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"Anyone who can at all catch the drift of experience—moral no less than physical—must feel that mechanism rules the whole world."

George Santayana

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PROCEEDINGS

May 26-27, 1952

THE PASSING SHOW

PRESIDENTIAL ADDRESS BY THOMAS O. CARLSON

After the battle of the quotations at our last meeting, I feel that you should be spared the shock of listening to an address from me without the inclusion of at least one or two more by way of tapering off.

This is in no sense of the word a sermon, but at the outset I wish to commend to you these words from Ecclesiastes as expressive of the aim of the actuary: "I applied mine heart to know, and to search, and to seek out wisdom, and the reason of things." Anyone who can say that has fulfilled his obligations to his profession and to himself. As a group we could ask for no more lofty an inscription to memorialize our role.

The label that I have put upon these remarks implies a detachment from the current situation that is less and less possible for the actuary as time goes on. Only a few years ago actuaries were looked upon even by many of their own executive superiors as the insurance counterpart of the ivory-tower dweller. Perhaps our acceptance as fellow humans stems in part from the fact that our verses clearly do not meet ivory-tower specifications. But the blame historically must rest, I fear, upon the widespread introduction of rate regulation with its requirement that insurance people must seek out and be prepared at all times to present "the reason of things" in their sphere of activity.

It may be observed that a pattern is being repeated. The early papers that are already referred to as classics in our literature were produced under the stress of regulatory requirements in the workmen's compensation field. If as an actuary you are in the habit of looking upon regulatory developments with a bilious expression, relax your facial muscles a bit with the thought that except for such developments, your field of work and opportunity would not have broadened as it has in recent years. This is one more application of the saw that whenever history repeats itself the cost goes up. For every actuary ten years ago, there is work for twenty today.

I am casting reflections upon nobody when I refer to the intervening stretch as a period of doldrums, the characteristics of which were dictated largely by an environmental atmosphere of expediency and a long recession from the crest of actuarial activity that marked the early days of this Society. In emerging from this period we may well ask ourselves, as did that greatest of mountaineers, Leigh-Mallory, on scaling a particularly difficult peak: "Have we vanquished an enemy?" And we must reply with him: "None but ourselves." Admitting by way of gambit that actuaries are under executive supervision and subject to executive interdiction, it is nevertheless true that in many

respects we have been our own worst enemies. How? you will ask. Primarily by not being sufficiently articulate. To a lesser extent by not having sufficient courage in our convictions to press them persistently. We must strive to be both firm and articulate in expression, which means that we must also be firm and articulate in comprehension. We have been too inclined to see ourselves as the underwriters love to picture us. If that weakness ever overtakes you again, think of these definitions of actuary and underwriter adapted from old definitions of optimist and pessimist: An actuary is one who recognizes that the future contains only uncertainty in the final analysis, while an underwriter is one who fears that the actuary is always correct.

Our responsibilities at the present time exceed any that have ever been laid upon us as a group in the past. The outlook in all third party lines is very ominous. I am reminded of the phrase with which Gerard Manley Hopkins begins one of his sonnets: "No worst, there is none." That is, there is only a continuous worsening, no such ultimate as worst is at this stage discernible. The problem of analysis, the mere fact finding in this instance, is a task of extreme complexity because the relationship between the inflationary spiral and the movement of loss costs is in reality the result of an interweaving of many chain reaction developments in the price field. The time lag and the degree of the impact of these various chain reactions in the spiral differ greatly. It is possible to measure the results only in an aggregate form. The relationship from year to year in the aggregate form is not constant, nor is the time lag. The only resort in such a contingency is projection on the basis of insurance data, utilizing the general relationship between insurance costs and external price movements only as a support for the principle of projection. If the actuary had the bargaining power of a John L. Lewis, the task would be simple indeed because the necessities are clear. Supervisory authorities, however, are more and more inclined, especially when reviewing a rate increase, to outdo in cautiousness the dude visitor to Texas who was buying a saddle and was asked whether he wanted one with a horn or one without a horn. After careful consideration, he answered hesitantly, "Well, I guess I could do without a horn. There doesn't seem to be much traffic on these prairies."

In this emergency then, the role of the actuary in seeking out the reason of things is highlighted. It is not enough for him to establish the facts as best he can; he must establish the reason for those facts developing as they do. This will involve far more than mathematical analysis. It will involve an understanding of underwriting developments and problems, of the interplay of external economic factors, of legislative and juristic developments. All of these fields, incidentally, are embraced in the scope of the Fellowship examinations of this Society and this brief appraisal of our current problems may clarify for the student why we require of him preparation in so broad a field of study.

We are living in an era of social and economic turmoil, of deep-rooted evolution tantamount to revolution in living and in thinking. Change is in the air: not the normal progressive change that stimulates like a charge of ozone, but rather a force that builds up like the electric potential on a towering mountain summit, foreboding with its continuous muted sizzling, and terrifying in the random destruction of its explosive releases. The most amazing

anomaly of our economic history is the meekness with which the American people are accepting the encroachment of bureaucratic controls that flirt dangerously with dictatorship over broad areas of business management, without apparent regard to the informed counsel of experience. There is a line in the Book of Proverbs that says: "In the multitude of counselors there is safety." If such a quotation sounds platitudinous, remember—as a friend reminded me recently—that the wisdom of the ages is wrapped up in such platitudes. One of the weaknesses of this era of technicalities, complexities and continuous innovation is its abhorrence of the commonplace, its disdain of the obvious.

These are generