OF THE SOCIETY

NOTE: As an innovation at the 1958 Spring meeting six seminars were held on topics of interest to our membership and partially reflective of the varying and broad scope of their responsibilities. Three seminars were held simultaneously so that those in attendance could attend two, but only two, of the meetings.

The actual scheduling of the respective seminars was based on the ballots of those attending as to their ranking of each of the six seminars in order of preference and, thus, most of those attending were assured an interesting morning.

Four of the seminars were led by guests of the Society and our gratitude to these experts is deep. The program for the second day of the meeting allowed for a report on his round table from each of the six discussion leaders. These reports were transcribed, edited and are printed below together with a few of the timely questions and answers which followed.

"PERSONNEL PROBLEMS — STUDENT RECRUITING"

(Summation by Mr. Harmon T. Barber, Second Vice President and Actuary, The Travelers Insurance Company)

Mr. Chairman, and fellow members. We had a good attendance and a full discussion at our seminar on personnel problems—student recruiting. My notes are rather limited and my report to you will be largely from memory and possibly incomplete.

Among a number of sub-topics which were discussed the first was "What is the objective of student recruiting?". Our conclusion was that in this business, as is true of others, it is highly desirable for any organization to have a group of capable young men coming along in back of experienced leaders, to fill any gaps which may occur with the passage of time. The need for potential replacements is not limited to the actuarial department and it is felt that actuarial training provides a good basic training for other types of activities in the casualty and fire insurance business.

There was some discussion as to the type of candidate for whom we should be looking. The consensus was that there should be no rigid adherence to a particular type but that an organization should strive to recruit a group of men with different characteristics and different capabilities with a few common characteristics such as superior intellect, evidence of latent administrative ability, sociability, and the individuals should have a knack for presenting their thoughts well verbally and in writing. It was considered desirable to watch the age of candidates in order to avoid concentrations which might be

disadvantageous later. It was suggested that it might be desirable to follow a definite program of trying to recruit several men each year or perhaps one man every two or three years, according to the size of the organization.

The seminar discussed where and how candidates might be found. Under this sub-topic there were mentioned such sources as recruiting missions to colleges, personal recommendations, use of brochures and publications such as the Society's red and black folder and contacts with college faculty, college guidance counsellors and college employment offices. Summer employment programs were also mentioned as helpful in getting acquainted with new men who may become available in two or three years' time, or possibly, even longer if military service intervenes. The company's own employment office as well as outside employment offices can be of assistance and in some cases there have been some very satisfactory intra-company transfers.

In interviewing the candidate a number of advantages can be cited as available to him. Actuarial work generally pays a good salary. It is a vocation with professional standing. The insurance business has a rather high degree of employment stability which is not found in some other pursuits more vulnerable to economic changes.

In talking to candidates each company probably has a number of selling points which can be put before the individual. A few of these may be mentioned, such as annual salary review for merit purposes, automatic salary increases for success with the Society examinations, the company's reputation, financial standing, favorable working conditions, employee benefits and on-the-job training program which includes rotation of responsibilities. Opportunities for social activities with fellow workers should not be neglected in talking with a prospect. There are also various advantages in the way of assistance in preparing for examinations; such as, a time and place during working hours for study, access to recommended texts, guidance conferences and even formal courses of study. In one instance a correspondence course, designed and conducted for agents, has been valuable in helping candidates prepare for some parts of the examination.

The work of a student employee gives him actual practice under experienced leadership in a variety of actuarial tasks in a company organization. The preparation of statements, monthly and annual, the determination of reserves and liabilities, tax filings, preparation of classification experience records and internal statistical records are some of the classes of work which may be encountered.

On the other side of the ledger we may ask what are some of the obligations which the student must assume. One fairly definite requirement is that the actuarial trainee must show reasonable progress in passing examinations or else he may be subject to transfer to another department or even to outside of the company. In this connection it should be pointed out that professional success is quite generally dependent on Fellowship standing in the Society. Preparation for examinations involves the investment of considerable per-

sonal time in study. Enthusiasm for the work, ambition and evidence of industriousness are expected from the student.

It is generally considered that a personal interview with the prospect is essential. While talking with a candidate about himself one can sort of check for desirable characteristics such as appearance, speech, mental alertness and a sense of humor, which I personally think is quite valuable. In judging the candidate's appearance it is well to try to picture him as he is likely to appear ten or fifteen years hence. The candidate may be introduced to department heads and other students and sometimes it is possible to discern from their reactions whether the prospect will be compatible.

Formal aptitude tests performed by the company employment office may be of assistance in the selection of candidates. One quick informal test can be made by asking how the candidate made out in the subject of plane geometry. This is a subject which teaches one to be precise and to reason logically, two very important attributes which an embryo actuary should have. If the prospect received good marks in this subject and did not dislike the solution of original problems, he has some of the basic characteristics for which we are searching.

The seminar discussed the competition which is encountered from offers by other industries. It was observed that most young college men have a single common denominator used in judging employment opportunities and that revolves around the question "What does the job pay?". In discussing this subject one should point out that the starting salary is not comfortable for any job and that the candidate should look at salary opportunities for the long pull. Actuarial work may have an edge in this respect compared with jobs with higher starting salaries.

Actuarial training is a good foundation for any phase of insurance activity and opportunities are really unlimited. A constantly changing industry such as ours presents new challenges and new interests to the individual. It is felt that there is a lot of solid satisfaction available here if the man is the type who is looking for something more than cash income.

It is the practice of one company to offer a new man a trial period of six months. If the trial period is satisfactory he usually receives a modest salary increase and is notified of permanent employment. After that time he is free to terminate his connections at any time with the proviso that an opportunity is sought to talk matters over whenever he has serious intentions of considering other openings. It is usually made clear to the student that the company will not indulge in competitive bidding on salary. It is of interest to the candidate to cite instances of former local students and also other Fellows of the Society who have achieved positions of prominence in the industry.

The seminar discussed what might be done to improve the climate for student recruiting. In this connection there is felt to be a need for better publicity, both written and oral, at the secondary school

level and during the first years in college. It was observed that many men who might be potential actuarial students take only enough mathematics to satisfy college entrance requirements and proceed to take standard courses of study during the first and second years in college. When the time comes to seriously consider the future some of these men find that they are hopelessly behind when it comes to essential mathematical background for actuarial work. Thus it is important to reach these men early so that they may orient their course of study to greater advantage.

Summer employment programs were mentioned as another way of encouraging possible candidates to become interested in the Society and the casualty actuarial profession. Some individuals are thus employed while in high school or in their early years in college. Employment of this character gives the company a chance to evaluate the individual and the individuals have a chance to learn something about the character of actuarial work—a very helpful beginning for the recruiting process.

These comments are based on a rather incomplete set of notes and I would be glad to have the remarks amplified by others who attended the seminar. The floor is also open to any who may have questions on the subject.

Q. (JOHN ROWELL)

In recruiting candidates for casualty actuarial work do you run into any competition with life actuarial work? If so, can you meet it?

A. Competition of this sort is frequently encountered. Generally speaking the large life companies located in the metropolitan New York area are quite aggressive in recruiting. To a lesser extent perhaps the life companies in our local area also give us competition including the life actuarial department of our own company. Usually the life companies offer somewhat greater salaries and larger automatic increases for success with examinations. They also seem to have a better or more extensive publicity program as respects opportunities in the actuarial profession.

In meeting competition from this source we endeavor to point out that it is difficult to draw a direct comparison between the life and casualty fields of actuarial work. The life actuarial profession is older and many of the problems encountered in daily work have been studied and solved and possibly recorded in print. On the other hand, casualty actuarial work is in a much younger stage of evolution. Many questions and problems arising currently require an original approach. Furthermore, I do not believe it is unfair to point out that life insurance deals largely with one probability, when is someone going to die. In contrast, in the casualty field we have the un-

certainties of whether a claim will arise, when it will arise and how much it will involve in cost. Then again, there is the variation encountered between such divergent insured events as automobile accidents, burglaries, boiler explosions, bond claims, etc. The differences indicated here should have different appeals to individuals with different temperaments. We feel that casualty work perhaps may be more exciting, more interesting, and possibly more dynamic.

We do occasionally encounter competition with our own life actuarial department but there have been successful interchanges and transfers of students from one department to the other. As a matter of fact, this can be a talking point if an individual is at all undecided as to which of the two fields he might prefer.

Q. (FRANK HARWAYNE)

There was one other seminar which I happened not to attend. One which discussed standards of professional conduct. I think this is somewhat related to the current topic of discussion. Do you think that some form of licensing or some formal type of recognition of the professional status of actuaries, in addition to membership in the Society, would improve the prospects of attracting more individuals into the casualty actuarial profession?

A. Personally I don't see much advantage for recruiting from a more formal casualty actuarial profession. Of course, a few additional candidates might be attracted to the work if there were greater general recognition of the profession and in all probability general recognition would not deter candidates from choosing this as a career. However, it seems as though there is an ample supply of young men who can be trained to become excellent casualty actuaries if only we can find them and convince them of the wisdom of such a choice of career. Recent popular agitation for more emphasis on mathematics and science in secondary schools might have a beneficial effect on the supply of recruits for casualty actuarial work—but they still will have to be recruited.

"INSURING THE ATOM"

(SUMMATION BY MR. RICHARD H. BUTLER, SECRETARY, THE TRAVELERS INSURANCE COMPANY)

The discussions in the round table on "Insuring the Atom" are difficult to summarize. That is my fault, because of the way I presented the subject. I furnished the other members with a very long outline and described in general how it was set up. Then we skipped around

on various phases of the subject according to their interests. I think the best I can do here is to tell you what the six major headings were in that outline and if you have any questions under those headings, we can talk about them.

The first one was the background of the formation of the Pools and how they operate. Incidentally, I am talking only about Liability insurance, and am not qualified on the subject of Property.

The second major heading was the effect of the Price-Anderson Law—the need for the first time, at least the first time in my experience, to tie insurance directly to a government indemnity program.

The third was the field of policy coverage. I think perhaps we spent more time on this one than on the first two. I covered the Facility Policy and the policy which we just finished, for which we as yet do not have a name. We have been calling it the "Iffy Policy" for three years now, and we realize we must have another name before it goes to print. The nearest we have come to it is "Supplier's and Transporter's Policy", but we hope to do better.

The fourth was the exclusion endorsement by which we take the coverage we propose to give in the pools off the normal liability policies. You would be surprised how fascinated people get with the subject of "doubling up" when they are committing $60 million dollars. We spent very little time on the exclusion endorsement.

Five was what I have called pricing systems. I hold actuaries in great awe, and I did not say very much about that although this section of the outline is quite long.

We did talk some about the last section, which dealt with the foreign and marine program. There is some inconsistency here in that the only honest to goodness quotation we have made is on the "Savannah", whose keel was laid last Thursday. Presumably we won't have to perform on this quotation for some time. We have talked a lot about foreign problems among ourselves, but we have not yet produced a definite program in this tremendously complicated field.

I am going to stop right there and ask if there are questions.

Q. (WIN GREEN)

Do you think there is a hope that this exclusion endorsement can ever be included in policies by reference, rather than the appalling tons and tons of printing and the expense necessitated by that delightful document?

A. I doubt if we can get it down to a reference. We are dealing here with terms which are unfamiliar. Some were lifted out of the Atomic Energy Act of 1954, which was not designed for insurance purposes. It was intended to promote the peaceful use of the atom, and they just were not thinking of our problems. Therefore, we had to take the terms and redesign them into insurance form.

Further, we had to do another thing. We had to make this endorsement not exclude a lot of things. We had to make it leave out the isotope program. We had to make it leave out suppliers who had not picked up pool coverage directly or indirectly and those things tend to make it very long. The drafters will do one thing when they move it over to the policy. You know the endorsement is made up of four exclusion paragraphs and four definitions. The definitions are longer than the exclusion paragraphs, and will be moved to the Conditions section of the policy where definitions are always printed. That will leave only the four exclusion paragraphs, so it will at least look shorter.

Perhaps, Mr. Green, over a period of years when everyone knows more about this subject, the exclusion can be shorter, but not now, in my opinion.

"PUBLIC AND PRESS RELATIONS IN THE INSURANCE INDUSTRY"

(SUMMATION BY MR. WALLACE L. CLAPP, VICE PRESIDENT, THE EASTERN UNDERWRITER)

Gentlemen, I am delighted to be here with members of the Society. This is one of many meetings of your organization which I have enjoyed.

In the forum discussion conducted on public and press relations, particularly in the casualty end of the business, we reached the conclusion that public relations particularly in connection with Automobile Liability rate increases are lousy. However, they show signs of improvement.

The poor public relations are due to a number of factors, but not exactly due to any lack of diligence on the part of the casualty people. You are up against some deep-seated problems, particularly inflation which, of course, is one of the chief factors which have made the automobile rate increases necessary. Inflation is really one of your bug-a-boos. When the car driving public reads in the newspapers reasons for rate increases—inflation, the increasingly larger jury awards, replacement of car parts, etc., these reasons just don't seem to make an impression. This is because people see red when advised that rates are going up 25%. They have had other cost-of-living increases and it just burns them up that their car rates will be higher. They can't understand it.

So it's inevitable that they become disgruntled and damn the insurance companies. They perhaps had a rate increase in their particular state last year and now there is another one coming along this year. So, instead of regarding an insurance company as a friend, they drop the "r" in that word and come up with "fiend."

What should be done about this situation? That's what the panel tried to concentrate on. One of the best suggestions made was that so-called pre-conditioning articles appear in various newspapers some weeks in advance of a rate increase. Actually, it would not be necessary or advisable to pinpoint the specific amount of the increase which is going to take place, but if there could be a general article appearing in a given paper (prepared by the National Bureau or Mutual Rating Bureau) with the assistance of insurance company public relations people in a given state, it would produce the desired results. One panel participant, in fact, said the Insurance Department of his state had given him helpful assistance in preparation of such rate increase news releases.

These pre-conditioning articles could call attention to the need for better traffic controls, more driving courtesy and a more understanding attitude on the part of juries in the making of the awards in accident cases. In other words, you would be setting the stage for the rate increase that was going to take place and for the announcement of that rate increase. This was considered by our panel to be a well-timed move because it would serve to take the surprise out of rate increases. They would not then be so precipitant. A certain percentage of the public for sure would read the pre-conditioning article and would say, "Well, something is coming." They wouldn't feel quite as disgruntled as they feel nowadays when they read in the morning paper that there will be an increase.

Incidentally, it was not felt that pre-conditioning articles would be violation of the so-called secrecy provision of the regulatory statute.

Viewed from another angle, these pre-conditioning articles, it was felt, would be most helpful to Insurance Commissioners. Admittedly they have a difficult task on their hands in connection with rate revisions. They are advised by the rating bureaus that experience dictates that rates must go higher. They realize that press announcements of such an increase will not add to their popularity as state officials, and this is particularly true if the rate increase comes out of the clear sky. They can become heroes in the eyes of the public if they refuse to grant the increase, or if they stall for a time by calling for a public hearing to consider the need for the higher rates. This has happened, as you well know, in a number of cities and states around the country. A good example would be in New York State.

As J. B. Donovan, counsel for NBCU, said at our panel: "To put it simply, it might be best to make it as easy as possible for the Commissioner to do what he feels he must do." Furthermore, it was felt that the industry people should be sympathetic toward the problem of the Insurance Commissioner who has the decision to make for a rate increase. He has a tough job on his hands in serving the public interest and anything that the insurance people can do to put him in a favorable light will be most helpful. That may present a new thought for you to consider—the build-up of the Insurance Commissioner —because actually at times he does need a build-up. We of the in-

surance press endeavor to do that when Commissioners make talks at various meetings. If he makes a good talk, then we are glad to give him a build-up.

Along the lines of newspaper publicity, it was felt by your public relations panel that the trade associations in the business are doing an excellent job in the preparation of factual news releases. The National Bureau of Casualty Underwriters, for example, has a well organized program which, I am told, is operated smoothly. All rate manual holders receive the manual pages and they know about the rate and rule changes before any news publicity is released.

They are pledged to secrecy until the Monday immediately preceding the Wednesday effective date of the revision. State agents' associations are also sent a copy of the news release which is patterned to fit the revision being made in their particular state.

The National Bureau says that this procedure has been helpful in the very necessary effort needed to sell automobile rate increases to the public.

Now as to a new phase of the program—and this is by the way of complementing National Bureau's program of news releases—I call your attention to the activity on the part of the Association of Casualty & Surety Companies in this field.

They have a stepped up program. They sent out recently to about 116,000 producers, a leaflet entitled, "I Checked Up on the Cost of Automobile Insurance and Guess What I Found?" This is written in the first person. It is described as blunt, hard hitting copy, and it endeavors to give to automobile drivers the real low-down on why their automobile rates are going up. It definitely points to the fact that the automobile drivers themselves are responsible for rate increases.

When this leaflet appeared in the hands of agents the Association found that it had made an instantaneous hit. The agents felt that they wanted to send it out to all of their clients. They were told that they could have as many copies of the leaflet as they wanted. Furthermore, (this is very interesting because it indicates the industry attitude on the part of the Association, which as you know is a stock company organization)—mutual agents who requested the leaflet (having heard about it) were invited, if they so desired, to send in for copies for distribution. A number of them have done so. It is furnished to them by the C. & S. Association, in as much quantity as they would like to have.

Another leaflet of this character will be issued in the Fall and it will be written in the same blunt language. I understand it will tell the public what they can and must do if they want lower automobile insurance rates.

The participants in the discussion readily accepted this public relations activity as valuable. They likewise showed an interest in the comparatively new trend of setting up Insurance Information Centers. Those of you who are either from Connecticut or in the near vicinity perhaps know that in Hartford there is such center which was set

up early this year. It is managed by Francis Ahearne, a former city editor of the Hartford Times, who is doing a good job. Whenever any of the member companies of this information center (and there are about 18 of them now, including all domestic stock and mutual companies), have a problem, they call Mr. Ahearne and give it to him. Then he gets busy. He has a lot of valuable news sources with newspaper editors and various other sources in and around Hartford and throughout Connecticut.

In addition, there were other similar information centers which have been set up and are operating. For example, there is the Western Insurance News Information Service on the Pacific Coast, the one in Lansing, Mich., one in Texas, another being set up in Nevada, and still another recently formed in Indianapolis. Over and above these, there are four regional public relation offices of the Association of Casualty & Surety Companies. I know also that the American Mutual Insurance Alliance is active in this type of work. There's a growing feeling that in order to get understanding from the public you have to be understanding yourselves—understanding to the point that you put yourself in the position of the insured, to find out what his problems are, his gripes, etc. These public relations offices are doing their best to create a favorable atmosphere and really be helpful.

Finally, I should mention the Speakers' Bureaus which are well set up in five different places. They are maintained by the Association of Casualty & Surety Companies in New York State, San Francisco, Oklahoma City, Chicago and in Florida. These bureaus as a public relations tool have actually proven of greater value than was originally anticipated. They are all important in themselves.

Thank you very much indeed, and also, thanks for the opportunity to come here and to be with you and speak because it is indeed an honor and appreciated.

REMARKS OF WILLIAM LESLIE, SR.

This has been an interesting presentation of an acute problem. The pre-conditioning news releases are a lot easier to develop than they are to handle in practice. This is because in drawing up the All-Industry bills it was provided that not only should there be rating organizations but there should be independent companies making filings. Thus, you do not have as of one date, one common upsurge in automobile liability rates.

Some of our most embarrassing moments have been when we have sent out publicity announcing a rate increase for our member companies, writing some 15% of the business, let us say, and this announcement has been accompanied by headlines from a host of independent companies saying they find no need for the rate increase and are not going to raise theirs. It is problems of that sort which will have to be solved.

For my own part, I have often wondered if we wouldn't solve them all if we avoided publicity. In other words, I feel that our problems

are very largely caused by the fact that when a rate increase is announced, there is a demand for publication of its effect. The average purchaser of automobile insurance is not going that day, or maybe in the next six months or nine months, to buy a new automobile policy. So, therefore, he would not be aroused, or shouldn't be aroused, until the time comes to pay more money. If we didn't have to have any publicity, if we could just go ahead and talk to our policyholders at the time they renewed their policies, explaining to them at that time in detail why the cost was going up, we would be better off.

"CURRENT RATE REGULATORY PROBLEMS"

(SUMMATION BY MR. JAMES B. DONOVAN, WATTERS AND DONOVAN)

Gentlemen, my report will be very brief, simply because the subject which we discussed at our seminar encompasses so very broad a field. Briefly, it concerned current rate regulatory problems and especially those that have arisen out of the necessary automobile rate increases which have been coming forward for the past few years.

We pointed out at the seminar that with the enormous growth in automobile transportation in the United States, automobile insurance today is largely regarded as a social form of insurance. Between compulsory automobile insurance and various other developments of that kind, a very wide segment of the American public have a direct interest in what they pay for automobile insurance. As a necessary concomitant of such public interest in any subject, those engaged in political endeavors necessarily enter the arena and the result is that we have found a great many cases in the past few years (in fact some thirteen during this past winter) that the industry has been called upon in public hearings to justify various rate increases.

Some of the discussion yesterday concerned possible ways of alleviating certain of the situations that have arisen. For example, we discussed whether or not it would aid to have more explicit definitions of the statutory standards, which now are very broad, merely being that rates shall not be excessive, inadequate or unfairly discriminatory.

I think this is a fair summary of what seemed to be the consensus yesterday. In the last analysis it has been the experience of those who work most closely with these statutory hearings, that the ultimate key to this situation does not simply lie in more law amendments but rather, to a greater degree, in securing as high a type of Insurance Commissioner in the United States as we possibly can and further seeing to it that he is staffed by top flight, competent, adequately compensated personnel. The experience of the industry has been that with a top flight Insurance Department, headed by a man who is intellectually honest, who recognizes not only his authority but also his responsibility, we have fared far better under any such regime than we do in the case of the poor department, headed by a man who

regards his post simply as an intermediate step to some kind of political advancement.

With respect to the specific role of the actuary in this development, we discussed the fact that in the future it could be possible that you would have various conflicts in actuarial testimony, so that we would develop a system of expert witnesses giving contradictory testimony. At its worst this could assume some of the tragic troubles that have beset other professions, such as the field of psychiatry where various psychiatrists customarily will take the stand and testify in direct conflict with each other.

It was suggested that precise uniformity of opinion among actuaries can never be ascertained; after all, this is an inexact science and we do not expect that a dollars-and-cents formula can be produced as the only actuarially sound answer to many of these complex problems. Nevertheless, to the maximum extent possible, without in any manner interfering with the individual's own sincere opinion, it would be in the best interests of the profession that efforts be made to minimize this kind of contest. Whether the actuary is with the Insurance Department or whether he is with a company, the opinion that he does give should be recognized by all as one that can be accepted as sound and intellectually honest and, to the maximum extent possible, does not present the type of conflict which would be to the detriment of the whole profession. In last analysis, such an endeavor can be an extremely important factor in eliminating many of these industry-Government disputes and in others could be determinative. To the extent that this goal could be accomplished, without curtailing in any way the intellectual freedom of each individual actuary, it would make not only for the solution of rate regulatory problems but also can only lead to further recognition of the high standards that this society has set for the profession of the actuary.

Thank you very much.

Q. (JOHN ROWELL)

The question I have to ask is whether it is possible to confine the use of the title "Actuary" to a member of the recognized society?

A. I think that would be a tremendous step forward if it could be accomplished. There is no reason why it couldn't be accomplished if it were presented to the legislature of an individual state in the proper way, although it undoubtedly would be accompanied by some licensing requirements. Briefly, it has been our experience in the past that the difficulties do not arise in large measure from members of this society. Looking at this countrywide, our greatest difficulties are in those states where a man bears the official title of "Actuary" and yet the truth is that he is utterly incompetent in this field. In some cases, where through political appointment or otherwise he has secured such

a title, we find that he just doesn't understand the problems that are presented. Especially is that true when he leaves the realm of simple arithmetic and gets into areas of judgment based on calculations of probabilities and various other factors of that kind. To the extent that this society can further its program, can have a greater number of members without in any way lessening its standards, it can only be a tremendous aid in this entire program.

Q. (DICK WOLFRUM)

I was wondering if any discussion ensued as to the practicality, advantages and disadvantages of setting up some sort of a standard of either profit or loss that either a rating organization or individual large companies should follow, and actually putting that into the law. This could be such as we have in public utilities, whereby over a ten year period companies should gain a certain percentage, either profit or loss, on certain standards under the law. Could not this get away from continual discussion in public hearings of just what the company should have in the way of profit or loss?

A. Such a standard does exist in one statute at least, which is in the Fire insurance rate regulatory statute in Arkansas, calling for an underwriting profit of 5%. As you know, in 1949 the National Association of Insurance Commissioners, after studying this problem for several years, adopted a report which calls for an underwriting profit and contingencies factor of 5 plus 1%—the 5 being for underwriting profit and 1% for contingencies such as catastrophe. This is a total really of 6% for that element, with a two point swing in either direction; meaning that if the profit for the appropriate period should drop to 4%, or should go up to 8%, there is no reason to undertake a complete rate revision. Now that has been accepted in most states; you do have variations in a few others.

So far as spelling it all out in the statute, it presents great difficulties. It would vary by line to a certain degree and the period to be taken would present variations. In some lines you have two years of experience taken as the appropriate gauge—other lines five years; in extended coverage insurance they have already used seven years in many states, and would hope to use ten years. In suretyship, as you know, they don't even take a period of years but rather evaluate economic cycles. As you can see, there would be great difficulty in spelling out all of this. Furthermore, because of the wide variance in the lines of insurance that our companies write, you would have extremely difficult problems of allocation of expense and profit. Now the public utility is normally confined geographically, performs a few specific functions and calculation of a profit involves pri-

marily a fair return on invested capital. The utility, of course, is monopolistic, unlike our industry. In our lines, if you were to consider the capital and surplus of the Company, you face the problem whether a company that invests in common stock should be treated differently rate-wise from one that perhaps invests mostly in bonds, or indeed may simply keep its funds in banks on deposit. So, too, while in good times you hear a great deal of talk about considering investment gains in connection with rate increases, on the other hand the experience has shown that this is not a two-way street, even though logically it should be. At a time when Wall Street goes down, any attempt to recoup investment losses at the expense of policyholders is not regarded favorably by rate regulatory officials. For all these reasons and more, thus far we have been unable to agree upon any fixed formula to be formally written into the statute.

Q. (BILL HAZAM)

Even among intellectually honest actuaries, our rate-making procedures could allow for determining rate level by a variety of methods, ranging from a plus 2% increase to a plus 30% increase. Within this range, companies may be filing for increases. How can we ever accomplish such a rate level which companies are proposing, where it is politically expedient probably to accept only 2%.

A. Because there is this area of difference, that doesn't necessarily mean that what I've suggested can't be accomplished to a material extent. While you do have variances, nevertheless in this rating there is what the Supreme Court of the United States in a public utility case once called the "zone of reasonableness". In other words, our position is, and we are seeking to maintain this in every state we can, that so long as industry (which has the responsibility of management and is accountable to the stockholders and also to the policyholders) so long as industry operates within this zone of reasonableness, it is not the function of the rate regulatory authority to step in. You do have this range, so that it does present these difficulties of not being able to have two actuaries perhaps come up with *the precise* result. Nevertheless, I will just say that in this whole controversy I think that the participants who can come closest to what I am talking about should be the actuaries. So long as you are just exercising your own best judgment or recognizing the best judgment of another man, and so long as you don't violate what are accepted as the best actuarial principles, I will just say that while it may not be a final answer to this problem, it should help to minimize it a great deal. I think that this would be brought home if you could see in some States the kinds of hearings

to which we are subjected. No competent actuary appears on the other side but instead we meet with the wildest arguments, distortions of figures and violations of simple principles, that simply wouldn't be advocated by any member of this Society under any circumstances.

So, while recognizing that there is this difficulty that you can't come exactly together, all I am saying is that to the extent that you recognize there is a desirable goal to be accomplished in the common professional interest, it can only be an influence for the better in these controversies.

Q. (RICHARD LINO)

Mr. Donovan, you used the term "intellectually honest". At one of our New York meetings you mentioned the term "advocate system". I wonder whether an actuary can be "intellectually honest" and use that philosophy in the actuarial profession.

A. Well, let me put it this way. An actuary is not an advocate as I would regard it except in the sense that he is upholding a certain point of view, which is true of any expert witness. I think that the discussion you are referring to was one in which I tried to explain how our legal system functions and I tried to explain the function of a lawyer in these various arguments. For example, before a court it is not the function of a lawyer to express his personal opinions. As a matter of fact, the canons of ethics of the legal profession forbid the lawyer to express his personal opinion. The English common law system of justice which we have in the United States, called the adversary system, consists of having an impartial judge and, at times, a jury with as able an advocate as possible to present each side of the controversy. The role of the individual advocate is just one part in this adversary process. The whole concept of it is that if each side is ably and honestly presented, then the judge and jury can arrive at a sound decision. Now let us turn to the actuary. When it reaches a point (and I don't care whether you're with an Insurance Department or you're with a company) where you are being asked to present as an actuary a professional opinion that is repugnant to your own intellectual convictions, I strongly advocate that you simply express your opinion as you believe it, whether it be to the chief executive involved or to the Insurance Commissioner. I think that a year later you would be very glad that you took that course. I think you should say, "Well, if you want to persuade someone of this, that's up to you, but so far as the sound actuarial basis you have for it, here are the facts in my opinion." If you take any other road, it seems to me that it is a very treacherous one which could create a distrust of the integrity of your profession.

Q. (DUNBAR UHTHOFF)

I have felt in recent years that, perhaps, we are wrong in preparing our rate filings, our figures and data in the simplest way possible, rather than the relatively complicated way that we could put out stuff together. This simplicity is designed to make it more understandable to the public and to the bodies involved, but I wonder whether sometimes we are not leaning a little too far backward in that direction. It seems to get the public some understanding, but perhaps not enough, and they thereby tend to object on a lot of points they don't really understand. I wonder if there could be any comment on this question of simplicity versus more complication.

A. Well, there is no question but that this simplicity program has created a great number of amateur actuaries and we encounter this problem in very many states. On the other hand, there is an increasing public demand for some understanding of where the money goes. There is no question but that we shouldn't over-simplify these things and I think you are right in that at times, in our efforts to make things clear to either inadequately staffed insurance departments, or to the general public, we oversimplify and it can boomerang. I think it varies by circumstances. In presenting the Plan D program, for example, it's not so easy to be very simple about it and on the other hand, in most of these rate revisions, there is a fair degree of simplicity that can be accomplished. If we think in terms of the Insurance Commissioner as representing the public (assuming that he is adequately staffed and is the right type of individual) to me this approach can be as great a solution to this problem as any other factor. In very many instances we just don't have proper regulatory officials. Once the man has taken some public position, however unsound, and we are in the position of trying to get him to reverse himself, then the crisis gets worse and finally leads to litigation which, as I said yesterday, is simply no answer to the problem.

"STANDARDS OF PROFESSIONAL CONDUCT FOR ACTUARIES"

(SUMMATION BY MR. WINFIELD W. GREENE, PRESIDENT, W. W. GREENE, INC.)

Mr. Chairman—I have been in a quandary as to how to make a report on the seminar which I enjoyed and which was well attended, thanks to the recruiting efforts of the very competent committee in charge of this meeting. I think there have been many precedents broken here, and I think I will break one, or perhaps create a new

one, when as one way of reporting on this seminar, I will endeavor to sketch the evolution of my own thinking on the subject at hand.

When I was asked to handle this round table, the subject as stated was "A Code Of Ethics For Actuaries". I wrote the Vice Presidents in charge of the program stating that I would prefer to re-phrase the subject to read, "Standards of Professional Conduct for Actuaries".

Now my thinking at that time was that the subject "A Code Of Ethics For Actuaries" implied that there should be such a Code. At that particular stage, which was only a few weeks ago, I wasn't convinced that there should be such an animal; so, I got one of the employees of the National Bureau who happens to be related to me by blood, to do a little reading for me. I am very sure, Mr. Chairman, that this young man did this work on his own time!

He looked up this subject a bit and I found that the British Institute of Actuaries has had a code of ethics from the time of its start, in the middle of the 19th Century. The Society of Actuaries has given a great deal of attention to this matter. In recent years they have taken certain steps to grapple with the problem of promoting high standards of professional conduct, and very recently indeed they have promulgated a set of guides to this end.

Now, in thinking this thing through, based on this observation of what other actuarial societies had done, my own conclusions were something like this:

Obviously, there can be no quarrel with the principle that the standards of professional conduct for actuaries should be of the highest. However, the constitution of our society does not mention, as one of the objects of the society, the promotion of these high standards of professional conduct. It seemed to me that the statement of purpose or object in our constitution should be broadened to state affirmatively that this is one of the major purposes of this society. It seemed to me also that there should be some machinery set up, other than what we have in the constitution at present, to promote these high standards. It occurred to me that there should be a committee, let's say, on professional conduct, which, in the event that there was a complaint that some member of the society was not living up to these high standards, would study the matter and get into the facts; the committee could talk with the person complained against, get his viewpoint, perhaps conclude that after all he was maintaining a high standard, or, if not, it might recommend some action on the part of the Council. It seemed to me that a committee like that could do a great deal of good.

At this point it is rather interesting to note that in our constitution there is a very brief article referring to the expulsion or suspension of members. The Society of Actuaries is more tactful about it. They say a member may be "warned, admonished, censured, suspended or expelled"—now that's far kinder than just saying "expel" or maybe just "suspend"!

Then, considering the matter of fair play, the expulsion or suspen-

sion article in our constitution doesn't say anything about the accused member having an opportunity to appear before the Council before he is expelled or just suspended. Shouldn't there be a provision in the constitution which would say that "the accused" was to have a hearing and to have advance notice of the complaint?

Now up to this point I agreed with myself, and I presented these ideas to the seminar and I left this business of whether there should or should not be a code or a set of guides wide open.

I listened to what was said during the seminar and I gathered that the majority of those present felt it would be a mighty good thing for the industry and, incidentally, a very good thing for this society, if something affirmative could be done to assure that high standards of conduct were being promoted. This point was affirmed independently and emphatically by Mr. Donovan in his panel, which I attended. Mr. Donovan stated that if insurance departments were represented by competent, conscientious, high minded actuaries and the same thing applied on the company side, it would certainly minimize the rate making problems confronting the industry today.

In Mr. Donovan's seminar, and in the one at which I presided, it was brought out that the greater degree of rate regulation in the last few years since the SEUA decision has brought the actuary into a position where in many cases he becomes, in a sense, an officer of the court, or of an administrative body which is exercising, to a degree, judicial functions. Accordingly, this matter of professional ethics has become a subject of more obvious importance than was the case only a few years ago.

One of the most valuable parts of our seminar was the reading to us of the "Guides to Professional Conduct" which have been worked out by the Society of Actuaries. The impression I got from this reading was that, to a very great degree, they had succeeded in sticking to matters of principle—they didn't get too specific, which is the danger in any code. This danger is recognized generally, and specifically it is recognized in the foreword to the canon of ethics of the New York State Bar Association, where they caution that just because no mention is made of a specific offense in the code, that doesn't mean that it may be permitted. If it by analogy is just as heinous as one which is mentioned—it's just as much a matter of discipline and possible disbarment.

So, now my own thinking has evolved to this point—that perhaps a set of guides should be adopted by this society in the near future. I still feel very strongly that in adopting such a set of guides, insofar as possible, matters of principle should be emphasized rather than getting into too much detail regarding specific situations.

Another point that was brought out in our round table discussion was that the more definitely the actuary is regarded as a member of a profession, the more able he is to choose and maintain the actuarially sound position. As somebody said, he should really take the Hippocratic Oath. For example, take the actuary who is employed by a

company. His boss wants him to take a certain position. He feels that his actuarial conscience forbids him to do so. The more he is regarded as a member of a profession which is not only just a group of wizards but a group of men dedicated to very high standards of conduct, the better that fellow's chances are of telling his boss "Uh,-Uh," and still keeping his job.

To summarize, I now feel that the objects of our society should be re-stated, that there should be machinery for handling these questions of professional conduct, and that the adoption of a set of guides to professional conduct would be a good thing. The need for such guides has lately been intensified, and this subject merits the utmost serious and conscientious consideration of the society.

Q. (FRANK HARWAYNE)

In view of the fact that many of these seminars have revolved around convincing outsiders of the high moral, ethical and professional standards of actuaries and their function, isn't the real problem not the setting up of a set of rules which we internally have been adhering to up to now, with no exceptions that I can think of? Isn't the problem one of putting the standards on such a plane, on such a level, that outsiders will be thoroughly and completely convinced that we are a profession and that we are not, as some outsiders may have expressed it, manipulators of figures?

A. For my own part, I would say that the point you mention is one of the reasons for having the object of the society re-stated and for adopting some kind of guides. Again I say such a guide should adhere to principle rather than be too specific.

REMARKS OF MR. MICHELBACHER:

Gentlemen, I am more convinced than ever that my friend Winfield is a reasonable man because he has come around, finally, to my way of thinking about this problem. We always have had an unwritten code of ethics in this society and there have been occasions in the past when disciplinary action was taken, directly or indirectly, against a few of our members. Now, because of various recent developments that have been discussed here, particularly by Mr. Donovan, the time has come when I believe the society owes it to itself and to the community to define more specifically exactly what we have in mind with regard to standards of professional conduct. If you tell a layman that you are an Actuary, the chances are that he will ask "Well, what does that mean—what is an Actuary?" One of our big responsibilities, it seems to me, is to engage in a little public relations activity so that more people will understand exactly what the term "Actuary" means. There are too many charlatans who do manipulate figures and who will sell their services to any cause for a price, to defend a position on either side of any problem. It seems to me that this development,

more than any other makes it essential that we should establish our good character by promulgating a definition of what we stand for and what we intend to require of our members in the way of professional conduct. We are moving in a direction that's highly important and I hope the committee of the society that is working on this problem will not take too long to bring in its report and recommendations.

"MODERN SYSTEMS OF EXPENSE CONTROLS"

MR. FRANCIS S. PERRYMAN, ASSISTANT UNITED STATES MANAGER AND ACTUARY, ROYAL-GLOBE INSURANCE GROUP

(HANDLED BY MR. CORWIN STEELE AND MR. FRED GLASSER IN MR. PERRYMAN'S ABSENCE.)

(SUMMATION BY MR. R. J. WOLFRUM, ASSISTANT ACTUARY, LIBERTY MUTUAL INSURANCE COMPANY)

It was in a moment of weakness last night at a cocktail party that I accepted this assignment. I vaguely remember that John told me I was going to make a few remarks and then call on people who attended the seminar to handle most of the questions, so I intend to follow that pretty closely. I don't remember all who attended the seminar but I have a few people in mind I can call on.

As Bill indicated, Mr. Steele and Mr. Glasser did a very commendable job in outlining the problems that you are faced with when you come down to Expense Control and administering certain systems of Expense Control. They outlined in pretty much complete detail a system of expense control which they have instituted just recently in their own company. I was quite impressed with the type of expense control they have and I believe they must have been sincere about it because I understand that as soon as they looked at the price of a room in this hotel—they took off like a bird last night. I don't know if they had to hitch-hike home. They really are putting in Expense Control in their company.

They divided their method of administering expenses of their company into three broad categories. First, salary—on the idea that salary will generate a lot of other expenses; second, travel expense; and third, fringe benefits. Under salary, we discussed four methods you could use to keep down expenses—the first being by means of a budget. This obviously is used in a lot of companies and it is very similar, as I understand it, to the type of budget you have in your own home where you say you are going to spend as much as you did last year, less 10%, or something like that. Under this category there was quite a bit of discussion as to just what the denominator should be to which this budget is related. In most companies, as I understand it, it is related to premium and there were quite a few people who thought that premium was not the proper basis to allocate or to re-

late the salary expenses to because of the various distributions of policies by size, by line, by location and by area. With varying distributions, most expenses, salary scales and various services do vary, and it was thought that possibly the company should use different denominators than premiums in order to determine just what budget should be allowed for salaries for various departments and various lines.

In our shop, by the way, we have our business broken down into various groups—we have the National Risks Department which handles the large accounts, the Business Risks Department which handles the medium sized accounts, Commercial Risks Department which handles the so-called small business accounts, Personal Risks Department, and then Motor Transport Department which handles long haul trucking accounts. So we have our departments pretty much aligned by size of policy and we have been looking into the possibility of trying to have each of the servicing departments which furnish service to the several Risk Departments establish a price for those services and these expenses would be allocated to the Risk Departments. Of course, in this way, we can control or get a general idea of what the expenses should be by size of risk or by the type of market. I do know that other companies are looking into this, and that we still haven't come to a complete answer in this respect.

The second way that some people possibly could keep this salary item in control is by a general job classification system instead of using subjective methods of determining salaries; to try to do an actuarial study on the various jobs and use objective methods of setting up certain job classifications and salary scales for certain jobs. I am glad we don't use that in our company because I don't know how long I'd be around if they started to set down some of the jobs in our department.

Many people felt that a job classification system will not work because you could have a super-salesman who could sell the important type of work that an individual is doing, use very glowing language as the duties that he or the individual had, and thereby knock out of balance the actual work that is done in related jobs which are not so emphasized.

The third method that some companies use is an incentive program whereby individuals would be paid more for the performance in terms of some work units. The question, of course, is how you determine the job standard—how you determine just what is the norm for the job and what you should give somebody who puts out a little extra. That was discussed in some detail and George Munterich felt that that was good for other companies because he finds that if other companies have this type of system, a lot of people leave such companies to go over to his company. He corrects his personnel problems that way.

The fourth method that the Royal has used to a great extent is to put a lot of jobs on electronic machines. They indicated they had a 705,

and they find that their Statistical Department is gradually disappearing. Now I didn't follow it up and I don't know whether they mean that their Statistical Department is as such disappearing and instead they have an Electronic Department which is twice as big. They indicated they are taking over a lot of jobs done by individuals and putting it strictly on machine time, which is a pretty good accountable item.

The next thing we got into was travel expenses. It was felt that the only way you can really keep down the expense of travel is to require vouchers, and much to my surprise I found that the Royal did not ask for any vouchers until recently; the Liberty expense account looks like a tax return and it has been used for about ten years. The Royal now requires everyone in that Company to furnish vouchers and expense account in considerable detail. We didn't get into too much detail on travel expenses—I guess it was found that it was not opportune at this time to discuss it properly.

The last thing which was discussed was how to maintain some balance on fringe benefits for all the employees. It broke down into three broad categories. First we discussed life insurance, particularly the insurance that is provided after retirement to people who retire at either 65 or 70—the amount of insurance that is furnished to those people. Then we discussed group accident and health insurance, and the same problem came up on this too,—just what type of accident and health insurance should be furnished by the company to people retiring. The third thing that was discussed was coffee breaks, and there are several methods of trying to keep them under control. I understand the problem is trying to keep a 15 minute coffee break down to at least a half hour.

All in all, I think the companies are using what they call a modern system of expense control but which is the old time New England thrift, just watching the store a little more closely, in this time of bad underwriting results. I am glad we are all looking into the expense end of the dollar rather than the loss end of the dollar because we actuaries are supposed to be responsible for the loss of the dollar.

I am also glad that they are not looking at how the rates are made and why we should be responsible for some of the things that happen.

In general, that is what we discussed at the seminar of Expense Control.

REPORT OF SPECIAL COMMITTEE ON MORTALITY OF DISABLED LIVES

This Committee was appointed in April, 1955 by President S. E. Smith as the result of action taken at the March 15, 1955 meeting of the Council. At the suggestion of T. O. Carlson, Chairman of the Research Committee, there was recommended among other projects, an Investigation on the Mortality of Disabled Lives, with the suggestion that if such investigation were made, the Life and Accident and Health people be invited to participate with the CAS. It was "Voted that the President be authorized to appoint a Special Committee to survey the possibility of undertaking the project and report back to the Council. It was understood that this would be done before any approach was made to other organizations or associations."

After noting the problems encountered by the previous committee and the assumptions required in order to develop a mortality table, it was decided to circularize the membership of the National Council in order to ascertain whether or not there is sufficient interest in the subject to make a study of this kind worth the required effort. Accordingly, a letter dated September 23, 1955, was sent to writers of Workmen's Compensation Insurance. Following a brief outline of the problem, the letter asked the following questions:

(1) Would you be willing to furnish the desired statistical data?
(2) To what extent do you use the existing tables which appear in Volume XXXII of the Proceedings of the Casualty Actuarial Society?
(3) Any other comments you may desire to make on this subject.

Replies to this questionnaire were received from 74 companies writing approximately 55% of the countrywide Compensation premium. Of these replies, 32 carriers that wrote about 27% of the Compensation premium indicated that they would comply with a call for data as outlined in the letter. The other 42 companies were unable or unwilling to comply with the call.

In reply to the second question "To what extent do you use the existing tables, etc." 40 of the replying companies stated, in effect, either "none" or "to a negligible extent." Seven companies indicated that they did make some use of the tables but in a very limited way. Only two companies indicated what might be considered more extensive use of the present tables.

The limited amount of cooperation that can be anticipated from the companies in assembling material to be used in calculating an up-to-date table probably reflects a lack of interest in the problem. Furthermore, it is generally recognized that as respects so-called permanently and totally disabled claimants, recovery is a more important consideration than mortality. In view of this the Committee is unanimous in its opinion that it would not be practicable to attempt to prepare a new table of Mortality for Disabled Lives.

The available statistics of the Society of Actuaries relative to Mortality on Disabled Lives is contained in two publications:

(1) "Report of Committee on Joint Investigation of Experience of American and Canadian Companies with Reference to Total and Permanent Disability Benefits." It was published by the Actuarial Society of America in May of 1926.

(2) "Report of the Committee on Disability and Double Indemnity Experience under Certain Ordinary Disability Benefits between 1930 and 1950 Anniversaries." It is contained in the 1952 Reports of Mortality and Morbidity Experience published by the Society of Actuaries.

The second report is, of course, more nearly up to date and is based upon a much greater volume of experience than the first report. Accordingly, the remarks contained herein are limited to the 1952 report.

This experience is based upon the experience of eleven large life insurance companies under various types of disability benefits which have been offered from time to time in connection with ordinary life insurance policies. The study was limited to five types of benefits, four of which provided waiver of premium plus a monthly life income during continuance of total disability of $10 per $1000 of life insurance. Three of these forms were issued for the most part during the 1920's and were discontinued early in 1930. The fourth form which contained a 120 day waiting period was written in 1930 and 1931, and the fifth form which provides waiver of premium only has been written since 1931.

The study is divided into two parts, the first of which is referred to as the active life study and deals with rates of disablement; the second part of the study deals with disabled lives and tables of recovery probability and death probability have been developed.

A review of this data indicates that the Mortality Tables would not be satisfactory for use in calculating loss reserves for permanent and total disability for Workmen's Compensation insurance for two reasons:

(1) A review of the claims by cause of disability indicates that approximately 10% of the losses were the result of accidents whereas the remaining 90% were caused by diseases. On the other hand, Workmen's Compensation claims are almost exclusively the result of accidental injuries.

(2) For the most part, the disability provisions of life insurance policies contain a rigid definition of permanent and total disability or provide a period of disability at the end of which permanent disability is presumed. On the other hand, Workmen's Compensaton claims are classified as permanent disability claims on the basis of the judgment of the examiners or companies' Compensation reserve practices.

It was concluded that the studies made by the Committee of the So-

ciety of Actuaries pertain only to claims incurred under disability provisions of life insurance policies and are not applicable to Workmen's Compensation losses.

The Workmen's Compensation Statistical Plans specify the following bases for calculating the outstanding amounts for permanent total disability claims:

Delaware and Pennsylvania—Casualty Actuarial Society Table at 2½% interest.

All states under the jurisdiction of the National Council and Massachusetts—Survivorship Annuitants Table at 2%.

New York—Survivorship Annuitants Table at 3% increased by 10%—The applicable annuity values are shown in New York Workmen's Compensation Board Bulletin #222.

In the rate-making procedure permanent total disability claims are unimportant, since they produce less than 2% of the total policy year incurred losses in New York and correspondingly small percentages in other states. Because of the long duration of payments in New York, Massachusetts and other important states, they make up a significant part of the total company Workmen's Compensation loss reserves. Companies are not required to adhere to the bases of calculating outstanding losses specified in the statistical plans except as respects filings made under these plans. Companies frequently establish their own mortality and interest bases for calculating loss reserves for internal accounting and annual statement purposes.

Special Committee on Mortality of Disabled Lives

Edward S. Allen — Ralph M. Marshall
John R. Bevan — Albert Z. Skelding
Frank Harwayne — Nels M. Valerius
Arthur N. Matthews (Chairman)

REPORT OF FIRE RATE MAKING SUB-COMMITTEE OF THE RESEARCH COMMITTEE

As a start in fire rate making research your sub-committee attempted to take a "broad view" of this topic, attempting to picture the total job to be done, as well as the most important segments. In doing this it was felt that perhaps the greatest service could be rendered by expanding the total interest in fire rate making, and the possible blending of fire and casualty rate making techniques, rather than devoting time to particular aspects of the problem.

Following this approach this report is intended to be an outline of a program aimed at running for several years down the road of time. During these years we hope this program will mutually serve all phases of the industry by bringing together for development and im-

provement the experience, ideas, and methods of the Casualty Actuarial Society members, fire rate makers, and casualty rate makers for the benefit of the insurance industry and the insuring public.

HISTORICAL BACKGROUND OF FIRE INSURANCE RATES

The earliest method of making fire insurance rates was the classification method. In general, this consisted of grouping risks with similar hazards into risk classes, each individual risk within the group taking the group rate.

In 1752 the Philadelphia Contributionship used a six-fold classification of risks which was exactly the same as that used by the Hand and Hand Company of London. No distinction was made between the building and the contents rate.

About 1800 an American Company doing business in Massachusetts devised a six-fold classification for buildings based upon building construction and a two-fold classification, i.e., hazardous and non-hazardous, for contents.

Provision was also made for determining contents rate based upon construction of the building housing the contents.

In 1826, several fire insurance companies in New York combined for the purpose of rate making. Their classification consisted of eight groups for buildings, depending upon construction, and four-fold classification for contents, ranging from non-hazardous to especially hazardous. The contents rates were dependent upon the nature of contents and the construction of the containing building.

It should be noted that all of these early rating classifications or groupings were based purely upon individual judgment. In the smaller communities, a smaller classification system would apply to the whole town, in larger communities, several such systems would apply to districts within the town.

Each insurance company used its own classification, and although they were similar, each was the result of individual action.

An inspector chosen by each company would rate its own risks; his word was final, and rates were based solely upon the liability of the property to destruction by fire. The governing factor was the aggregate loss ratio of each class. Little was known about loss causing factors and the inherent fire hazard of various classes was not developed until comparatively recent times.

From this extremely simple form of rating, the number of classes has increased as building construction became more complex and as occupancies and congested areas began to increase in number. As the business of fire insurance grew in volume there was added confusion among the companies resulting from the use of their various rating structures. Competition for preferred risks caused recognition for certain good features by granting reductions in rate, and charges were made for the existence of poor features, and this was really the start of schedule rating.

Converting this historical background into today's methods, the fire insurance business has two rate bases:

1 - Class or minimum rates.

2 - Specific rates, which are developed by application of a rating schedule.

Examples of class rates are dwellings, small stores and dwellings, farms, schools, and churches.

Examples of specific rates are manufacturing plants, large mercantile risk, buildings in congested districts of cities, office buildings, hospitals.

One of the earliest examples of schedule rating is the tariff for New York City which appeared in 1839, and included a list of items for the presence of which charges were to be made when rating warehouses and stores.

The first actual detailed schedule was put in practical use in the United States by the St. Louis Board of Underwriters in 1875 and many of the principal features of the schedules as they are applied today had their origin in this first schedule.

Its base rate was the equivalent of a standard building, and charges were made for deficiencies in construction, communications and exposures. The contents rate depended upon the damageability of the contents and the floor location in the containing building.

In 1893 Mr. F. C. Moore of the Continental Insurance Company was Chairman of a committee which ultimately published the Universal Mercantile Schedule, which was the first recognized schedule offered for general use. While it was intended for universal application, widely varying local conditions required many changes in the original Universal Schedule, and it was never applied as originally written. It paved the way for educating companies and the public to schedule rating and served as a guide for Mr. A. F. Dean who later published the Analytic System, resulting in the publication of his Mercantile Tariff Exposure Formulas for the fire hazards in 1903.

The Dean Analytic System was adopted by the Western Actuarial Bureau and is the form of rating now used by 19 Mid-Western and Mountain States.

Modifications of the Universal Mercantile Schedule are now used in many Eastern and Southern States and the Dean Schedule, with certain modifications, is used in New England.

Since the early 1900's there have been several attempts at a National rating plan for fire risks, including one developed by the Insurance Executives Association, but none of these have been put into practical use. However, in Pennsylvania, where it was necessary to consolidate four different rating schedule treatments, there was adopted a composite patterned after the Universal Schedule and currently being used for the re-rating of all specifically rated risks.

In general, fire insurance rating has followed the early pattern of classification groups of essentially the same hazard related to

variables of construction of building, the susceptibility and damageability of contents, the degree of public protection and the possibility of a communicating fire from an exposing building.

PRESENT DAY FIRE RATE MAKING ORGANIZATIONS

The fire insurance rate making process is concluded in the operation of 40 Rating Organizations. Some are limited to a single state and others cover more than one. Each is regularly licensed under the rating laws of the several states in which they operate.

There are four regional organizations acting in an advisory capacity to the Rating Organizations and each is regularly filed as such under the Rating laws of the several states having provisions for such advisory organizations.

These are the Eastern Underwriters Association, Western Underwriters Association, South-Eastern Underwriters Association and Board of Fire Underwriters of the Pacific. They do not have identical functions in their advisory capacity. For instance, Eastern Underwriters Association has a Rating Methods Research Committee which makes recommendations as to Rules and Forms to Rating Organizations in its territory. Eastern Underwriters Association does not perform the engineering function of grading fire defenses of municipalities with population under 25,000 nor does it set forth the details of rate schedules for applications to risk classes.

Western Underwriters Association does not have a Rating Methods Research Committee, but this function is performed by another advisory organization, the Western Actuarial Bureau, which serves the 19 Mid-Western States and Mountain States. This latter organization developed and continues the use of the Dean Schedule for rating the fire hazard of risk classes which produces reasonable uniformity throughout its territory. It also recommends rules and forms for use in connection therewith.

South-Eastern Underwriters Association functions in the dual capacity as an advisory organization, and the operator of four rating organizations (Florida, Alabama, Georgia, South Carolina). It also grades fire defenses in towns of under 25,000 population in those four States, and also serves two other states, Virginia and North Carolina. It recommends rules and forms for use in its territory.

Board of Fire Underwriters of the Pacific recommends rules and forms and also grades fire defenses in towns under 25,000 population.

The Inter-Regional Insurance Conference, which is a National advisory organization, coordinates the activities of the four regional organizations to achieve national uniformity on matters of national significance. Representatives of the four regional organizations, with the Western Actuarial Bureau, constitute an Advisory Committee to assist in developing national recommendations. Inter-Regional also recommends on Public Utility Schedules and, in addition, develops recommendations on allied lines, such as earthquake, explosion, water damage, sprinkler leakage.

Certain rating jurisdictions are not assigned to regional areas because of peculiar provision of rating laws within these states, and Inter-Regional Insurance Conference sends its recommendations direct to those rating organizations. Texas, Virginia, West Virginia, Louisiana, North Carolina, Mississsippi, Washington and Arkansas are the states without an assignment to any regional territory.

In addition to the advisory organizations mentioned, there are others involved in rating recommendations.

Reporting Form Service Office recommends on reporting form business as to rating plan and form.

Multiple Peril Insurance Conference recommends on multiple peril policies as to rating plan and form.

Factory Insurance Association recommends on highly protected risk rating plan and form.

Oil Insurance Association recommends on petroleum products rating plan and form.

The National Board of Fire Underwriters has no advisory functions on rates or rating methods, nor does it recommend forms or rules. It has, for many years, graded the fire defenses of cities having population of 25,000 or more in conjunction with the engineering staff of the local rating organization.

As to the use of schedules for measuring the hazards and developing the fire insurance rate, there is no absolute uniformity in the application of charges and credits, but in a general way the reflection of construction, occupancy, protection and exposure as to each risk class is inherent in every rate produced by the application of a schedule.

Variations will be evident in the four basics, usually more evident in protection through use of extra refinement in public protection classes and the judgment accorded sprinkler installation and watchman service or central alarm treatment. In some cases, territorial application to occupancies will vary due to climatic or other conditions.

It is against this background that such current problems as term discounts, catastrophe and deductible coverages, and minimum premium variables must be measured. Since some of these present fire problems touch subjects previously treated in the casualty field it also reflects the point at which future blending of interest must start.

ACQUAINTING MEMBERS WITH FIRE RATE MAKING PROBLEMS AND ENLISTING THEIR INTEREST AND AID IN SOLVING THEM

Over their respective period of development, casualty rate making and fire rate making have developed along different lines. Up until recent years, the Casualty Actuarial Society concentrated on a background of interest in casualty insurance. However, as the companies have more generally started writing fire, inland marine, and casualty lines, as well as multiple line policies (such as commercial property forms—manufacturers output forms), the importance of a casualty actuary knowing a great deal about fire insurance has become increas-

ingly evident, and conversely, those educated in the intricacies of fire insurance need to learn more about casualty and inland marine insurance rating making.

Back in 1951, the process of interesting Casualty Actuarial Society members in fire rate making problems was initiated with papers by Messrs. Longley-Cook and McConnell. The years 1952, 1953 and 1954 saw additional papers on various phases of fire rate making, but this still leaves many areas of the problem needing exploration.

Our Society is dedicated to "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 . . . and such other means as may be found desirable." As such, there is undoubtedly within our group the ability to help with some of the rating problems now confronting the fire insurance industry.

ENCOURAGING FIRE MEN TO CONTINUE STUDY AIMED AT IMPROVING RATE MAKING TECHNIQUES

The CAS affords a professional environment within which the fire insurance rater can forward his research—with the counsel of his fellows in the companionate fields of casualty insurance. We harbor no illusion that fire insurance rating techniques are automatically transferrable to casualty rating practices or vice versa. But we are certain that there is a common bond between the scientists in these two fields—a dissatisfaction with mean accomplishments and the constant search for improvement.

There is a goodly number of fire insurance men either now engaged in, or capable of conducting, worthwhile research into the problems of fire insurance rating. We suspect that not all such scholars are presently enrolled within our membership. Surely we are not looking for that zealot with a pancea for all problems—even for those which do not exist. Nor by the same token can our society afford seemingly to accept contributions technically unsound and/or negligently executed. But within the professional standard which constitutes our *raison d'etre,* our Society must encourage worthwhile contributions of conscientious students.

Your sub-committee believes that recognization and appreciation of worthwhile endeavors is the spur for the ambitious student. It is quite important that the Society's efforts be not out-of-touch with the immediate problems confronting the industry. But it is no less important that our Society should be the vanguard of original research. Today's problems are always more easily solved if there was someone yesterday who figured out what tomorrow might bring. Your subcommittee can imagine no more satisfying reward for the serious student than the opportunity of presenting his ideas to a society of qualified professionals.

The ingrained humility of the scholar precludes any supposition that his proposals would be unchallenged. For he would recognize

that such accretion to the sum total of human knowledge can ultimately be traced to an exchange of ideas—and sometimes even to seemingly irreconcilable points-of-view. Thus we propose that the CAS proceedings afford a vehicle through which the researcher's contributions may become known. And we are no less confident that his findings, once having passed the test of a careful documentation, will eventually become an integral part of the fire insurance heritage.

PROGRAM FOR ACTUAL RESEARCH WORK ON FIRE RATE MAKING

The foregoing is aimed at developing greater interest in fire rate making. However, any actual development will likely come from research into this field. Accordingly we would recommend:

1. Encouraging some of our members to try and tie together more closely casualty and fire rate making concepts. For example, boiler and machinery insurance has some of the same characteristics of fire, and a study of the possibilities of using some of the boiler and machinery approaches on fire might be worthwhile. (Perhaps also the reverse.)
2. Burglary insurance is also subject to some of the elements of fire rating, thus comparative reviews of occupancy classes, plus watchman service might tie in with fire insurance approaches.
3. Several of the men with CPCU degrees might be interested in developing special studies of fire rate making for recognition in the CAS.
4. In order to encourage participation in the area of preparing papers, the following list of titles is shown as types of studies which we believe desirable:
    a. Means of Recognizing the Expense Differential on Small Policies.
    b. The Impact of the Packaging Concept on the Fire Business.
    c. Deductibles—Their Advantages and Problems.
    d. Extended Coverage Rates and Reserves for Future Catastrophe Losses.
    e. The Impact of Deviations and Independent Filings on Fire Rate Structure.
    f. Review of Minimum or Class Rates for Dwellings and Small Mercantile Risks.
    g. The Nature of the Statistical Justification for Coverage Extensions on Fire and Allied Lines Insurance Contracts.
    h. A Rational of Schedule Rating Techniques as Applied to Fire Insurance Risks.

i. A Study of Minimum Premiums Sufficient to Match Processing Costs and to Pay the Losses and Adjustment Expense on the Risks Covered.

j. A Study of Term Insurance and the Discounts for Cash or Installment Premium Payments.

Other subjects may also be suggested when members serving their companies in the field of multiple line underwriting explore the possibilities of coordinating the work of the society with the needs of the business.

CONCLUSION

In preparing this report your sub-committee has pictured the broad program outlined as a "Statement of Intent" for CAS members. It is hoped that this will serve as a reference, guide, and point of departure for handling future developments and expansion in the field of Fire Insurance Rating Making.

Fire Rate Making Sub-committee
of Special Research Committee

M. STANLEY HUGHEY
ROBERT L. HURLEY
FREDERICK W. DOREMUS, *Chairman*

OBITUARY

HELMUTH G. BRUNNQUELL

1879-1958

Helmuth G. Brunnquell, an Associate of the Casualty Actuarial Society, died in Milwaukee, Wisconsin on June 3, 1958 in his seventy-ninth year. He was born in Milwaukee on June 20, 1879 and throughout his career was identified with the insurance industry in his home state.

His life insurance career started in 1898 in the Secretary's Department of the Northwestern Mutual Life Insurance Company. The exposure here to accounting and statistical methods aroused his interest in actuarial work and prompted further study and training with special tutoring through West Division High School in Milwaukee to prepare him for entry as a special student at the University of Wisconsin. He resigned in 1912 to pursue these further studies at the University. On their completion he joined the Actuarial Branch of the Wisconsin Insurance Department in 1915. He served that Department as Assistant Actuary and Actuary until his return in 1930 to the Northwestern as an Assistant Actuary. He continued with this Company in that capacity till his retirement in June 1949.

He was admitted as an Associate of the Casualty Actuarial Society in 1918 and of the American Institute of Actuaries (now Society of Actuaries) in 1919.

Mr. Brunnquell was admired and respected by all who knew him. His wide acquaintance both in the supervisory field and in the field of life insurance generally, developed particularly during his years with the Insurance Department, was a source of deep pleasure to him. His interest in people was not simply a passing interest—it was a continuing interest in their activities and well being in every respect—a kindly interest. His remarkable memory for the important dates in their lives was a constant source of amazement to all who knew him.

Though he retired in 1949 he had maintained an active interest in events until shortly before his death. Those interests included, in addition to the contacts with his many friends, activity in the Washington Irving Reading Society, a group with which he had been closely associated for over sixty years. He was a member of the Milwaukee City Club and of St. John's Lutheran Church of Port Washington, Wisconsin.

He is survived by his wife, Hazel, and by two brothers, W. G. and Herbert G. Brunnquell, both of Port Washington.

OBITUARY

EDMUND ERNEST CAMMACK

1881–1958

Edmund Ernest Cammack died in Hartford, Connecticut, December 17, 1958 after a short illness.

He was born December 7, 1881 in Spaulding, Lincolnshire, England and received his schooling at Bedford Modern School and London University. He remained a British subject all his life.

After a brief career as a London bank clerk he went to Johannesburg in 1903 as actuary of the African Life Insurance Company, which position he held about seven years. In 1909 he became a Fellow of the Actuarial Society of America, and in 1910 he came to America to commence the association with Ætna Life which was to last until his death. He was admitted to the Institute of Actuaries as an Associate in 1911, and to the American Institute of Actuaries as a Fellow in 1925.

Mr. Cammack was a Fellow and charter member of the Casualty Actuarial Society. He served on the Council 1920-22, as Vice-President 1922-24, and on the Council 1924-28. He also served as a member of the Council of the Actuarial Society of America for a number of years.

His first contribution to the Casualty Actuarial Society was a paper in 1915 on "A System of Analyzing Workmen's Compensation Business by Means of Perforated Cards." In 1921 he made an important contribution by his paper "Premiums and Reserves for Non-Cancellable Accident and Health Insurance" which emphasized the inadequacy of premium rates then being charged. Had this paper been taken as seriously as it deserved, costly mistakes in this field might have been avoided.

He was also the author of a series of papers dealing with mortality experience under group life insurance and a 1919 paper on the computation of non-participating premium rates for ordinary life insurance which is still a classic.

He was elected Vice-President and Actuary of the Ætna Life Insurance Company in 1924 and was active in all departments, although his major contribution was the creation and development of its group insurance division. He became Vice-President of the Automobile Insurance Company of Hartford in 1927 and was executive head of the fire and marine operations of the Ætna Life Affiliated Companies from that time until his retirement in 1956. He was elected a Director of Ætna Life and Ætna Casualty in 1947 and served on their Boards until his death.

Mr. Cammack was a man of great drive and ability, and his capacity for friendship was very great. His loyalty to his friends was unbounded and his friends, for their part, had a regard for him that bordered on idolatry. His death came as a severe blow.

He is survived by his wife, Zelie Kirkby Cammack, and a son Christopher.

OBITUARY

LEONARD W. HATCH

1869-1958

Dr. Leonard W. Hatch, a Fellow of the Society since 1915, died November 23, 1958 at the age of eighty-nine, after a short illness.

He was born in Traverse City, Michigan on June 30, 1869. He graduated from Oberlin College in Ohio, obtained a master's degree from the University of Wisconsin and a Ph.D. degree from Columbia University.

He started his service to New York State in 1897 as statistician in the old Bureau of Statistics of Labor. In 1907, he became chief statistician of the State Labor Department and in 1920 director of the State Insurance Fund. He was director of the bureau of statistics and information of the Labor Department from 1925 until 1927, when Governor Alfred E. Smith appointed him to the New York State Industrial Board. He was Chairman of the Board at the time of his retirement in 1935.

Dr. Hatch was also a Fellow of the American Statistical Association and the author of numerous articles on accident prevention. A son, Philip H. Hatch, survives.

OBITUARY

JAMES RENWICK LEAL, SR.

1885-1957

James R. Leal, Sr., a charter Fellow of the Casualty Actuarial Society, died December 26, 1957 in Chattanooga, Tennessee. He was born on June 30, 1885 in Richmond, Virginia.

Mr. Leal entered the life insurance business at the age of 13 in the Home Office of the Life Insurance Company of Virginia. After association with several companies and a three year period as a consulting actuary and public accountant in Atlanta, Georgia, he became the first Actuary of the Florida Insurance Department.

Mr. Leal was appointed Actuary of the Interstate Life and Accident Insurance Company of Chattanooga, Tennessee, in 1919, was elected to its Board of Directors in 1920, and became Vice President and Secretary in 1921. At the time of his death, he was a Vice President and Director of the Company, although less active than in former years.

Mr. Leal was widely recognized in the industry for his knowledge and leadership ability. He was President of the Industrial Insurers' Conference, later known as the Life Insurers' Conference, from 1928 to 1929. He was Chairman of the Combination Companies Section of American Life Convention for 1942 and 1943. His broad experience and his willingness to share his knowledge helped greatly to bring about the friendly relationship which now exists among life insurance companies generally.

Mr. Leal was an active churchman, being an Elder and Clerk of the Session of the First Presbyterian Church at the time of his death. He was active in civic enterprises and served as President of Pine Breeze Sanatorium from January, 1956 until his death.

He is survived by his son, James R. Leal, Jr.

OBITUARY

THOMAS FREEMAN TARBELL

1888-1958

Thomas Freeman Tarbell, a Fellow and former President of the Casualty Actuarial Society, died suddenly in Scotland on July 2, 1958 during an extended tour of Europe.

Mr. Tarbell was also a Fellow of the Society of Actuaries, a past President of the Association of Casualty Accountants and Statisticians, a former Chairman of the Industry Uniform Accounting Committee and had served as company representative on the actuarial and statistical committees of many casualty rating organizations, notably the Massachusetts Automobile Rating and Accident Prevention Bureau.

He was born May 15, 1888 in Pepperell, Massachusetts and was educated at Lawrence Academy, Groton, Massachusetts and Williams College, receiving the degree of A.B. from the latter in 1910. During the first eight years of his insurance career he was employed in the actuarial department of the Mutual Life Insurance Company of New York. In 1919 he became Actuary of the Connecticut Insurance Department. He was Actuary of the Aetna Life Companies (casualty departments) from 1923 to 1927. In the latter year he joined the Travelers Insurance Company as Actuary of the Casualty Actuarial Department. He was appointed Chief Actuary, Casualty and Fire Actuarial Departments, in 1950 and became Vice President and Actuary of the Travelers in 1953. He retired from this position in 1955, just three years prior to his untimely death.

Mr. Tarbell contributed many papers and written discussions to the Proceedings of this Society as well as authoring many articles in the insurance press. While Actuary of the Connecticut Insurance Department he prepared a set of rules and regulations for the amortization of fixed term securities for the use of insurance companies doing business in the state, which has become a standard reference work. He was an authority on annual statement procedures and was influential in designing the current annual statement blank for fire and casualty companies. He served on many committees and participated frequently in discussions of this Society and other insurance organizations. He was active in the Insurance Accounting and Statistical Association and headed up the editorial board which compiled the standard text "Insurance Accounting—Fire and Casualty" published by the Association.

Aside from his profesional attainments, Tom Tarbell was possessed of many human qualities which endeared him to a wide acquaintance. Many will remember the annual gatherings of Hartford insurance officials for golf and dinner which he organized. His wit and wisdom at the speakers table made these and other occasions memorable ones for those present. He was a golfer of more than average ability and played a good game of bridge.

He was courteous, modest, and generous. His business associates found him to be a very considerate and able leader. He was always ready with advice and encouragement to those under his supervision. His popularity was enhanced by a keen sense of humor which frequently found expression in a *bon mot* which was particularly fitting to the occasion.

He took an active interest in church affairs and served as a member of the official board and finance committee of the First Methodist Church of Hartford.

Mr. Tarbell was truly a national authority on casualty insurance. His energy and activities have left a lasting impress on actuarial procedures. He lived a full and complete business life. It is regrettable that his sudden passing did not permit him to enjoy longer the leisure years which he so richly deserved. His genial personality endeared him to many who will join with his intimate friends in a deep feeling of sadness and loss in his sudden demise.

OBITUARY

JOHN L. TRAIN

1884-1958

John L. Train, President and General Manager of the Utica Mutual Insurance Company, died June 12, 1958 after a long illness, at the age of 74.

Mr. Train was born in Batavia, New York and attended Batavia High School, graduating in 1900. He entered Syracuse University, and worked his way through law school, graduating with honors in 1904.

Mr. Train was admitted to the bar in 1904, and practiced law in Syracuse for a year. In August, 1905, he was appointed a clerk in the State Insurance Department in Albany. Later he was named assistant examiner and assistant to the chief examiner, with headquarters in New York City. His specialty was casualty insurance.

He came to be recognized as one of the most expert compensation men in the state, and it was this reputation that led to his call to Utica in 1914, shortly after the Mutual Compensation Insurance Company, the present Utica Mutual, was organized. He was named General Manager, and started with three employees. Today the firm has expanded to its modern New Hartford building, and now has more than 1,000 employees.

Mr. Train was a charter member of the Casualty Actuarial Society. He served as President of the Association of New York State Mutual Casualty Companies and the National Association of Automotive Mutual Insurance Companies. He was one of the founders of the American Mutual Insurance Alliance and a Director of that organization from its beginning.

For more than twenty years, he was a member of the Governor's Advisory Council on Employment and Unemployment Insurance, and for seven years served as Chairman of the Governor's Committee to Employ the Physically Handicapped. His voice and counsel commanded the respectful attention of our state legislators, and many of the important amendments to the New York Workmen's Compensation Law were the products of his recommendations to the Legislature.

Mr. Train was active in Utica civic affairs, serving on the Executive Committee of the Utica Chamber of Commerce for many years. In 1938, he was responsible for carrying out the plan by which the City of Utica purchased the property of the Consolidated Water Company, now regarded as the city's most valuable municipal asset. More recently, he was Chairman of a Committee to devise additional financing which the Water Board needs to meet the cost of expansions required by the city's industrial growth.

He is survived by his wife; a daughter, Mrs. Elizabeth MacDonald of New York; a granddaughter; and a sister, Mrs. Sherman Simmons, of Byron, New York.

MINUTES OF THE MEETING

May 26 and 27, 1958

SKYTOP LODGE, SKYTOP, PENNSYLVANIA

The Spring Meeting of the Casualty Actuarial Society was held at Skytop Lodge at Skytop, Pennsylvania, on May 26 and 27, 1958. An informal buffet supper, preceded by refreshments, was held at the Lodge on the evening of May 25th for early arrivals.

The meeting started at 9:30 A.M. on Monday, May 26th with the following three concurrent seminars, each attending member of the C A S and invited guest participating in one or the other of the three discussions:

(1) "Insuring The Atom"

Leader: R. H. Butler, Secretary, Compensation and Liability Department, Travelers Insurance Company.

(2) "Public and Press Relations In the Insurance Industry"

Leader: W. L. Clapp, Associate Editor, Eastern Underwriter.

(3) "Standards of Professional Conduct For Actuaries"

Leader: W. W. Greene, President, W. W. Greene, Inc.

Following the conclusion of these three round table discussions at 11:00 A.M., three additional concurrent seminars were held, beginning at 11:15 A.M., as follows:

(4) "Personnel Problems—Student Recruiting"

Leader: H. T. Barber, Second Vice President & Actuary, Travelers Insurance Company.

(5) "Current Rate Regulatory Problems"

Leader: J. B. Donovan, Member of the Firm of Watters and Donovan.

(6) "Modern Systems of Expense Controls"

Leaders: T. Corwin Steele, Secretary and Comptroller of the Royal-Globe Insurance Group;

F. F. Glaser, Chief Accountant of the Royal-Globe Insurance Group.

Messrs. Steele and Glaser had very kindly consented to substitute for the originally designated Leader, Mr. F. S. Perryman who, at the last moment, found it impossible to attend the meeting.

These seminars were concluded at about 12:45 P.M. at which time the meeting adjourned for luncheon. The afternoon of May 26 was left open for recreational activities by the attendance.

An informal dinner was held in the evening at which time Elden Day, acting as Master of Ceremonies, turned over to Win Greene, a Past President of the Society, the pleasant task of welcoming two distinguished Past Presidents of the Society and their wives, namely Mr. & Mrs. William Leslie and Mr. & Mrs. G. F. Michelbacher. Messrs. Greene, Leslie and Michelbacher held the attention of the gathering in relating anecdotes of a personal nature going back to the early days of the Society.

The meeting reconvened at 9:30 A.M. on May 27 and it was noted that the registration showed the following 62 Fellows and 12 Associates in attendance:

FELLOWS

ALLEN, E. S.
BARBER, H. T.
BARKER, G. M.
BERKELEY, E. T.
BEVAN, J. R.
BONDY, M.
BORNHUETTER, R. L.
CARLETON, J. W.
COATES, C. S.
CURRY, H. E.
DAY, E. W.
FINNEGAN, J. H.
FONDILLER, R.
FOSTER, R. B.
GILLAM, W. S.
GRAVES, C. H.
GREENE, W. W.
HART, W. V., JR.
HARWAYNE, F.
HAZAM, W. J.
HOPE, F. J.
HUGHEY, M. S.
KORMES, M.
LA CROIX, H. F.
LESLIE, W.
LESLIE, W., JR.
LINDER, J.
LINO, R.
LISCORD, P. S.
LIVINGSTON, G. R.
LONGLEY-COOK, L. H.
MACKEEN, H. E.
MAKGILL, S. S.
MASTERSON, N. E.
MATTHEWS, A. N.
MAYCRINK, E. C.
MCCONNELL, M. H.
MENZEL, H. W.
MICHELBACHER, G. F.
MUNTERICH, G. C.
MURRIN, T. E.
OTTESON, P. M.
PINNEY, A. D.
PRUITT, D. M.
RESONY, A. V.
RODERMUND, M.
ROWELL, J. H.
SALZMANN, R. E.
SCHLOSS, H. W.
SIMON, L. J.
SKELDING, A. Z.
SKILLINGS, E. S.
SMICK, J. J.
SMITH, S. E.
TAPLEY, D. A.
THOMAS, J. W.
TRIST, J. A. W.
UHTHOFF, D. R.
VALERIUS, N. M.
WIEDER, J. W., JR.
WILLIAMS, P. A.
WOLFRUM, R. J.

ASSOCIATES

AIN, S. N.
EGER, F. A.
FURNIVALL, M. L.
HARACK, J.
HUNT, F. J., JR.
KLAASSEN, E. J.
MUIR, J. M.
NICHOLSON, E.
SCHWARTZ, M. J.
STERN, P. K.
WHITE, A.
WOODWORTH, J. H.

The registration list also showed the following invited guests present:

BUTLER, R. H.
CHILDS, W.
CLAPP, W. L.
DONOVAN, J. B.
ESPIE, R. E.
GLASER, F. F.
O'HALLORAN, W. F.
STEELE, T. C.

In addition, many of the members and invited guests were accompanied to the meeting by their wives.

Following the roll call, the leaders of the six seminars held on the previous day, with Vice President William Leslie, Jr., acting as presiding officer, gave a brief resumé of the discussion at their particular seminars. Each resumé was followed by a question and answer period, participated in by members from the floor. In passing, it is noted that R. J. Wolfrum substituted for Messrs. Steele and Glaser in presenting the resumé on the Expense Controls Seminar inasmuch as those two gentlemen, because of previous commitments, had to take an early departure.

There then followed a presentation of written discussions of previous papers:

(1) "Principles And Practices In Connection With Classification Rating Systems For Liability Insurance As Applied to Private Passenger Automobiles" by Joseph M. Muir—Reviewed by G. R. Livingston and T. O. Carlson.

(2) "Graduation Of Excess Ratio Distributions By The Method Of Moments" by Lewis H. Roberts—Reviewed by L. H. Longley-Cook.

(3) "Revision Of Rates Applicable To A Class Of Property Fire Insurance" by C. Otis Shaver—Reviewed by Royal N. Beckwith (read by William Leslie, Jr.).

(4) "Automobile Bodily Injury Liability Rate-making On A Prospective Basis" by J. Edward Faust, Jr.—Reviewed by R. J. Wolfrum.

The foregoing was followed by presentation of new papers:

(1) "The Employment Of Property And Casualty Actuaries" by L. H. Longley-Cook.

(2) "Auto B. I. Liability Rates—Use of 10/20 Experience In The Establishment Of Territorial Relativities" by Martin Bondy.

As an experiment, the proceedings of the session on May 27 were recorded on tape with the thought of ascertaining the feasibility of producing a permanent record for the Proceedings of the C A S, after transcription and editing.

This completed the program and, upon motion the meeting was declared adjourned at 12:30 P.M.

MINUTES OF THE MEETING

November 13 and 14, 1958

STATLER HILTON HOTEL, HARTFORD, CONNECTICUT

The 1958 meeting of the Society was held at the Statler Hilton Hotel in Hartford, Connecticut, on November 13 and 14, 1958.

The meeting convened at 2:00 P.M. on Thursday, November 13, with President Dudley M. Pruitt presiding. The following Fellows and Associates were in attendance:

FELLOWS

AINLEY, J. W.
ALLEN, E. S.
BAILEY, R. A.
BARBER, H. T.
BARTER, J. L.
BENNETT, N. J.
BERKELEY, E. T.
BERQUIST, J. R.
BONDY, M.
BORNHUETTER, R. L.
CAHILL, J. M.
CARLETON, J. W.
CARLSON, T. O.
CURRY, H. E.
DORWEILER, P.
DROPKIN, L. B.
ELLIOTT, G. B.
FAIRBANKS, A. V.
FARLEY, J.
FONDILLER, R.
FOSTER, R. B.
FOWLER, T. W.
GILLAM, W. S.
GINSBURGH, H. J.
GODDARD, R. P.
GRAVES, C. H.
HART, W. V., JR.
HARWAYNE, F.
HAZAM, W. J.
HOPE, F. J.
HUGHEY, M. S.
HURLEY, R. L.
JOHE, R. L.
JOHNSON, R. A.
KALLOP, R. H.
KORMES, M.
LA CROIX, H.
LESLIE, W., JR.
LINO, R.
LISCORD, P. S.
LIVINGSTON, G. R.
LONGLEY-COOK, L. H.
MACKEEN, H. E.
MAGRATH, J. J.
MAKGILL, S. S.
MASTERSON, N. E.
MATTHEWS, A. N.
MAYCRINK, E.
MAYERSON, A. L.
MCCONNELL, M. H.
MENZEL, H. W.
MILLS, R. J.
MUNTERICH, G. C.
MURRIN, T. E.
NILES, C. L., JR.
OTTESON, P. M.
PERRYMAN, F. S.
PETZ, E. F.
PINNEY, A. D.
PRUITT, D. M.
RESONY, A. V.
RESONY, J. A.
ROBERTS, L. H.
RODERMUND, M.
ROWELL, J. H.
RUCHLIS, E.
SALZMANN, R. E.
SCHLOSS, H. W.
SIMON, L. J.
SKELDING, A. Z.
SKILLINGS, E. S.
SMICK, J. J.
SMITH, E. M.
SMITH, S. E.
TARBELL, L. L., JR.
THOMAS, J. W.
TRIST, J. A. W.
VALERIUS, N. M.
WIEDER, J. W., JR.
WILLIAMS, P. A.
WITTICK, H. E.
WOLFRUM, R. J.
WRIGHT, B.

ASSOCIATES

ALEXANDER, L. M.	GETMAN, R. A.	SCAMMON, L. W.
ANDREWS, E. C.	HALL, H. L.	SIMONEAU, P. W.
BLODGET, H. R.	HARACK, J.	STANKUS, L. M.
BLUMENFELD, M. E.	JONES, N. F.	SYKES, Z. M., JR.
BOYLE, J. I.	KLAASSEN, E. J.	WILCKEN, C. L.
BYRNE, H. T.	LATIMER, M. W.	WILLSEY, L. W.
DANIEL, C. M.	MCDONALD, M. G.	WILSON, J. C.
DU ROSE, S. C., JR.	MCGUINNESS, J. S.	WOODWARD, B. H.
EGER, F. A.	PHILLIPS, H. J., JR.	WOODWORTH, J. H.
FAUST, J. E., JR.	POLLACK, R.	

In addition, there were also present a number of invited guests.

President Pruitt then turned the meeting over to Harold E. Curry, Chairman of the Research Committee, who led a most interesting panel discussion on the topic "Current Look At Electronic Equipment." The panel members were

(1) C. A. Marquardt—Vice President—Planning and Research—State Farm Mutual Automobile Liability Insurance Company. "Areas Of Usefulness Found So Far For IBM 650's and Kindred Equipment."

(2) James P. Hurst—Assistant Secretary—Electronics Division—Travelers Insurance Company. "Bismac, Why It Was Adopted And The Extent Of The Contemplated Use Of This Equipment."

(3) Claude Williams—Director of Planning and Programming—SPAN—"SPAN—The Installation—Benefits And Disadvantages Of This Cooperative Effort."

(4) Thomas O. Carlson—Actuary—National Bureau of Casualty Underwriters—"Observations On The Remington Rand File Computer."

Following the panel presentation, there was a round table discussion from the floor. Unfortunately, it was necessary, because of the hour, to call a halt to this discussion before the opportunity to be heard could be afforded to all those who had something to say, or questions to ask.

After a short recess, the gathering reconvened for a brief social hour followed by dinner.

The meeting reconvened at 9:30 A.M. on Friday, November 14, Dudley M. Pruitt again presiding.

At that time the President noted that during the past year the Sec-

retary had been informed of the decease of the following members of the Society:

Helmuth G. Brunnquell	James R. Leal, Sr.
Edmund E. Cammack	Thomas F. Tarbell
Leonard W. Hatch	John L. Train

The first order of business was the presentation of the Secretary's Report consisting of a brief summary of the activities of the Council during the previous year and a reading of the cash receipts and disbursements report of the Society for the period October 1, 1957 through September 30, 1958. This financial report, which had been certified as correct by the Auditing Committee, is attached hereto. The Secretary also noted that, in accordance with the recommendation of the Auditing Committee, the Council had voted that the bond covering the Secretary-Treasurer be increased from $5,000 to $10,000. President Pruitt then informed the gathering of the following:

(1) The Council had voted to increase the monthly allowance for secretarial service to the Secretary's office from $50 to $75, effective January 1, 1959.

(2) At the recommendation of the Nominating Committee, the Council had voted to appoint Fellow Roy Kallop to the newly created position of Assistant Secretary-Treasurer, with the understanding that the position did not involve being a member of the Council, or an officer of the Society.

The gathering then received the report of the Nominating Committee, Seymour Smith, Chairman, namely,

(a) *Nominated for re-election:*

President—Dudley M. Pruitt
Vice-President—John W. Carleton
Vice-President—William Leslie, Jr.
Secretary-Treasurer—Albert Z. Skelding

(b) *Nominated to become Members of the Council—Term to expire at 1961 Annual Meeting:*

Francis J. Hope
Thomas E. Murrin
Richard J. Wolfrum

There being no nominations from the floor, the above were declared duly elected.

The meeting then ratified the action of the Council in electing the following for the coming year:

Editor—Edward S. Allen
Librarian—Richard Lino
General Chairman—
Examination Committee—William J. Hazam

The President then called to the attention of the members the last sentence of Article III of the Constitution which states

> "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 Fellow unless recommended by a duly called meeting of 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."

The gathering was informed that, acting under this Constitutional provision, the Council had unanimously recommended that Robert G. Espie be admitted as a Fellow without examination. For the further information of the members it was noted

(a) Mr. Espie became affiliated with the Aetna Life in 1938, appointed Assistant Actuary in 1947, Associate Actuary in 1953, and Chief Accounting Officer of the Aetna Casualty & Surety Company in 1953, and, as such, is head of the Actuarial Department of that company.

(b) He is a Fellow of the Society of Actuaries and an Associate of the Institute of Actuaries.

(c) He is Chairman of the Blanks Committee of the Association of Casualty & Surety Companies, a member of the Joint Blanks Committee of the Life Insurance Association of America and the Life Insurance Convention, Chairman of the Annual Statement Committee of the Association of Casualty Accountants and Statisticians, and serves as a member of other industry committees.

The membership unanimously voted to accept the recommendation of the Council and Mr. Espie was, therefore, duly elected a Fellow of the Society.

The President then presented, by name, the following new Associates:

Bernat, L. A.	Sarnoff, P. E.
Blodget, H. R.	Schlenz, J. W.
Blumenfeld, M. E.	Simoneau, P. W.
DuRose, S. C., Jr.	Stankus, L. M.
Latimer, M. W.	Sykes, Z. M., Jr.
McGuinness, J. S.	Van Cleave, M. E.
Pollack, R.	Willsey, L. W.

He also presented diplomas to the following new Fellows:

Benbrook, P.	Niles, C. L., Jr.
Dropkin, L. B.	Roberts, L. H.
Espie, R. G.	Smith, E. M.
Magrath, J. J.	Tarbell, L. L., Jr.
Mayerson, A. L.	Wright, B.

President Pruitt then presented his Presidential Address "The Seat of Wisdom," which is reproduced in the current Proceedings.

The members then heard the following discussions of previously presented papers:

(a) Comments by J. Edward Faust, Jr., on the review of his paper "Automobile Bodily Injury Liability Rate-making on a Prospective Basis," previously presented by Richard J. Wolfrum.

(b) "Auto B. I. Liability Rates—Use of 10/20 Experience in the Establishment of Territorial Relativities" by Martin Bondy—Reviewed by LeRoy J. Simon.

The following new papers were also presented:

(a) "The Advantages of Calendar-Accident Year Experience and the Need For Appropriate Trend and Projection Factors in the Determination of Automobile Liability Rates"—by Paul Benbrook.

(b) "A Uniform Statistical Plan and Integrated Rate Filing Procedure For Private Passenger Automobile Insurance" —by Stanley C. DuRose, Jr.

(c) "Estimating Ultimate Incurred Losses in Auto Liability Insurance"—by Frank Harwayne.

(d) "Methods of Cost Limitations Under Private Unemployment Benefit Plans"—by Murray W. Latimer.

(e) "Ratemaking For Fire Insurance" — by Joseph J. Magrath.

(f) "Rate Revision Adjustment Factors" — by LeRoy J. Simon.

(g) "The Canadian Merit Rating Plan For Individual Automobile Risks"—by Herbert E. Wittick.

This part of the program was followed by what has been designated as a "Brainstorm Session" and involved a sort of free-for-all round table discussion, with no holds barred, on any and every problem which the panel participants, selected from the younger Fellows of the Society, cared to discuss or to raise question about with the older members. This discussion was carried on under the able leadership of William Leslie, Jr., and the panel participants were Messrs. R. A. Bailey, J. R. Berquist, M. Bondy, R. L. Bornhuetter, L. B. Dropkin, R. B. Foster, R. Lino, S. S. Makgill, R. J. Mills, A. D. Pinney, L. L. Tarbell, Jr., and P. A. Williams.

Following the completion of this round table the meeting was adjourned.

For the purpose of the record, there is appended a list of those who passed the examinations held on May 8 and 9, 1958.

1958 EXAMINATIONS — SUCCESSFUL CANDIDATES

Following is a list of those who passed the examinations held by the Society on May 8 and 9, 1958:

ASSOCIATESHIP EXAMINATIONS

PART I (a)	Baine, M. B.	Green, T. A.	Nagel, J. R.
	Bannister, D. W.	Hockenberg, D. R.	Piersol, D. E.
	Budd, E. H.	McGuinness, J. S.	Roberts, K. W.
	Cooper, W. P.	McNamara, D. J.	Sykes, Z. M., Jr.
	DeMelio, J. J.	Miller, N. F., Jr.	Young, R. G.
	Ehlert, D. W.		Zory, P. B.
PART I (b)	Cooper, W. P.	Hockenberg, D. R.	Roberts, K. W.
	Ehlert, D. W.	McGuinness, J. S.	Rogers, D. J.
	Gillespie, J. E.	Miller, N. F., Jr.	Sykes, Z. M., Jr.
PART II (a)	Arce, N. S.	Hickman, J. C.	Rogers, D. J.
	Brannigan, J. F.	McDonald, C.	Royer, A. F.
	Budd, E. H.	McGuinness, J. S.	Smith, E. R.
	Carson, D. E. A.	Miller, N. F., Jr.	Sondergeld, D. R.
	Craig, R. A.	Nagel, J. R.	Sykes, Z. M., Jr.
	Fitzgibbon, W. J., Jr.	Riccardo, J. F., Jr.	Vanderhoof, I. T.
	French, J. T.		Weber, D. C.
	Gillespie, J. E.		Zory, P. B.
PART II (b)	Brannigan, J. F.	Gillespie, J. E.	Miller, N. F., Jr.
	Budd, E. H.	Gold, M. L.	Morrison, D. I.
	Carrick, W. R.	Greene, T. A.	Moseley, J.
	Cherlin, G.	Herman, F. L.	Nagel, J. R.
	Copestakes, A. D.	Hickman, J. C.	Riccardo, J. F., Jr.
	Dvorak, W. L.	McClelland, K. T.	Rogers, D. J.
	Flanagan, R. M.	McClure, R. D.	Scheibl, J.
	French, J. T.	McDonald, C.	Sykes, Z. M., Jr.
	Gelb, M. R.	McNamara, D. J.	Vanderhoof, I. T.
PART III	Bilisoly, R. S.	McClure, R. D.	Piersol, D. E.
	Blumenfeld, M. E.	Miller, P. V.	Pollack, R.
	Brannigan, J. F.	Moseley, J.	Richards, H. R.
	Craig, R. A.	Peterson, H. M.	Sykes, Z. M., Jr.
	Holmberg, R. K.		Weber, D. C.
PART IV	Bernat, L. A.	Miller, P. V.	Simoneau, P. W.
	Blodget, H. R.	Peterson, H. M.	Stankus, L. M.
	Blumenfeld, M. E.	Pollak, R.	Sykes, Z. M., Jr.
	Crowley, J. H., Jr.	Sarnoff, P. E.	Van Cleave, M. E.
	McClure, R. D.	Schlenz, J. W.	Willsey, L. W.

FELLOWSHIP EXAMINATIONS

PART I	Alexander, L. M. Blodget, H. R. Blumenfeld, M. E. Byrne, H. T. Crowley, J. H., Jr.	Hunt, F. J., Jr. Klaassen, E. J. Morrison, D. I. Niles, C. L., Jr.	Pollack, R. Roberts, L. H. Simoneau, P. W. Wilcken, C. L. Willsey, L. W.
PART II	Moseley, J. Niles, C. L., Jr.	Phillips, H. J., Jr.	Wilcken, C. L. Wright, B.
PART III (a) and (b)	Alexander, L. M. Blodget, H. R. Boyle, J. I. Byrne, H. T.	Dickerson, O. D. Dropkin, L. B. Klaassen, E. J.	McNamara, D. J. Phillips, H. J., Jr. Tucker, T. F. Wilson, J. C.
PART III* (b) only	Mayerson, A. L.		
PART IV	Boyle, J. I. Byrne, H. T. Dickerson, O. D.	Hunt, F. J., Jr. Klaassen, E. J.	Smith, E. M. Tarbell, L. L., Jr. Tucker, T. F.

* Credit for other section previously granted.

NEW ASSOCIATES

The following 14 candidates, having been successful in completing the examinations, will be admitted as Associates of the Society as of the date of the Annual Meeting in November, 1958:

Bernat, L. A.	McGuinness, J. S.	Simoneau, P. W.
Blodget, H. R.	Pollack, R.	Stankus, L. M.
Blumenfeld, M. E.	Sarnoff, P. E.	Sykes, Z. M., Jr.
DuRose, S. C., Jr.	Schlenz, J. W.	Van Cleave, M. E.
Latimer, M. W.		Willsey, L. W.

NEW FELLOWS

The following 10 Associates, having been successful in completing the examinations, will be admitted as Fellows of the Society as of the date of the Annual Meeting in November, 1958:

Benbrook, P.	Mayerson, A. L.	Smith, E. M.
Dropkin, L. B.	Niles, C. L., Jr.	Tarbell, L. L., Jr.
Espie, R. G.	Roberts, L. H.	Wright, B.
Magrath, J. J.		

CASUALTY ACTUARIAL SOCIETY

Cash Receipts and Disbursements
from October 1, 1957 to September 30, 1958

Income			*Disbursements*	
On deposit in Chase Manhattan, October 1, 1957		$ 4,761.41	Printing & Stationery	$ 7,318.12
Members Dues	$7,400.00		Postage & Tele.	91.00
Sale of Proceedings	3,005.92		Secretarial Work	600.00
Examination Fees	1,045.00		Examination Expense	1,327.70
Luncheons & Dinners	1,836.00		Luncheons & Dinners	2,191.29
Interest on Bonds	125.00		Library Fund	11.31
Sale of Reprints	32.50		Insurance	12.50
Michelbacher Fund	1,690.38		Refunds	51.00
Foreign Exchange	1.42		Miscellaneous	770.23
Miscellaneous	356.18	15,492.40	Total	$12,373.15
Total		$20,253.81	On deposit 9-30-58 in Chase Manhattan	7,880.66
			Total	$20,253.81

Assets			*Liabilities*	
Cash in Bank 9-30-58	$7,880.66		Michelbacher Fund	$ 9,423.09
U. S. Savings Bonds	5,000.00		Other Surplus	3,457.57
		$12,880.66	Total Liab. & Surplus	$12,880.66

* * * * *

One 12 Yr. U. S. Savings Bond 2½% Series G. No. M6,756,060G due for $1,000 on Nov. 1, 1960.

Four 12 Yr. U. S. Savings Bonds 2½% Series G Nos. M7,228,102G-103G-104G-105G due for $4,000 on October 1, 1961.

Employers' Fire Insurance Company Policy No. 31F169622 for $5,000 on Proceedings stored at 200 East 42 Street, New York, N. Y. and $2,000 on Books kept in N. Y. Insurance Society Library. Expires September 14, 1962.

Surety Bond for $5,000 in the Royal Indemnity Company.

* * * * *

The "Misc." item under Disburse. includes the following: $356.18 for entertainment of ASTIN. This amount was reimbursed. (See "Misc." item under Income.) $150 for Insurance Society Organizational Membership. $210.55 for two file cabinets. $25 contribution to Heart Fund in memory of T. F. Tarbell. $25 dues to International Congress of Actuaries. * * * * *

This is to certify that we have audited the accounts, examined all vouchers and investments shown above and find same to be correct.

H. G. CRANE
Chairman, Auditing Committee

October 17, 1958

EXAMINATION FOR ENROLLMENT AS ASSOCIATE

PART I SECTION (a)

1. (a) Prove that if a constant k is added to each variate in a frequency distribution the arithmetic mean is increased by k and the standard deviation is unchanged.

   (b) From the definition of the standard deviation for grouped data derive the short formula for the standard deviation of grouped data.

2. A study of the wearability of denim overalls showed that a sample of 50 made by Company A had an average lifetime in daily wear of 20 months with a standard deviation of 8 months, and that a sample of 50 made by company B had an average lifetime of 23 months with a standard deviation of 9 months. B company claims their overalls are superior. Would you accept this claim at a significance level of .05? Given:

Normal Curve Areas

$t =$	1	1.5	1.96	2	3
Area	.3413	.4332	.4750	.4772	.4987

3. The following table gives the average hourly earnings (in cents) in excess of $2, and the average weekly earnings (in cents) in excess of $82 of production workers in manufacturing industries from July, 1957 through December, 1957:

Av. Hr. Earnings	7	7	8	9	11	11
Av. Wk. Earnings	18	80	99	56	92	92

Find the equation of the regression line and the coefficient of correlation.

4. (a) The number of defective pieces produced by a machine as detected among successive samples was as follows:

8, 6, 11, 12, 9, 10, 8, 9, 7, 12, 13, 10, 11, 12, 9, 10, 11, 9, 7, 5, 8, 10, 13, 15, 17, 14, 11, 4, 8, 6, 9.

Use the method of runs above and below the median to determine whether this arrangement is random at the level of significance of .05. Given: The critical values of the total number of runs are:

$u_{.025\,(12,15)} = 8, \quad u_{.025\,(12,19)} = 10, \quad u_{.025\,(15,16)} = 10$

$u_{.975\,(12,15)} = 20, \quad u_{.975\,(12,19)} = 22, \quad u_{.975\,(15,16)} = 23$

(b) The following table gives the index of industrial production in the United States:

1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
104	97	112	120	124	134	125	139	143	143

By the method of semiaverages find the annual trend increment, the monthly trend increment and the trend values.

PART I SECTION (b)

1. If we know that the probability that a telephone call will be answered is 2/3, what is the probability that, on a telephone survey, on 12 calls placed by one surveyor in a half hour period:

(a) All will answer?

(b) None will answer?

(c) Exactly eight will answer?

(d) At least one will not answer?

(e) At least one but not all will answer?

Given $3^{12} = 531{,}441$ express your answers in the form of a fraction.

2. What are the odds that, in a class of 25, at least two students have the same birthday? Assume that all years are of equal length and that birth rates are constant throughout the year. Express your answer in simplest form; however, it is not necessary to carry out the computation.

3. John Smith travels from Watertown to Fairfield in a minutes and Jim Brown travels from Fairfield to Watertown, via the same road, in b minutes. Both are known to have started and completed their trips within a fixed period of time $a+b+c$ minutes. What is the chance that they pass on the road?

4. A man is to continue throwing a die until he throws an ace. If he succeeds on the first throw, he wins \$5; if on the second, he wins \$4; if on the third, he wins \$3 and so on. If he does not succeed until the sixth throw, he wins nothing. If he succeeds on the seventh throw, he loses \$1; if he succeeds on the eighth throw, he loses \$2; and so on until an ace turns up. What is the man's expectation?

PART II SECTION (a)

1. (a) Prove the identity:

$$ {}_{n|}q_x \cdot v^{n+1} = {}_nE_x \cdot A^1_{x+n:\overline{1}|} $$

(b) Prove by means of the commutation symbols that, if γ is the limiting age of a mortality table, then

$$A_x = A_{x:\overline{\gamma-x}|} = A^1_{x:\overline{\gamma-x}|}$$

2. Calculate P_{98} if $q_x = 0.01x$ and $v = 0.9$

3. Express the quarterly premium in terms of the commutation symbols for a \$1,000 20-year term insurance policy issued at age 45.

4. A man aged 45 has been making annual premium payments on a \$10,000 ordinary life insurance policy which was issued at age 25. He wants to convert this policy to one paid up at age 65 with the understanding that the new policy will have the same reserve on the date of conversion as the old policy. Express the increase in the premium in terms of the commutation symbols.

PART II SECTION (b)

1. (a) Explain how the institution of insurance produces economic benefits to society.
   (b) Explain how "hedging" produces economic benefits to society.
2. (a) Give a statement illustrating the law of diminishing utility.
   (b) Why does gambling represent a net economic loss to society?
3. Define the following terms used with regard to investments:
   (a) leverage
   (b) arbitrage
   (c) short selling
4. (a) What are three types of fundamental (or group) hazards? Give an example of each.
   (b) Briefly describe three methods for meeting the consequences of hazards.

5. It has been stated that insurance
   (a) may reduce the probability of a loss
   (b) reduces the degree of uncertainty of a loss
   (c) increases business efficiency
   (d) enables small business enterprises to compete with large corporations upon more equal terms.

   Discuss each statement briefly.

6. Distinguish between investing for the "long pull" as opposed to investing for the "long swing." Which is the better method for investors who are primarily interested in bonds? Discuss.

PART III

SECTION (a)

1. What are the legal principles underlying a contract of insurance?

2. How are policy forms controlled under insurance law and regulation?

3. How is Workmen's Compensation different from tort liability?

4. List all of those assets of insurance companies that are "not admitted" by the New York Insurance Law and explain briefly why they are not admitted.

5. Under the state laws, insurance rates must meet certain standards. What are these standards and what factors are to be considered in evaluating whether these standards are met?

6. What action and what position has the NAIC taken recently regarding the Federal Trade Commission's actions against certain insurance companies for "false or deceptive advertising"?

7. How does the United States tax domestic nonlife insurance companies?

8. What would be the advantages to a mutual nonlife insurance company to be under the same federal tax basis as a stock nonlife insurance company?

SECTION (b)

1. What are the principal differences in the compulsory automobile liability laws of New York and Massachusetts?

2. Briefly describe the various alternatives to compulsory liability insurance as a solution to the problem of the uninsured motorist.

3. What are the weaknesses in the present day procedure of determining, and collecting for, damages in a motor vehicle accident case by an action at law involving a trial with or without a jury?

4. Outline briefly what factors you would consider in evaluating the cost of benefits under OASI.

5. All of the state unemployment compensation laws provide formulas by which the employer's rates of contribution are determined by past experience. Name and describe four types of these formulas.

6. What are the differences between social and commercial insurance?

7. What kinds of cash sickness benefit plans are currently in effect in the United States?

   Explain each plan. Be brief.

PART IV

SECTION (a)

NOTE: Answer any nine of the questions numbered 1 through 12.

1. What perils are covered by the "comprehensive" part of the automobile physical damage policy?

2. The standard fire policy (New York 1943) permits several methods of settlement in the event of a fire loss. Describe each briefly. Do you believe any of the alternatives you have mentioned could work a hardship on the insured? State fully the reasons for your answer.

3. What type of fire policy would you recommend for:

   (a) An apartment building, to cover loss of rents of the apartments occupied or intended for occupancy by tenants?

   (b) A manufacturing establishment, to cover suits between the time of finishing and sale?

   (c) A manufacturing establishment making dresses?

   (d) A tenant who installed fixtures and equipment in premises covered by a long-term lease?

4. What are the perils covered under the Additional Extended Coverage Endorsement?

5. Where a fire has occurred, explain the difference in coverage between business interruption and profits insurance. Give an example where both coverages are needed.

6. Under an inland marine transportation policy name five coverages usually included, in addition to fire and lightning.

7. Explain the difference between the independent contractors hazard and the contractual hazard.

8. With regard to overseas vessels, what are the restrictions of the usual form of open marine policy as to age, construction, classification, means of propulsion, flag and size?

9. With regard to a boiler and machinery policy, explain briefly the essential difference between use and occupancy insurance and outage insurance.

10. What is meant by a superseded suretyship clause?

11. Distinguish between Division 1 and Division 2 coverages under a garage liability policy. What are the payroll classes used in the premium determination of Division 1 and how are they limited?

12. (a) What benefits are provided by a Workmen's Compensation policy?

    (b) What maximum limitations are applied to these benefits?

SECTION (b)

NOTE: Answer all the questions numbered 13 through 16.

13. (a) Recently the National Council on Compensation Insurance has increased the maximum weekly wage used in obtaining exposure from $100 to $300. What are the advantages and disadvantages:
    (1) Of using payroll as the exposure basis?
    (2) Of using this higher payroll limitation?

    (b) Define the following terms as they are applied in Workmen's Compensation ratemaking:
    (1) Present on Rate Level
    (2) Correction for Off-Balance
    (3) Expense Constant Offset

(c) Name two major statistical sources used in measuring the effect of amendments to a Workmen's Compensation act and outline briefly how each is used in such a calculation.

14. (a) Define catastrophes and describe how they are handled in ratemaking for the following lines of insurance:
(1) Compensation
(2) Fire

(b) Discuss the application of the pure premium approach to Fire ratemaking.

15. (a) A ratemaking procedure in common use for automobile bodily injury liability insurance involves the use of two credibility tables, one for determining the overall statewide rate level change, and the other for determining the trend in average paid claim costs for each state. Both tables are applied to basic limits loss experience. The criteria for 100% credibility is 1084 claims in determining the rate level change and is $7,500,000 of paid losses for the latest calendar year in determining the trend. The average basic limits claim cost for bodily injury is slightly less than $1,000. Analyze the relationship between these two credibility tables.

(b) The expense allowances other than claim expense for private passenger automobile liability are as follows:

Production	25%
General Administration and Inspection	7%
Taxes	3%
Profit and Contingencies	5%

If the indicated increase in pure premiums for a state is 20%, what is the overall rate level change if the production allowance is reduced to 15% on classes amounting to 20% of the premium volume in the state?

(c) Develop a rate for uninsured motorists' coverage for a state in

which it is estimated that 90% of all cars registered are insured. Assume an average statewide bodily injury pure premium of $25 and a permissible loss ratio of 60%.

16. Your company writes group major medical insurance for employees and their dependents. The policy pays for 80% of covered medical expenses in excess of the deductible up to a maximum benefit of $5000. Three deductibles are offered, $25, $50, and $100. Most of your business is at the $25 and $50 deductibles and only a very limited amount at the $100 deductible. What factors do you think would have significant influence on costs and therefore on rates? How would you develop a reliable test of the relationship between the rates for the three different deductibles on the basis of your own company's experience? If you were asked to develop rates for a $200 deductible how would you do it?

EXAMINATION FOR ENROLLMENT AS FELLOW

PART I

SECTION (a)

1. (a) Explain the meaning of the phrase "equity in the unearned premium reserve."

   (b) For each of the following, determine the direct premium written, net premium written, net premium in force, net unearned premium reserve and net premium earned as of December 31, using the monthly pro rata method of calculation for unearned premiums.

   (1) One year policy written in November with an advance premium of $1,992.

   (2) One year policy written in August with an advance premium of $2,976 but cancelled in November with a return premium of $2,232.

   (3) One year policy written in September with an advance premium of $2,688 and reinsured in September with a reinsurance premium of $768 paid to the reinsurance company.

   (4) Three year policy written in October with a three year advance premium of $8,712.

2. (a) Outline a reasonable monthly method and the information which would be needed for testing the adequacy of Automobile Bodily Injury Liability case reserves.

   (b) How should miscellaneous bodily injury coverages such as Medical Payments, Uninsured Motorists and Death and Disability be treated in such a test? Give reasons.

3. A Casualty company newly entering the Fire Insurance business must decide how to record term installment policies. Assume:

   (1) Three year policy effective January 1 with a first year premium of $2,400, a second year premium of $2,112 and a third year premium of $2,112

(2) Losses are $1,000 each year

(3) Acquisition and taxes are 30% of written premium and all other expenses are $800 the first year, $400 the second year and $400 the third year

(4) An exact method is used in determining earned premium.

(a) Calculate the unearned premium reserve and show the effect on policyholders surplus for each of the three calendar years if:

(1) in the first year the company should record the full three year premium of $6,624 as written premium for that year treating the unpaid installments as premiums in course of collection

(2) the company should record $2,400 as written premium for the first year, $2,112 as written premium for the second year, and $2,112 as written premium for the third year.

Round all calculations to the nearest dollar and disregard Federal Income Tax.

(b) What is the major difference between these two methods of recording term installment policies?

4. (a) Outline a reasonable method for determining reserves for each of the following:

(1) allocated loss adjustment expense

(2) unallocated loss adjustment expense.

(b) "The ratio of unallocated loss adjustment expense paid to losses paid should be applied to outstanding reserves to obtain the reserve for unallocated loss adjustment expense."
Comment on this statement.

SECTION (b)

5. The following data is given relative to the operations of Company X, a stock casualty company. The items are 1957 transactions or values

as of December 31, 1957 unless otherwise specified. Assume this a complete list of operations.

(1)	Unearned premium at December 31, 1956	$65,000
(2)	Loss reserve at December 31, 1956	84,000
(3)	Losses (net) paid during year	110,000
(4)	Net unrealized capital gains	7,000
(5)	Stocks	124,000
(6)	Unearned premium	74,000
(7)	Net investment income earned	7,000
(8)	Loss reserve	91,000
(9)	Premiums written (net)	211,000
(10)	Excess of bodily injury and compensation statutory and voluntary reserves over case basis and loss expense reserve	1,000
(11)	Capital paid up	14,000
(12)	Federal income taxes incurred	5,000
(13)	Bonds	163,000
(14)	Loss adjustment expense incurred	9,000
(15)	Loss adjustment expense reserve	7,000
(16)	Unassigned funds (surplus)	82,000
(17)	Net realized capital gains	5,000
(18)	Surplus as regards policyholders December 31, 1956.	126,000
(19)	Contingency reserve	52,000
(20)	Other underwriting expense incurred	68,000
(21)	Agents' balances or uncollected premium	13,000
(22)	Cash and bank deposits	21,000

Prepare the Statement of Income and Capital and Surplus Account of the underwriting and investment exhibit of the annual statement of Company X for the year ended December 31, 1957. In order to conserve time, use the numbers of the items above rather than their descriptions.

6. Using the data of question 5 prepare the following parts of the Annual Statement:

   (a) Page 2 captioned "Assets"
   (b) Page 3 captioned "Liabilities, Surplus and Other Funds".

7. (a) State how Annual Statement values are obtained for each of the following types of assets:
      (1) Bonds
      (2) Stocks
      (3) Mortgage loans on real estate
      (4) Real Estate less encumbrances.

   (b) It has been suggested that the line for equipment, furniture and supplies (line 29) in the Analysis of Non-Admitted Assets (Exhibit 2, page 11) be eliminated because "items such as furniture, fixtures, automobiles, etc. are not permitted to be included in a company's assets and we see no reason for making a company go to all this trouble."
   Comment.

   (c) Page 14, Exhibit of Premiums and Losses (for each state), of the Annual Statement for the year 1957 requires information which differs from the information required in the 1956 Annual Statement. What are the major changes in this page?

8. (a) There are four Parts to the Insurance Expense Exhibit. Briefly describe each Part.

   (b) State the purpose of Section B of Part II of the Insurance Expense Exhibit.

   (c) What is the meaning of "Adjusted Direct Premiums Written" as used in Section B of Part II of the Insurance Expense Exhibit?

PART II

SECTION (a)

NOTE: Answer any four of the questions numbered 1 through 6.

1. Each of the following questions relates to the 1940 Workmen's Compensation Experience Rating Plan of the National Council On Compensation Insurance.
   (a) If W = 1.00 for expected losses of 275,000 and over, give the state accident limit and the self rating point.
   (b) Show the formula from which the primary actual loss table is obtained and give the maximum primary loss with an explanation of the relationship between the formula and the maximum primary loss.
   (c) Show the formula from which the modification is determined, explaining the meaning of each of the symbols used.
   (d) Explain the purpose of the D ratio.
   (e) Explain why it is possible for a rate revision to result in an increase in the manual rate for a particular classification without any increase in the expected loss rate.
   (f) State the circumstances under which revisions may be made in loss values used in experience ratings.

2. (a) Outline the changes made during the past year in the N.A.U.A. Automobile Physical Damage Fleet Rating Plans for
      (1) Fire and Theft Formula as respects:
         (1) Comprehensive
         (2) Eligibility
         (3) Maximum increase or decrease

(2) Collision Rating Formula as respects:

(1) Eligibility
(2) Net debit
(3) Maximum increase or decrease

(b) State three major differences between the fire and theft and collision rating formulas.

3. (a) What are the eligibility requirements for New York State for different kinds of insurance which may be written under the Composite Rating Plan as published by the National Bureau of Casualty Underwriters?

(b) Under what conditions may a risk be loss rated under the Composite Rating Plan. Outline the steps to be taken in determining the basic limits composite rate for such a risk.

4. (a) How is the Furrier's Block Experience Rating Plan, as promulgated by the Inland Marine Insurance Bureau, limited as respects:

1. Credibility
2. Maximum credit
3. Maximum debit
4. Effect of a single loss

(b) Briefly describe the Jewelers' Block Experience Rating Plan. Include in your discussion any similarities to General Liability Experience Rating.

5. (a) Explain the reason for the following rule in Retrospective Rating Plans:

"So much of the Standard Premium in those states which have approved the Premium Discount Plan on an interstate basis

as is subject to retrospective rating shall not be subject to discount."

(b) Explain why the Loss Conversion Factor in Retrospective Rating Plans A, B, and C is 1.14 for all companies but Plan D provides that the Loss Conversion Factor shall not be greater than 1.20 for stock carriers, or 1.40 for non-stock carriers.

(c) Explain why the Rules of Retrospective Rating Plans A, B, C, and D provide that the Excess Loss Premium Factor(s) shall be multiplied by the Loss Conversion Factor.

(d) Briefly describe a method to be used by underwriters as guidance in the selection of maximum premium ratios in Retrospective Rating Plan D.

6. The rules of the Multiple Location Rating Plan provide that, in the calculation of the final annual average rate, the Premium Subject to Credit shall be modified by considering three distinct characteristics of the risk. The first two characteristics may earn the risk a credit on its final rate while the third may decrease or entirely eliminate this credit.

(a) What are these three characteristics on which the individual risk rating depends?

(b) Four different recognized methods of individual risk rating are involved in producing a final average rate under this plan. List these four methods and indicate the risk characteristic with which it is associated.

(c) The final step in the plan, providing for reduction of previously granted credits, involves the principle which recognizes that the occurrence of a loss is of more significance than the ultimate cost in determining an individual risk modification. How is this principle applied?

SECTION (b)

NOTE: Answer any four of the questions numbered 7 through 12.

7. Insurance companies writing Accident & Health Insurance have been criticized for not extending insurance benefits into the following so-called problem areas:

    1. Substandard risks
    2. Older ages
    3. Small groups
    4. Rural population

Outline briefly the problems encountered and the progress, if any, made in each of these areas.

8. The Ace Insurance Company has made a proposal to all member companies of a certain automobile assigned risk plan to accept all assignments made by the plan in return for an aggregate stop loss agreement under which it would be reimbursed by the companies for losses in excess of 70% on all assigned risks underwritten by it. It is maintained that such a plan would provide more efficient and uniform handling of applications and claim notices and provide equal loss ratios on assigned risk business for all member companies. Outline a memorandum you would prepare for your superior regarding your company's participating in such a proposal.

9. (a) Specific and Treaty are two forms of reinsurance used in the Fire Insurance business.
    (1) Briefly define each of these two forms of Fire reinsurance.
    (2) Name and define three additional forms of Fire reinsurance.

    (b) People sometimes erroneously use the term reinsurance when they mean double insurance, and confusion also exists as to coinsurance and pools. Define each of the following:
        (1) Reinsurance
        (2) Double Insurance
        (3) Coinsurance
        (4) Pool

(c) Define each of the following reinsurance terms:
(1) Retention
(2) Line
(3) Quota-share Treaty
(4) First Surplus Treaty

10. Recently we have seen the fire and casualty business evolve from mono-line to multiple line to (in some instances) all lines operation including life; contrariwise, the broadening of the life business has stopped short of entry into fire and casualty. Discuss.

11. (a) As a Consulting Actuary, you have been asked to produce a method of measuring the difference in cost of Workmen's Compensation insurance among various states.
(1) Comment on the usefulness of a comparison of the ratios of earned premiums to payrolls and a comparison of the average collected rates.
(2) Outline a method which would produce a reasonably accurate measure of such differences in cost.

(b) The manual rule concerning the amount of payroll to be used in determining Workmen's Compensation premium has recently been changed from an average of $100 per week to an average of $300 per week. However, it has been argued that this limitation should be decreased rather than increased since, in many states, the maximum benefit under the Workmen's Compensation law is based on an average weekly wage which is less than the present limitation of $100 per week. Is this a valid argument? Discuss.

12. Discuss briefly both the favorable and unfavorable developments stemming from the state regulation of fire and casualty insurance from the insurance carriers' point of view.

PART III

SECTION (a)

1. With respect to the high speed electronic computers being considered by the insurance industry, name and describe briefly the five basic parts of such machines.

2. Briefly discuss the more important practical considerations involved in deciding upon the purchase of an electronic computer.

3. (a) One of the three basic operational areas of any record-keeping system is the "input" area. Name the other two areas and state which, in your opinion, is the most important area, giving reasons for your answer.

   (b) It is expected that the "binary" numerical system will be used extensively with magnetic tape in the new electronic machines. Explain what the binary system is and how the number 173 would be denoted under this system.

4. Although your company does not prepare its Workmen's Compensation Unit reports by use of mechanized procedure, it is in the process of developing a punch card on which will be recorded the most pertinent unit data for internal analytical purposes. List the fields which you believe should be included and the approximate number of columns for each field, assuming you are to use an 80 column card.

SECTION (b)

NOTE: Answer any four of the questions numbered 5 through 10.

5. There has been much interest shown during the last few years about the possibility of making automobile rates on the basis of calendar year-accident year statistics. Describe how the statistics needed for this ratemaking basis differ from those necessary for the traditional policy year basis. What are the advantages and disadvantages of the proposed method?

6. The aggregate loss reserves as of December 31 for two insurance companies are compared with their written premiums for the year just ended with the following results:

Carrier A: Ratio .60
Carrier B: Ratio .80

What conclusions about the comparative adequacy of the loss reserve of each can be drawn from this information? Discuss four factors which might account for this difference in ratios between Carrier A and Carrier B.

7. In Workmen's Compensation Insurance, statistics are reported under the National Council Workmen's Compensation (Unit) Statistical Plan and basic premium and loss data are submitted by policy on "unit reports." In diagrammatic form, sketch a "unit report" showing columnar headings and other important details.

8. It has been said that the statistical plans of the National Association of Independent Insurers were not designed as ratemaking statistical plans. Discuss this statement by comparing the Automobile Liability Statistical Plan of the National Bureau of Casualty Underwriters and the Automobile Statistical Plan of the National Association of Independent Insurers.

9. The Statistical Plan for Homeowners' Policies provides for collecting experience which heretofore has been incurred under separate policies and collected under several individual statistical plans. Each of these individual plans differed from the others in its fundamental approach to the statistical reporting best suited to the characteristics of a particular line of insurance. Compare the Homeowners' Statistical Plan with the statistical plans that would apply if the coverages were written on separate policies.

10. (a) How is the experience for the blanket portion of the Personal Property Floater collected under the statistical procedure of the Inland Marine Insurance Bureau? Do you consider this method entirely satisfactory from a ratemaking view? Why?

(b) In recent months there has been increasing experimentation with a prospective method of ratemaking which would combine

traditional premium, loss, and exposure statistics with supplementary economic trend data. Describe the composition and source of two economic indices which you consider worth testing Outline the preliminary experimental procedure you would follow, with respect to a chosen line, to predict the accuracy of projection methods applied to current insurance statistics.

PART IV

SECTION (a)

NOTE: Answer any four of the questions numbered 1 through 6.

1. As a result of investigations of the effect of wage changes on Workmen's Compensation premiums and losses, certain conclusions have been drawn with respect to the reliability of the available data and the problems involved. Briefly outline six such conclusions.

2. Some people have proposed the abolition of the fire insurance term rule with a suitable adjustment in rates to maintain equity. Assuming, (1) net fire insurance premium of one billion dollars distributed 40%, 45% and 15% between one, three and five year policies; (2) the term rule grants a three year policy for 2.5 annual premiums and a five year policy for 4 annual premiums, paid in advance; (3) the term rule was withdrawn for all policies issued after December 31, 1957; (4) the same risks were insured with only annual policies issued but with annual rates reduced so that the total cost of insurance to the public remains the same, what is the financial effect on:
   (a) Premium Income
   (b) Commission Income of Agents and Brokers
   (c) Unearned Premium Reserve
   (d) Statutory Underwriting Profit and Taxes.

3. Consideration is being given to a proposal that each automobile assigned risk plan establish a single set of rates which would not vary from risk to risk, in accordance with the carriers' approved filings. Comment on the advisability of such uniform rates if they should be:
   (a) established on the experience of the individual plan
   (b) the rates charged by the majority of the member carriers of the plan.

4. The table which is partially shown below is used in revising fire insurance rates. The upper and lower single year loss ratio limits are so calculated as to limit the effect of the experience of a single year to a rate level change of 10% after the appropriate credibility factor has been applied to the limited five-year loss ratio. Assume a constant annual premium volume and compute the missing values (a) and (b). The loss provision in the rates is 50%.

Five Year Premium	*Five Year Credibility Factor*	*Single Year Loss Ratio Limit*	
		Upper	*Lower*
$2,500,000–$3,999,999	(a)	.917	.083
$4,000,000–$4,999,999	.90	(b)	.222

5. From the following data, develop an expression to show the annual employee pure premium per $1 of hospital daily benefit for a 2-day deductible, 30-day maximum duration hospital plan, assuming 25% females.

	Annual Data on Plan with 32-Day Max. Duration	
	Male Employees	*Female Employees*
a. Exposure in lives	10,000	10,000
b. Number of claims	1,000	1,100
c. Average length of stay	7 days	8 days
d. No. of claims lasting exactly one day	200	250
e. No. of claims lasting exactly two days	150	200

6. The premium data used for establishing indicated rate level changes in the Fire Insurance field are not adjusted for any term discounts and are a mixture of standard and discounted rates. Describe and explain the practical effect which this procedure has on actual rate levels.

SECTION (b)

7. Outline and write an essay on any one of the following topics:
   (a) The inclusion of Dental Coverage under Group Insurance Plans.
   (b) Graduated fire and extended coverage rates on dwellings based on the amount of insurance in force.
   (c) Extension of Group Insurance Principles into the Fire and Casualty Field.
   (d) Expense loading techniques for Automobile Liability Insurance.
   (e) Inland Marine Insurance and the growth of multiple-line underwriting.

   Show your outline of the topic clearly.

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CASUALTY ACTUARIAL SOCIETY

ORGANIZED 1914

1959 YEAR BOOK

(Addendum to Volume XLV of the *Proceedings*)

Corrected to February 1, 1959

FOREWORD

The Casualty Actuarial Society was organized November 7, 1914 as the Casualty Actuarial and Statistical Society of America, with 97 charter members of the grade of Fellow. The present title was adopted on May 14, 1921. The object of the Society is the promotion of actuarial and statistical science as applied to the problems of casualty and social 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 organization of the Society was brought about through the suggestion of Dr. I. M. Rubinow, who became the first president. The problems surrounding workmen's compensation were at that time the most urgent, and consequently many of the members played a leading part in the development of the scientific basis upon which workmen's compensation insurance now rests.

The members of the Society have also presented original papers to the *Proceedings* upon the scientific formulation of standards for the computation of both rates and reserves in accident and health insurance, liability, burglary, fire, and the various automobile coverages. The presidential addresses constitute a valuable record of the current problems facing the casualty insurance business. Other papers in the *Proceedings* deal with acquisition costs, pension funds, legal decisions, investments, claims, reinsurance, accounting, statutory requirements, loss reserves, statistics, and the examination of insurance companies. "The Recommendations for Study" appear in *Proceedings* Vol. XLI and are in effect for the 1955 examinations and thereafter. The Report of the Committee on Mortality for Disabled Lives together with commutation tables and life annuities has been printed in *Proceedings* No. 62. The Committee on Compensation and Liability Loss and Loss Expense Reserves submitted a report which appears in Volume XXXV.

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 insurance and allied lines in recognition of multiple line writing powers granted by many states to both casualty companies and fire companies.

The lower grade of membership in the Society is that of Associate. Examinations have been held every year since organization; they are held during the second or third week of the month of May, in various cities in the United States and Canada. The membership of the Society consists of actuaries, statisticians, and executives who are connected with the principal casualty companies and organizations in the United States and Canada. The Society has a total membership of 340 consisting of 190 Fellows and 150 Associates.

The Society issues a publication entitled the *Proceedings* which contains original papers presented at the meetings. The *Proceedings* also contain discussions of papers, and reviews of books. This Year Book is published annually. "Recommendations for Study" is a pamphlet which outlines the course of study to be followed in connection with the examinations for admission. These two booklets may be obtained free upon application to the Secretary-Treasurer, Albert Z. Skelding, 200 E. 42nd Street, New York 17, N. Y.

CASUALTY ACTUARIAL SOCIETY

NOVEMBER 14, 1958

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MEMBERSHIP OF THE SOCIETY, NOVEMBER 14, 1958

FELLOWS

Those marked (†) were Charter Members at date of organization, November 7, 1914

Admitted	
Nov. 21, 1930	AINLEY, JOHN W., Statistician; Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 14, 1947	ALLEN, EDWARD S., Assistant General Manager and Actuary, New York Compensation Insurance Rating Board, 200 E. 42nd Street, New York 17, N. Y.
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., Assistant Actuary, Hardware Mutual Casualty Company & Hardware Dealers Mutual Fire Insurance Company, 200 Strongs Avenue, Stevens Point, Wis.
Nov. 20, 1924	BARBER, HARMON T., Second Vice President and Actuary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 19, 1954	BARKER, GORDON M., c/o Bowles, Andrews & Towne, 1004 Thompson Street, Richmond 21, Va.
Nov. 14, 1947	BARKER, LORING M., Actuary, Fireman's Fund Insurance Group, 3333 California Street, San Francisco, Calif.
Nov. 20, 1942	BART, ROBERT D., Comptroller and Assistant Treasurer, West Bend Aluminum Company, 92 Island Avenue, West Bend, Wis.
Nov. 18, 1932	BARTER, JOHN L., Vice President, Hartford Accident and Indemnity Company, 690 Asylum Avenue, Hartford 15, Conn.
Nov. 13, 1931	BATHO, ELGIN R., Vice President and Actuary, Berkshire Life Insurance Company, 7 North Street, Pittsfield, Mass.
Nov. 14, 1958	BENBROOK, PAUL, Vice President, American General Insurance Company, 700 Rusk Bldg., P.O. Box 2179, Houston 2, Texas.
Nov. 16, 1956	BENNETT, NORMAN J., Actuary, America Fore Loyalty Group, 80 Maiden Lane, New York 38, N. Y.
Nov. 22, 1934	BERKELEY, ERNEST T., Actuary, Employers' Group, 110 Milk Street, Boston 7, Mass.
Nov. 22, 1957	BERQUIST, JAMES R., Assistant Actuary, Employers' Mutual Liability Insurance Company of Wisconsin, 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, Chairman, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 17, Mass.
Apr. 20, 1917	BLANCHARD, RALPH H., Professor Emeritus of Insurance, Graduate School of Business, Columbia University, Plympton, Mass.
Nov. 16, 1956	BONDY, MARTIN, Principal Actuary, New York State Insurance Department, 123 William St., New York 38, N. Y.
Nov. 22, 1957	BORNHUETTER, RONALD L., Assistant Actuary, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
Nov. 16, 1956	BOYAJIAN, JOHN H., Actuary, California Inspection Rating Bureau, 500 Sansome Street, San Francisco 11, Calif.
†	BREIBY, WILLIAM, Vice President, Pacific Mutual Life Insurance Company, Box 6050 Metropolitan Station, Los Angeles 55, Calif.
Nov. 21, 1952	BRINDISE, RALPH S., Casualty Actuary, Standard Oil Company (Indiana), 910 S. Michigan Avenue, Chicago 80, Ill.

FELLOWS

Admitted	
Nov. 18, 1927	BROWN, F. STUART, Electronics Committee, American Insurance Group, 15 Washington Street, Newark 2, N. J.
Oct. 22, 1915	BROWN, HERBERT D., (Retired), Glenora-on-Lake Seneca, Dundee, N. Y.
†	BUCK, GEORGE B., Consulting Actuary, 60 Worth Street, New York 13, N. Y.
Apr. 20, 1917	BURHOP, WILLIAM H., President, Employers' Mutual Liability Insurance Company of Wisconsion, 407 Grant Street, Wausau, Wis.
Nov. 23, 1928	BURLING, WILLIAM H., Secretary, Group Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 19, 1929	CAHILL, JAMES M., Secretary, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
Nov. 18, 1932	CAMERON, FREELAND R., Senior Vice President and Secretary, Reliable Insurance Company, 901 N.E. Second Avenue, Miami 32, Fla.
Nov. 17, 1938	CARLETON, JOHN W., Vice President and Actuary, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 17, Mass.
Nov. 21, 1930	CARLSON, THOMAS O., Actuary, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
Nov. 18, 1949	CLARKE, JOHN W., Vice President, Gulf Life Insurance Company, Jacksonville 1, Fla.
Nov. 15, 1918	COATES, BARRETT N., 1007 Cragmont Avenue, Berkeley 8, Calif.
Nov. 17, 1922	COATES, CLARENCE S., Second Vice President, Lumbermens Mutual Casualty Company, 4750 Sheridan Road, Chicago 40, Ill.
Feb. 19, 1915	COLLINS, HENRY, (Retired), Lochbrae, Windermere, Fla.
Nov. 22, 1934	CONSTABLE, WILLIAM J., 45 Pondfield Road, West, Bronxville 8, N. Y.
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., Partner, 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. 19, 1953	CURRY, HAROLD E., Vice President, State Farm Mutual Automobile Insurance Company, 112 E. Washington Street, Bloomington. Ill.
Nov. 18, 1932	DAVIES, E. ALFRED, (Retired), Falls Village, Conn.
Nov. 18, 1927	DAVIS, EVELYN M., Partner, Woodward, Ryan, Sharp & Davis, Consulting Actuaries, 55 Broadway, New York 6, N. Y.
May 25, 1956	DAY, ELDEN W., Resident Secretary, Lumbermens Mutual Casualty Company, 342 Madison Avenue, New York 17, N. Y.
Nov. 16, 1951	DOREMUS, FREDERICK W., Manager, Eastern Underwriters Association, 85 John Street, New York 38, N. Y.
Nov. 17, 1920	DORWEILER, PAUL, (Retired), 51 Wethersfield Avenue, Hartford 14, Conn.
Nov. 22, 1957	DROBISCH, MILES R., Statistician, California Inspection Rating Bureau, 500 Sansome Street, San Francisco 11, Calif.

FELLOWS

Admitted	
Nov. 14, 1958	DROPKIN, LESTER B., Associate Actuary, New York State Insurance Department, 123 William Street, New York 38, N. Y.
Nov. 24, 1933	EDWARDS, JOHN, Actuary, Ontario Department of Insurance, 1st Floor, 145 Queen Street West, Toronto 1, Ontario, Canada.
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., Treasurer and Actuary, *Merchants Mutual Insurance Company*, 268 Main Street, Buffalo 5, N. Y.
Nov. 14, 1958	ESPIE, ROBERT G., Chief Accounting Officer, Aetna Life Affiliated Companies, Hartford 15, Conn.
Nov. 18, 1955	FAIRBANKS, ALFRED V., Assistant 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), 1352 Overlea Street, Clearwater, Fla.
May 25, 1956	FINNEGAN, J. H., Manager, Actuarial Bureau, National Board of Fire Underwriters, 85 John Street, New York 38, N. Y.
Nov. 15, 1935	FITZHUGH, GILBERT W., Vice President, Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.
Feb. 19, 1915	FONDILLER, RICHARD, Consulting Actuary, Woodward & Fondiller, Inc., 200 W. 57th Street, New York 19, N. Y.
Nov. 18, 1955	FOSTER, ROBERT B., Assistant Actuary; Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 18, 1955	FOWLER, THOMAS W., Principal Actuary, New York State Insurance Department, 324 State Street, Albany 10, N. Y.
Nov. 18, 1927	FREDERICKSON, CARL H., Actuary, Canadian Underwriters Association, 12 Upjohn Road, Don Mills, Ontario, Canada.
Nov. 22, 1934	FULLER, GARDNER V., Second Vice President, *Lumbermens Mutual Casualty Company & American Motorists Insurance Company*, 4750 Sheridan Road, Chicago 40, Ill.
Nov. 19, 1948	GARDINER, JAMES B., Assistant Actuary, Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.
Nov. 22, 1957	GILLAM, WILLIAM S., Research Unit, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
Nov. 20, 1924	GINSBURGH, HAROLD J., Senior Vice President, American Mutual Liability Insurance Company; & Vice President, American Policyholders' Insurance Company & Allied American Mutual Fire Insurance Company, Wakefield, Mass.
Nov. 21, 1930	GLENN, JOSEPH B., Consulting Actuary, 6110 Valley Road, Washington 14, D. C.
Nov. 13, 1931	GODDARD, RUSSEL P., Assistant to the President, Pennsylvania Manufacturers Association Casualty Insurance Company, Finance Bldg., Philadelphia, Pa.
†	GOODWIN, EDWARD S., (Retired), Investment Counselor, 96 Garvan Street, East Hartford 8, Conn.
Nov. 19, 1926	GRAHAM, CHARLES M., Consulting Actuary, 552 Oakhurst Road, Largo, Fla.

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†	GRAHAM, WILLIAM J., Consultant, 1070 Park Avenue, New York 18, N. Y
Nov. 19, 1958	GRAVES, CLYDE H., Actuary, Mutual Insurance Rating Bureau, & Assistant Manager, Mutual Insurance Advisory Association, 111 Fourth Avenue, New York 3, N. Y.
†	GREENE, WINFIELD W., President, W. W. Greene, Inc., Reinsurance Intermediaries and Actuarial Consultants, 32 Cliff Street, New York 38, N. Y.
Nov. 19, 1958	HALEY, JAMES B., JR., Actuary, Argonaut Insurance, 250 Middlefield Road, Menlo Park, Calif.
†	HAMMOND, H. PIERSON, (Retired), 22 Vanderbilt Road, West Hartford 7, Conn.
Nov. 16, 1956	HART, W. VAN BUREN, JR., Compensation & Liability Dept., 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., Vice President, The Travelers Insurance Company & The Travelers Indemnity Company, 700 Main Street, Hartford 15, Conn.
Nov. 17, 1950	HAZAM, WILLIAM J., Assistant Vice President and Associate Actuary, American Mutual Liability Insurance Company, Wakefield, Mass.
Nov. 16, 1951	HEWITT, CHARLES C., JR., c/o Bowles, Andrews & Towne, 156 William Street, New York 38, N. Y.
Nov. 22, 1934	HOOKER, RUSSELL O., Consulting Actuary, and President and Actuary, Insurance City Life Company, 750 Main 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 STEPHEN, Emeritus Professor of Insurance, University of Pennsylvania; President Emeritus, American College of Life Underwriters, 3924 Walnut Street, Philadelphia 4, Pa.
Nov. 14, 1947	HUGHEY, M. STANLEY, Second Vice President, Lumbermens Mutual Casualty Company, 4750 Sheridan Road, Chicago 40, Ill.
†	HUNTER, ARTHUR, (Retired), 124 Lloyd Road, Montclair, N. J.
Nov. 18, 1955	HURLEY, ROBERT L., Actuary, Liberty Mutual Fire Insurance Company, 175 Berkeley Street, Boston 17, Mass.
Feb. 25, 1916	JACKSON, CHARLES W., (Retired), 801 Meadowlark Lane, Glenview, Ill.
Nov. 19, 1954	JOHE, RICHARD L., Actuary, United States Fidelity and Guaranty Company, Calvert & Redwood Streets, Baltimore 3, Md.
Nov. 14, 1941	JOHNSON, ROGER A., Actuary, Utica Mutual Insurance Company, P.O. Box 530, Utica 1, N. Y.
Nov. 16, 1939	JONES, HAROLD M., Group Research Div., John Hancock Mutual Life Insurance Company, 200 Berkeley Street, Boston 17, Mass.
Nov. 16, 1956	KALLOP, ROY H., Assistant Actuary, National Council on Compensation Insurance, 200 E. 42nd Street, New York 17, N. Y.
Nov. 22, 1957	KATES, PHILLIP B., Vice President and Actuary, Southern Fire and Casualty Company, P.O. Box 240, Knoxville, Tenn.
Nov. 19, 1926	KELTON, WILLIAM H., Actuary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 14, 1941	KOLE, MORRIS B., Principal Actuary The State Insurance Fund, 199 Church Street, New York 7, N. Y.

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Nov. 24, 1933	KORMES, MARK, Consulting Actuary, 285 Madison Avenue, New York 17, N. Y.
Nov. 16, 1951	KUBISTA, ELIA, (Retired), 4 W. Mill Drive, Great Neck, N. Y.
Nov. 19, 1953	KUENKLER, ARTHUR S., Executive Vice President, Security-Connecticut Insurance Group, 175 Whitney Avenue, New Haven, Conn.
Nov. 18, 1949	LA CROIX, HAROLD F., Associate Actuary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 13, 1931	LA MONT, STEWART M., (Retired), Hotel Claremont, Berkeley, Calif.
†	LESLIE, WILLIAM, (Retired), P.O. Box 104, Newtown, Conn.
Nov. 17, 1950	LESLIE, WILLIAM, JR., General Manager, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
Nov. 20, 1924	LINDER, JOSEPH, Consulting Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York 38, N. Y.
Nov. 16, 1956	LINO, RICHARD, Senior Assistant Actuary, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
Nov. 18, 1955	LISCORD, PAUL S., Assistant Actuary; Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 17, 1950	LIVINGSTON, GILBERT R., Consulting Actuary, 192 Nutley Avenue, Nutley 10, N. J.
Nov. 16, 1951	LONGLEY-COOK, LAURENCE H., Actuary, Insurance Company of North America, 1600 Arch Street, Philadelphia 1, Pa.
Nov. 13, 1936	LYONS, DANIEL J., Vice President, Guardian Life Insurance Company, 50 Union Square, New York 3, N. Y.
Nov. 19, 1954	MACKEEN, HAROLD E., Assistant Actuary; Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
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; Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 23, 1928	MARSHALL, RALPH M., Assistant Actuary, National Council on Compensation Insurance, 200 E. 42nd Street, New York 17, N. Y.
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., 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., Assistant Professor, Mathematics and Insurance, University of Michigan, Ann Arbor, Mich.
Nov. 15, 1935	MCCONNELL, MATTHEW H., Superintendent, Compensation & Liability Dept., General Accident Fire and Life Assurance Corporation, Ltd., Fourth and Walnut Streets, Philadelphia 5, Pa.
Oct. 31, 1917	MCMANUS, ROBERT J., (Retired), 8 Ridgebrook Drive, West Hartford, Conn.
Nov. 18, 1955	MENZEL, HENRY W., Actuary, Springfield Insurance Companies, 1250 State Street, Springfield, Mass.
†	MICHELBACHER, GUSTAV F., (Retired), 72 Hartsdale Avenue, White Plains, N. Y.

FELLOWS

Admitted	
Nov. 17, 1938	MILLER, JOHN H., Vice President and Senior Actuary, Monarch Life Insurance Company, Springfield 1, Mass.
†	MILLIGAN, SAMUEL, Senior Vice President, Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.
Nov. 18, 1937	MILLS, JOHN A., Vice President and Actuary, Lumbermens Mutual Casualty Company, American Motorists Insurance Company, American Manufacturers Mutual Insurance Company & Federal Mutual Insurance Company, 4750 Sheridan Road, Chicago 40, Ill.
Nov. 22, 1957	MILLS, RICHARD J., Statistical Dept., Lumbermens Mutual Casualty Company, 4750 Sheridan Road, Chicago 40, Ill.
Nov. 18, 1921	MONTGOMERY, VICTOR, President, Pacific Employers Insurance Company & California Union Insurance Company, 1033 S. Hope Street, Los Angeles 15, Calif.
†	MOORE, GEORGE D., Actuary, 13 Emerson Street, East Orange, N. J.
Nov. 17, 1920	MUELLER, LOUIS H., 2845 Lake Street, San Francisco 21, Calif.
Nov. 16, 1956	MUETTERTIES, JOHN H., Casualty Actuary, Industrial Indemnity Company, 155 Sansome Street, San Francisco 4, Calif.
Nov. 17, 1950	MUNTERICH, GEORGE C., Assistant Secretary, Hartford Accident and Indemnity Company & Hartford Fire Insurance Company, 690 Asylum Avenue, Hartford 15, Conn.
May 28, 1920	MURPHY, RAY D., Chairman of the Board, Equitable Life Assurance Society of the United States, 393 Seventh Avenue, New York 1, N. Y.
Nov. 19, 1954	MURRIN, THOMAS E., Associate Actuary, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
Nov. 14, 1958	NILES, CHARLES L., JR., Assistant Actuary, American Mutual Liability Insurance Company, Wakefield, Mass.
Nov. 15, 1935	OBERHAUS, THOMAS M., Consulting Actuary, Woodward & Fondiller, Inc., 250 W. 57th Street, New York 19, N. Y.
†	OLIFIERS, EDWARD, Consulting Actuary, Caixa Postal 8, Petropolis, Rio, Brazil.
†	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 East Broadway, Owatonna, Minn.
Nov. 21, 1919	OUTWATER, OLIVE E., (Retired), Harbert, Mich.
Nov. 22, 1957	PERKINS, WILLIAM J., Senior Actuarial Assistant, The London Life Insurance Company, London, Ontario, Canada.
Nov. 21, 1930	PERRYMAN, FRANCIS S., Assistant United States Manager and Actuary, Royal-Globe Insurance Group, 150 William Street, New York 38, N. Y.
Nov. 14, 1941	PETERS, STEFAN, Actuary, Connell, Price and Company, 161 Devonshire Street, Boston 9, Mass.
Nov. 21, 1952	PETZ, EARL F., Statistical Dept., Lumbermens Mutual Casualty Company, 4750 Sheridan Road, Chicago 40, Ill.
Nov. 24, 1933	PICKETT, SAMUEL C., (Retired), 126 Macktown Road, Windsor, Conn.
Nov. 22, 1957	PINNEY, ALLEN D., Assistant Actuary; Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 17, 1922	PINNEY, SYDNEY D., 290 Wolcott Hill Road, Wethersfield 9, Conn.

FELLOWS

Admitted	
Nov. 18, 1931	PRUITT, DUDLEY M., Assistant General Manager and Actuary, General Accident Fire and Life Assurance Corporation, Ltd., Fourth & Walnut Streets, Philadelphia 5, Pa.
Nov. 18, 1955	RESONY, ALLIE V., Actuary; Accident & Sickness Div., Actuarial Dept., Hartford Accident and Indemnity Company, 690 Asylum Avenue, Hartford 15, Conn.
Nov. 18, 1949	RESONY, JOHN A., Assistant Secretary, Accident & Group Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 16, 1951	RICE, HOMER D., (Retired), 1731 Morningside Drive, Mount Dora, Fla.
Nov. 19, 1926	RICHTER, OTTO C., Chief Actuary, American Telephone & Telegraph Company, 195 Broadway, New York 7, N. Y.
May 24, 1921	RIEGEL, ROBERT, Professor of Statistics and Insurance, University of Buffalo, Buffalo 14, N. Y.
Nov. 14, 1958	ROBERTS, LEWIS H., Mathematician, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
Nov. 14, 1947	RODERMUND, MATTHEW, Assistant Secretary, Interboro Mutual Indemnity Insurance Company, 270 Madison Avenue, New York 16, 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., Actuary, Health Service Inc., Medical Indemnity of America, Inc., 200 N. Michigan Avenue, Chicago 1, Ill.
Nov. 17, 1938	RUCHLIS, ELSIE, Actuarial Dept., National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
Nov. 14, 1947	SALZMANN, RUTH E., Associate Actuary Hardware Mutual Casualty Company & Hardware Dealers Mutual Fire Insurance Company, 200 Strongs Avenue, Stevens Point, Wis.
Nov. 19, 1948	SCHLOSS, HAROLD W., Secretary, Royal-Globe Insurance Group, 150 William Street, New York 38, N. Y.
Nov. 18, 1937	SHAPIRO, GEORGE I., 934 E. 9th Street, Brooklyn 30, N. Y.
Nov. 18, 1931	SILVERMAN, DAVID, Partner, Wolfe, Corcoran & Linder, 116 John Street, New York 38, N. Y.
Nov. 19, 1954	SIMON, LEROY J., Associate Actuary, Insurance Company of North America, 1600 Arch Street, Philadelphia 1, Pa.
Nov. 19, 1929	SKELDING, ALBERT Z., Associate General Manager, National Council on Compensation Insurance, 200 E. 42nd Street, New York 17, N. Y.
Nov. 19, 1929	SKILLINGS, E. SHAW, Assistant Vice President and Actuary, Allstate Insurance Company, 7447 Skokie Boulevard, Skokie, Ill.
Nov. 18, 1932	SMICK, JACK J., Consulting Actuary, 200 E. 42nd Street, New York, 17, N. Y.
Nov. 14, 1958	SMITH, EDWARD M., Actuarial Assistant; Casualty, Fire & Marine Actuarial Dept., 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. 16, 1951	SNOW, A. J., Manager, Oregon Insurance Rating Bureau, 329 S.W. 5th Avenue, Portland, Ore.
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 Commpany, 40 Central Street, Boston 9, Mass.

FELLOWS

Admitted	
May 25, 1956 *	TAPLEY, DAVID A., Actuary, State Farm Mutual Automobile Insurance Company, 112 E. Washington Street, Bloomington, Ill.
Nov. 14, 1958	TARBELL, LUTHER L., JR., Assistant Actuary; Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 16, 1956	THOMAS, JAMES W., Assistant Actuary; Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
†	THOMPSON, JOHN S., (Retired), Vice Chairman of Board, Mutual Benefit Life Insurance Company, 520 Broad Street, Newark 2, N. J.
Nov. 17, 1922	TRAVERSI, ANTONIO T,, 59 Barry Street, Neutral Bay, Sydney, Australia.
Nov. 19, 1958	TRIST, JOHN A. W., Statistical Dept., Lumbermens Mutual Casualty Company, DeForest Avenue, Summit, N. J.
Nov. 19, 1948	TURNER, PAUL A., 435 S. La Cienega Boulevard, Los Angeles 48, Calif.
Nov. 14, 1947	UHTHOFF, D. R., Associate Actuary, Employers' Mutual Liability Insurance Company of Wisconsin, 407 Grant Street, Wausau, Wis.
Nov. 23, 1928	VALERIUS, NELS M., Associate Actuary, Aetna Casualty and Surety Company, 151 Farmington Avenue, Hartford 15, Conn.
Nov. 21, 1919	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., (Retired), 86 Hunter Drive, West Hartford 7, Conn.
Nov. 14, 1947	WIEDER, JOHN, W., JR., Associate Actuary, Aetna Casualty and Surety Company, 151 Farmington Avenue, Hartford 15, Conn.
Nov. 15, 1935	WILLIAMS, HARRY V., Vice President, Hartford Accident and Indemnity Company, 690 Asylum Avenue, Hartford 15, Conn.
Nov. 22, 1957	WILLIAMS, PHILLIP A., Assistant Actuary; Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 14, 1941	WILLIAMSON, W. RULON, Research Actuary, 3400 Fairhill Drive, Washington 23, D. 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., Assistant Actuary, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 17, Mass.
Nov. 16, 1951	WOODALL, JOHN P., Manager, South-Eastern Underwriters Association, 327 Trust Co. of Georgia Bldg., Atlanta 2, Ga.
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., Executive Vice President, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 17, Mass.

ASSOCIATES

Admitted	
Nov. 22, 1957	ABEL, FRANCES E., Actuarial Div., National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
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. 22, 1957	ALEXANDER, LEE M., Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford, 15, Conn.
Apr. 5, 1928	ALLEN, AUSTIN F., Chairman of the Board, Texas Employers' Insurance Association, P.O. Box 2759, Dallas 21, Texas.
Nov. 18, 1955	ANDREWS, EDWARD C., Associate Actuary; Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 15, 1918	ANKERS, ROBERT E., 414 E. Broad Street, Falls Church, Va.
Nov. 21, 1930	ARCHIBALD, A. EDWARD, Vice President, Investors Diversified Services, Inc., Minneapolis 2, Minn.
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, Vice President and Comptroller, Life Insurance Company of Georgia, 573 W. Peachtree Street, N.E., Atlanta 8, Ga.
Nov. 16, 1956	BERG, ROY A., JR., Assistant Actuary, Old Republic Life Insurance Company, 307 N. Michigan Avenue, Chicago 1, Ill.
Nov. 14, 1958	BERNAT, LEO ALLEN, Consultant, Minnesota Research Associates, 688 Holly Avenue, Apt. 4, St. Paul 4, Minn.
Nov. 18, 1925	BITTEL, W. HAROLD, Chief Actuary, Department of Banking and Insurance, State of New Jersey, Trenton 25, N. J.
Nov. 17, 1920	BLACK, NELLAS C., (Retired), 4310 Norwood Road, Baltimore 18, Md.
Nov. 14, 1958	BLODGET, HUGH R., Casualty Statistical Dept., Aetna Casualty and Surety Company, 151 Farmington Avenue, Hartford 15, Conn.
Nov. 14, 1958	BLUMENFELD, M. EUGENE, Cost Analyst, Federal Life and Casualty Company, Wolverine-Federal Tower, Battle Creek, Mich.
Nov. 22, 1934	BOMSE, EDWARD L., Assistant Manager, Foreign Dept., Royal-Globe Insurance Group, 150 William Street, New York 38, N. Y.
Nov. 23, 1928	BOWER, PERRY S., Assistant General Manager and Treasurer, The Great-West Life Assurance Company, 177 Lombard Street, Winnipeg, Manitoba, Canada.
Nov. 22, 1957	BOYLE, JAMES I., Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 22, 1957	BRAGG, JOHN M., Actuary, Life Insurance Company of Georgia, 573 W. Peachtree Street, N.E., Atlanta 8, Ga.
Oct. 22, 1915	BUFFLER, LOUIS, Insurance Underwriting Consultant, The State Insurance Fund, 199 Church Street, New York 7, N. Y.
Nov. 20, 1924	BUGBEE, JAMES M., Vice President, Maryland Casualty Company, Box 1228, Baltimore 3, Md.
Mar. 31, 1920	BURT, MARGARET A., Office of George B. Buck, Consulting Actuary, 60 Worth Street, New York 13, N. Y.

ASSOCIATES

Admitted	
Nov. 22, 1957	BYRNE, HARRY T., Casualty Statistical Dept., Aetna Casualty and Surety Company, 151 Farmington Avenue, Hartford 15, Conn.
Nov. 17, 1922	CAVANAUGH, LEO D., Chairman of the Board, Federal Life Insurance Company, 6100 N. Cicero Avenue, Chicago 46, Ill.
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. 22, 1957	CHURCH, HARRY M., Coates, Herfurth & England, Consulting Actuaries, 325 North Lake, Pasadena, Calif.
Nov. 18, 1955	COATES, WILLIAM D., Assistant Actuary, Accident & Health Dept., Continental Casualty Company, 310 S. Michigan Avenue, Chicago 4, Ill.
Nov. 19, 1953	CONTE, JOSEPH P., Vice President and Secretary, Columbian Mutual Life Insurance Company, 305 Main Street, Binghamton, N. Y.
Nov. 24, 1933	CRAWFORD, WILLIAM H., Vice President and Treasurer, Industrial Indemnity Company, 155 Sansome Street, San Francisco 4, Calif.
Nov. 18, 1932	CRIMMINS, JOSEPH B., Associate Actuary, Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.
Nov. 19, 1953	CROFTS, GEOFFREY, Associate Professor of Actuarial Science, Occidental College, Los Angeles 41, Calif.
Nov. 21, 1952	DANIEL, C. M., Applied Service Representative, International Business Machines Corporation, 2116 Grand, Des Moines 12, Iowa.
Nov. 18, 1925	DAVIS, MALVIN E., Vice President and Chief Actuary, Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.
Nov. 16, 1956	DORF, STANLEY, Actuarial Dept., Royal-Globe Insurance Group, 150 William Street, New York 38, N. Y.
Nov. 14, 1941	DOWLING, WILLIAM F., President, New York Mutual Casualty Insurance Company, 260 Fourth Avenue, New York 10, N. Y.
Nov. 14, 1958	DUROSE, STANLEY C., JR., Insurance Rater, Wisconsin Insurance Department, 127 South, State Capitol, Madison 2, Wis.
Nov. 19, 1954	EATON, KARL F., Electronics Analyst, Business Men's Assurance Company, 215 Pershing Road, Kansas City 41, Mo.
June 5, 1925	EGER, FRANK A., Secretary-Comptroller, Indemnity Insurance Company of North America, 1600 Arch Street, Philadelphia 1, Pa.
Nov. 19, 1954	EIDE, K. ARNE, Statistical Bureau, Actuarial Div., Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.
Nov. 16, 1956	FAUST, J. EDWARD, JR., Group and Casualty Actuary, Nelson & Warren Inc., Consulting Actuaries, 111 South Bemiston, St. Louis, Mo.
Nov. 22, 1957	FELDMAN, MARTIN F., Senior Actuary, New York State Insurance Department, 123 William Street, New York 38, N. Y.
Nov. 16, 1956	FLACK, PAUL R., Actuarial Assistant, General Accident Fire and Life Assurance Corporation, Ltd., 414 Walnut Street, Philadelphia 5, Pa.
Nov. 16, 1923	FLEMING, FRANK A., (Retired), c/o Mutual Insurance Rating Bureau, 111 Fourth Avenue, New York 3, N. Y.
Nov. 21, 1952	FRANKLIN, NATHAN M., Actuary, The Surety Association of America, 60 John Street, New York 38, N. Y.
Nov. 19, 1929	FURNIVALL, MAURICE L., Associate Actuary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.

ASSOCIATES

Admitted	
Nov. 19, 1954	GAINES, NATHANIEL, Office of George B. Buck, Consulting Actuary, 60 Worth Street, New York 13, N. Y.
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., President, American Mutual Reinsurance Company, 919 N. Michigan Avenue, Chicago 11, Ill.
Nov. 16, 1923	GILDEA, JAMES F., (Retired), 236 Nott Street, Wethersfield, Conn.
Nov. 14, 1947	GINGERY, STANLEY W., Associate Actuary, The Prudential Insurance Company of America, Newark 1, N. J.
Nov. 18, 1927	GREEN, WALTER C., Consulting Actuary, 455 East 4th South, Salt Lake City 11, Utah.
Nov. 15, 1940	GROSSMAN, ELI A., Vice President, The Great Eastern Life Insurance Company, 10 Dorrance St., Providence 3, R. I.
Nov. 15, 1935	GUERTIN, ALFRED N., Actuary, American Life Convention, 230 N. Michigan Avenue, Chicago 1, Ill.
Nov. 16, 1939	HAGEN, OLAF E., Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.
Nov. 18, 1921	HAGGARD, ROBERT E., (Retired), 922 The Alameda, Berkeley 7, Calif.
Nov. 17, 1922	HALL, HARTWELL L., (Retired), 34 Lincoln Avenue, West Hartford 7, Conn.
Nov. 13, 1936	HAM, HUGH P., Vice President and General Manager, The Western Assurance Company, 40 Scott Street, Toronto 1, Ontario, Canada.
Nov. 19, 1953	HARACK, JOHN, Manager, Statistical-Research Div., Blue Shield Medical Care Plans, 425 N. Michigan Avenue, Chicago 11, 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., Vice President and Actuary, The United States Life Insurance Company, 84 William Street, New York 38, N. Y.
Nov. 17, 1927	HIPP, GRADY H., (Retired), 216 Pine Forest Drive, Greenville, S. C.
Nov. 22, 1957	HOUSTON, DAVID B., Acting Assistant Professor of Insurance, University of California, School of Business Administration, Los Angeles 24, Calif.
Nov. 22, 1957	HUNT, FREDERIC J., JR., Assistant Actuary, Insurance Company of North America, 1600 Arch Street, Philadelphia 1, Pa.
Nov. 19, 1929	JACOBS, CARL N., President, Hardware Mutual Casualty Company & Hardware Dealers Mutual Fire Insurance Company, 200 Strongs Avenue, Stevens Point, Wis.
Nov. 18, 1921	JENSEN, EDWARD S., Assistant Vice President, Group Dept., Occidental Life Insurance Company of California, 1151 South Broadway, Los Angeles 55, Calif.
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, Newark 1, N. J.
Nov. 17, 1922	KIRK, CARL L., Consulting Actuary, 135 S. LaSalle Street, Chicago 3, Ill.

ASSOCIATES

Admitted	
Nov. 16, 1956	KLAASSEN, ELDON, J., Assistant Actuary, Continental Casualty Company, 310 S. Michigan Avenue, Chicago 4, Ill.
Nov. 14, 1958	LATIMER, MURRAY W., Industrial Relations Consultant, 1625 K Street, N.W., Washington 6, D. C.
Nov. 14, 1947	LUFKIN, ROBERT W., Office Manager, Craftsman Insurance Company, 851 Boylston Street, Boston 16, Mass.
Nov. 18, 1925	MALMUTH, JACOB J., Principal Examiner, New York State Insurance Department, 123 William Street, New York 38, N. Y.
Mar. 24, 1927	MARSH, CHARLES VAN R., (Retired), Fidelity and Deposit Company, Charles & Lexington Streets, Baltimore, Md.
Nov. 16, 1956	MATHWICK, L. F., Group Rate Analyst, Employers' Mutual Liability Insurance Company of Wisconsin, 407 Grant Street, Wausau, Wis.
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., Fire and Casualty Actuary, Department of Banking and Insurance, 100 Nashua Street, Boston 14, Mass.
Nov. 14, 1958	MCGUINNESS, J. S., Associate Actuary, Allstate Insurance Company, 7447 Skokie Boulevard, Skokie, Ill.
Nov. 17, 1922	MCIVER, R. A., Actuary, Washington National Insurance Company, 1630 Chicago Avenue, Evanston, Ill.
Nov. 13, 1931	MILLER, HENRY C., Comptroller, California State Compensation Insurance Fund, 450 McAllister Street, San Francisco 1, Calif.
Nov. 18, 1937	MINOR, EDUARD H., Assistant Actuary, Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, 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. 22, 1957	MUIR, JOSEPH M., General Manager, Mutual Insurance Rating Bureau, & *Acting General Manager, Mutual Insurance Advisory* Association, 111 Fourth Avenue, New York 3, N. Y.
Nov. 18, 1937	MYERS, ROBERT J., Chief Actuary, Social Security Administration, Washington 25, D. C.
Nov. 15, 1935	NELSON, S. TYLER, Casualty Division Manager, American Agricultural Mutual Insurance Company, Room 2300 Merchandise Mart, Chicago 54, Ill.
Oct. 27, 1916	NEWELL, WILLIAM, (Retired), 1225 Park Avenue, New York 28, N. Y.
Nov. 18, 1925	NICHOLSON, EARL, Actuary, Joseph Froggatt & Company, Inc., 74 Trinity Place, New York 6, N. Y.
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., Office of George B. Buck, Consulting Actuary, 60 Worth Street, New York 13, N. Y.
Nov. 20, 1924	PENNOCK, RICHARD M., (Retired), 12 E. Lodges Lane, Bala-Cynwyd, Pa.
Nov. 21, 1952	PENNYCOOK, RODERICK B., Assistant Commissioner, Manitoba Hospital Services Plan, 116 Edmonton Street, Winnipeg, Manitoba, Canada.
Nov. 14, 1947	PERRY, ROBERT C., First Vice President, State Farm Life Insurance Company, 112 E. Washington Street, Bloomington, Ill.

ASSOCIATES

Admitted	
Nov. 16, 1956	PHILLIPS, HERBERT J., JR., Actuarial Assistant, Employers' Liability Assurance Corporation, Ltd., 110 Milk Street, Boston 7, Mass.
Nov. 19, 1929	PHILLIPS, JOHN H., Vice President and Actuary, Employers' Mutual Liability Insurance Company of Wisconsin & Employers' Mutual Fire Insurance Company, 407 Grant Street, Wausau, Wis.
Nov. 17, 1920	PIKE, MORRIS, Vice President, John Hancock Mutual Life Insurance Company, Boston 17, Mass.
Nov. 23, 1928	PIPER, K. B., Vice President, Provident Life and Accident Insurance Company, 721 Broad Street, Chattanooga 2, Tenn.
Nov. 14, 1958	POLLACK, ROBERT, Actuarial Assistant, American Mutual Liability Insurance Company, Wakefield, Mass.
Nov. 17, 1922	POORMAN, WILLIAM F., President, Central Life Assurance Company, 611 Fifth Avenue, Des Moines 6, Iowa.
Nov. 13, 1936	POTOFSKY, SYLVIA, Senior Actuary, The State Insurance Fund, 199 Church Street, New York 7, N. Y.
Nov. 15, 1918	RAYWID, JOSEPH, Woodward & Fondiller, Inc., 200 W. 57th Street, New York 19, N. Y.
Nov. 19, 1932	RICHARDSON, HARRY F., (Retired), Seven Oaks, Bozman, Md.
Nov. 19, 1953	RICHMOND, OWEN D., Department Head, IBM Dept., Business Men's Assurance Company, 215 Pershing Road, Kansas City, Mo.
Nov. 18, 1932	ROBERTS, JAMES, A., Group Statistician, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 18, 1927	SARASON, HARRY M., Consulting Actuary, 1121 S. Hill Street, Los Angeles 15, Calif.
Nov. 14, 1958	SARNOFF, PAUL E., Assistant Actuarial Director, The Prudential Insurance Company of America, Newark 1, N. J.
Nov. 16, 1923	SAWYER, ARTHUR, (Retired), 217 San Antonio West, San Clemente, 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. 14, 1958	SCHLENZ, J. W., Actuary, Federal Life & Casualty Company, Wolverine-Federal Tower, Battle Creek, Mich.
Nov. 22, 1957	SCHNEIKER, HENRY C., Associate Statistician, Mutual Insurance Rating Bureau, 111 Fourth Avenue, New York 3, N. Y.
Nov. 19, 1954	SCHULMAN, JUSTIN, Actuarial Dept., National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
Nov. 14, 1947	SCHWARTZ, MAX J., Principal Actuary, New York State Insurance Department, 324 State Street, Albany 10, N. Y.
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. 14, 1958	SIMONEAU, PAUL W., Casualty Statistical Dept., Aetna Casualty and Surety Company, 151 Farmington Avenue, Hartford 15, Conn.

ASSOCIATES

Admitted	
Nov. 19, 1926	SOMERVILLE, WILLIAM F., (Retired), "Brookholm," Lawson, Mo.
Nov. 18, 1925	SOMMER, ARMAND, Vice President, Continental Casualty Company, Transportation Insurance Company & United States Life Insurance Company, 310 S. Michigan Avenue, Chicago 4, Ill.
Nov. 15, 1918	SPENCER, HAROLD S., (Retired), 8 Chelsea Lane, West Hartford, Conn.
Nov. 14, 1958	STANKUS, LEO M., Associate Actuary, Allstate Insurance Company, 7447 Skokie Boulevard, Skokie, Ill.
Nov. 20, 1924	STELLWAGEN, HERBERT P., Executive Vice President, Indemnity Insurance Company of North America, 1600 Arch Street, Philadelphia 1, Pa.
Nov. 16, 1956	STERN, PHILIPP K., Actuary, Mutual Insurance Rating Bureau, 111 Fourth Avenue, New York 3, N. Y.
Nov. 16, 1923	STOKE, KENDRICK, Actuary, Michigan Mutual Liability Company, 28 W. Adams Avenue, Detroit 26, Mich.
Nov. 21, 1930	SULLIVAN, WALTER F., Actuary, State Compensation Insurance Fund, 450 McAllister Street, San Francisco 1, Calif.
Nov. 14, 1958	SYKES, ZENAS M., JR., Actuarial Assistant, United States Fidelity and Guaranty Company, Baltimore 3, Md.
Nov 21, 1919	TRENCH, FREDERICK H., Budget Director, 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, 127 South, State Capitol, Madison 2, Wis.
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, ALEXANDER C., Senior Vice President, Protective Life Insurance Company, Birmingham, Ala.
Nov. 21, 1930	WELLS, WALTER I., Secretary, Sickness & Accident Div., State Mutual Life Assurance Company of America, 440 Lincoln Street, Worcester, Mass.
Nov. 16, 1951	WERMEL, MICHAEL T., Vice President, Woodward & Fondiller, Inc., Consulting Actuaries, 417 S. Hill Street, Los Angeles 13, Calif.
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 Actuary, Ostheimer & Company, 1510 Chestnut Street, Philadelphia 2, Pa.
Nov. 22, 1957	WILCKEN, CARL L., Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 19, 1954	WILLIAMS, DEWEY G., Assistant Actuary, Texas Employers' Insurance Association, Dallas 1, Texas.
Nov. 14, 1958	WILLSEY, LYNN W., Casualty, Fire & Marine Actuarial Dept., The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
Nov. 18, 1955	WILSON, JAMES C., Actuary, Wolverine Insurance Company, Battle Creek, Mich.
Nov. 16, 1939	WITTLAKE, J. CLARKE, Vice President, Business Men's Assurance Company, B.M.A. Bldg., Kansas City 10, Mo.

Admitted	
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., Associate 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, 305 E. 45th Street, New York 17, N. Y.
Nov. 16, 1956	WOODWORTH, JAMES H., Superintendent, Rating Div. of Actuarial Dept., Hartford Accident and Indemnity Company, 690 Asylum Avenue, Hartford 15, Conn.
Nov. 18, 1925	WOOLERY, JAMES MYRON, Vice President and Actuary, Occidental Life Insurance Company, Raleigh, N. C.

OFFICERS OF THE SOCIETY

Since Date of Organization

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.

Secretary-Treasurer

1914-1917....*C. E. Scattergood
1918-1953.....R. Fondiller
1954-1958.....A. Z. Skelding

General Chairman
Examination Committee

1949-1951.....R. A. Johnson
1952-1956.....J. W. Wieder, Jr.
1957-1958.....W. J. Hazam

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

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
1958-1959.....R. Lino

*Deceased.
†The offices of Editor and Librarian were not separated until 1916.

FELLOWS WHO HAVE DIED

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
†	William A. Budlong	June 4, 1934
Nov. 18, 1932	Charles H. Burhans	June 15, 1942
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
†	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
†	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
May 25, 1923	William A. Granville	Feb. 4, 1943
†	William H. Gould	Oct. 28, 1936
†	Robert Cowen Lees Hamilton	Nov. 15, 1941
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. 20, 1947

FELLOWS WHO HAVE DIED—*Continued*

Admitted		Died
†	Burritt A. Hunt	Sept. 3, 1943
Nov. 28, 1921	William Anderson Hutcheson	Nov. 19, 1942
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
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
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
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
†	Henry Moir	June 8, 1937
Feb. 19, 1915	William J. Montgomery	Aug. 20, 1915
Nov. 19, 1926	William L. Mooney	Oct. 21, 1948
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
†	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
†	Edward B. Phelps	July 24, 1915
Nov. 19, 1926	Jesse S. Phillips	Nov. 6, 1954
†	Charles Grant Reiter	July 30, 1937
†	Charles H. Remington	Mar. 21, 1938
May 23, 1919	Frederick Richardson	July 22, 1955
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
April 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

FELLOWS WHO HAVE DIED—*Continued*

Admitted		Died
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

ASSOCIATES WHO HAVE DIED

Admitted		Died
May 23, 1924	Milton Acker	Aug. 16, 1956
Oct. 22, 1915	Don A. Baxter	Feb. 10, 1920
Nov. 15, 1940	John M. Blackhall	Nov. 14, 1957
Nov. 15, 1918	Helmuth G. Brunnquell	June 3, 1958
May 25, 1923	Harilaus E. Economidy	Apr. 13, 1948
Nov. 20, 1924	John Froberg	Oct. 11, 1949
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. 20, 1924	Leslie LeVant Hall	Mar. 8, 1931
Oct. 31, 1917	Edward T. Jackson	May 8, 1939
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, 1945
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
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 14, 1958

	Fellows	Associates	Total
Membership, November 22, 1957	185	145	330
Additions:			
By Election	1	...	1
By Reinstatement	...	...	...
By Examination	9	14	23
	195	159	354
Deductions:			
By Death	5	1	6
By Withdrawal	...	...	...
By Transfer from Associate to Fellow	...	8	8
	190	150	340

CONSTITUTION

(As Amended November 17, 1950)

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 one negative vote, become enrolled as an Associate of the Society, provided that he shall pass such examination as the Council may prescribe. Such examination may be waived in the case of a candidate who for a period of not less than two years has been in responsible charge of the Statistical or Actuarial Department of an insurance organization (other than life insurance) or has had such other practical experience in insurance (other than life insurance) as, in the opinion of the Council, renders him qualified for Associateship.

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 Fellow unless recommended by a duly called meeting of 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 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.

BY-LAWS

(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.

RULES REGARDING EXAMINATIONS FOR ADMISSION TO THE CASUALTY ACTUARIAL SOCIETY

1. Dates of Examination.

Examinations will be held on two successive days during the second or third week of the month of May each year in such cities as will be convenient for three or more candidates. 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. No applications will be considered unless received before the first day of March preceding the dates of examination. Applications should definitely state for what parts the candidate will appear.

3. Associateship and Fellowship Examinations.

The examination for Associateship consists of four parts, each of which has two sections. A candidate may now write any or all sections covering Parts I and II and will receive credit for any section passed. This arrangement is restricted to Associateship Parts I and II.

A candidate may present himself for part or all of the Fellowship examinations either if he has previously passed the Associateship examinations or if he concurrently presents himself for and submits papers for all unpassed parts of the Associateship examination. Subject to the foregoing requirements, the candidate will be given credit for any part or parts of either examination which he may pass.

4. Fees.

The examination fee is $2.50 for a section subject to a minimum of $5.00. Examination fees are payable to the order of the Society and must be received by the Secretary-Treasurer before the first day of March preceding the dates of examination.

5. Credit for Examination Parts under Former Syllabus.

The new Syllabus of examinations effective in 1955 represents a considerable rearrangement of study materials. In order to simplify the process of transition and assure maximum equity among candidates, the following procedure has been established:

A candidate who has passed, or been credited with, one or more parts of the Associateship or Fellowship examinations under the Syllabus effective in 1948 and/or the Syllabus effective in 1953 will receive credit for the corresponding parts of the new Syllabus in accordance with the following table:

Parts Passed or Credited Under Old Syllabus (Effective in 1948 and/or 1953)	*Parts Credited Under New Syllabus (Effective in 1955)*
Associateship, Part I	Associateship, Part I (a) and II (b)
" " II	" " III
" " III	" " I (b) and II (a)
" " IV	" " IV
Fellowship, Part I	Fellowship, Part IV
" " II	" " II (a) and III (a)
" " III	" " I (a) and III (b)
" " IV	" " I (b) and II (b)

Partial examinations will be given to those candidates requiring them in accordance with the foregoing credits.

6. Waiver of Examinations for Fellowship:

The examinations for Fellowship will be waived under Article III of the Constitution in part or in whole for those candidates who meet the qualifications and requirements set forth below.

1. WAIVER OF FELLOWSHIP PARTS III AND IV

(a) The candidate shall present himself in the same year for Fellowship Parts I and II, or shall have previously passed Parts I and II.

(b) The candidate shall present an original thesis on an approved subject relating to insurance (other than life insurance). Such thesis must show evidence of ability for original research and the solution of advanced insurance problems comparable with that required to pass Fellowship Parts III and IV. The thesis shall be of a character which would qualify it for printing in the *Proceedings*.

(c) Candidates electing this alternative should communicate with the Secretary-Treasurer and obtain through him approval of the Committee on Papers of the subject of the thesis and also of the thesis. In communicating with the Secretary-Treasurer, the candidate should state, in addition to the subject of the thesis, the main divisions of the subject and the general method of treatment, the approximate number of words and the approximate proportion to be devoted to data of an historical nature. All theses shall be in the hands of the Secretary-Treasurer before the examinations are held in May of the year in which they are to be considered. No examination fee will be required in connection with the presentation of a thesis.

2. FULL WAIVER

(a) The candidate shall have completed twenty years as an Associate member of this Society.

(b) The candidate shall present an original thesis on an approved subject relating to insurance (other than life insurance). The thesis shall be of a character which would qualify it for printing in the *Proceedings*.

(c) Candidates electing this alternative should communicate with the Secretary-Treasurer and obtain through him approval by the Com-

mittee on Papers of the subject of the thesis and also of the thesis. No examination fee will be required in connection with the presentation of a thesis.

7. Waiver of Examinations for Associateship.

The examinations for Associateship will be waived under Article III of the Constitution in part or in whole for those candidates who meet the qualifications and requirements set forth below.

1. PARTIAL WAIVER

Associateship Part I will be waived for a candidate who has passed Parts 1, 2 and 3 of the examinations of the Society of Actuaries.

2. FULL WAIVER

(a) The candidate shall be at least thirty-five years of age.

(b) The candidate shall have at least ten years' experience in actuarial or statistical work in insurance (other than life insurance) or in a phase of such insurance which requires a working knowledge of actuarial or statistical procedure or in the teaching of the principles of insurance (other than life insurance) in colleges or universities.

(c) For the two years preceding date of application, the candidate shall have been in responsible charge of the actuarial or statistical department of an insurance organization (other than a life insurance organization) or shall have occupied an executive position in connection with the phase of insurance (other than life insurance) in which he is engaged, or, if engaged in teaching, shall have attained the status of a professor.

(d) The candidate shall have submitted a thesis approved by the Committee on Papers. Such thesis must show evidence of analytical ability and knowledge of insurance (other than life insurance) sufficient to justify waiver of examinations.

(e) Refer to Paragraph 1 (c) of Rule 6 for details of submission.

LIBRARY

All students 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 107 William St., New York 38, New York and are under the supervision of Mr. Harry S. Weeks.

Registered students may have access to the library by receiving from the Society's Secretary-Treasurer the necessary credentials. Books 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
107 William St.
New York 38, New York

INDEX TO PROCEEDINGS

The fourth index will be found in Volume XL of the *Proceedings*.

SYLLABUS OF EXAMINATIONS

(Effective with 1955 Examinations)

ASSOCIATESHIP

Part	*Section*	*Subject*
I	(a)	Statistics.
	(b)	Probability.
II	(a)	Elementary Life Insurance Mathematics.
	(b)	General Principles of Insurance; Insurance Economics and Investments.
III	(a)	Insurance Law; Supervision, Regulation and Taxation of Insurance.
	(b)	Social Insurance.
IV	(a)	Policy Forms and Underwriting Practice.
	(b)	General Principles of Rate-making; Credibility.

FELLOWSHIP

I	(a)	Determination of Premium, Loss and Expense Reserves.
	(b)	Insurance Expense Analysis and Accounting.
II	(a)	Individual Risk Rating.
	(b)	Advanced Problems in Underwriting and Administration.
III	(a)	Machine Methods.
	(b)	Advanced Problems in Insurance Statistics.
IV	(a)	Advanced Problems in Rate-making.
	(b)	Current Insurance Problems.

15TH INTERNATIONAL CONGRESS OF ACTUARIES, NEW YORK

15th October, 1957

Inaugural and other meetings of ASTIN

The Council of the Permanent Committee having approved the change of rules permitting the formation of sections of the Committee for the study of specialized subjects, and the various National Associations having approved the rules prepared by the committee of ASTIN elected at the Madrid Congress, a meeting was held in Rooms B and C at 2:30 p.m. on Wednesday, 16th October for the formal establishment of the ASTIN section and also for the submission of various papers. 46 persons were present at the meeting.

Mr. N. E. Masterson, Vice-President of the Honorary Congress Committee and President of the Casualty Actuarial Society, opened the Council meeting and invited Sir George Maddex, as the member of Council of the Permanent Committee appointed to the Committee of ASTIN, to take the chair for the inauguration proceedings. The business was as follows:

a. Report of the ASTIN Provisional Committee presented by Mr. E. Franckx.

b. Adoption of the proposed rules and constitution for ASTIN as a section of the Permanent Committee.

c. Dissolution of the Provisional Committee appointed in Madrid, (Messrs. Beard, Franckx, Johansen and Monic).

d. Appointment of a Committee (Sir George Maddex, Messrs. Beard (London), Franckx (Brussels), Johansen (Copenhagen), Monic (London), Perryman (New York), Philipson (Stockholm)).

The formal business being concluded, the following four papers were presented on the status of actuarial applications to non-life insurance in various countries:

By Mr. L. Wilhelmsen (Oslo)	"Actuarial activity in general insurance in the northern countries of Europe."
Mr. P. Depoid (Paris)	"Travaux Scientifiques de Langue Francaise Concernant l'Assurance des Risques non Viagers."

Mr. B de Finetti (Rome)	"L'etude mathematique des assurances non viageres dans l'Europe continentale occidentale."
Mr. L. H. Longley-Cook (Philadelphia)	"The Casualty Actuarial Society and actuarial studies in Development of non-life insurance in North America" (read in his absence by Mr. F. S. Perryman).

After a short discussion the meeting closed at 4:45 p.m.

At an ASTIN committee meeting held after the inaugural meeting the following were elected as the Officers of the first ASTIN committee:

Chairman	Mr. P. Johansen
Vice-Chairman	Mr. F. S. Perryman
Editor	Mr. E. Franckx
Treasurer	Mr. B. Monic
Secretary	Mr. R. E. Beard

An informal discussion meeting of ASTIN was held at 2:30 p.m. in Room E on Thursday, 17th October, when the newly appointed Officers were introduced to the members present and details relating to the future working of ASTIN were discussed. 29 persons were present.

Mr. Philipson opened a discussion on certain aspects of the papers presented to the Congress under subject IV-A.

The meeting closed at 4:30 p.m.

INTERNATIONAL CONGRESSES OF ACTUARIES

Adapted from "1958 Year Book" of Society 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. According to the revised regu-

lations adopted by the New York Congress in 1957, the objects of the Permanent Committee are:

1. To promote or conduct work and research of interest in 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.

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 for an effective interchange of ideas on an international basis.

It has as its object the promotion of actuarial research in general insurance and will establish contact between actuaries, groups of actuaries, and other suitably qualified persons interested in this field.

This section will, from time to time, publish papers on topics related to its objects and will also publish a bulletin containing notes of general interest to members. Conferences will be held about every three years.

The XVth International Congress was held in New York in 1957. Present plans call for the XVIth Congress to be held in Brussels in 1960.

With these purposes in mind the Permanent Committee wishes to enlist members as broadly as possible. Membership in the Permanent Committee and in the ASTIN Section is open to members

of the Casualty Actuarial Society. The annual dues for membership are 100 Belgian francs for the Permanent Committee and an additional 200 Belgian francs for the ASTIN Section. It is necessary at present for members to pay $2.50 for the Permanent Committee and an additional $5.00 for the ASTIN Section in order that dues may be met and to provide a small margin for the expenses of collection and transmission of funds as well as to meet small miscellaneous expenses.

Inquiries regarding membership in the Permanent Committee and in the ASTIN Section should be directed to Albert Z. Skelding, Secretary-Treasurer, Casualty Actuarial Society, 200 East 42nd Street, New York 17, N. Y.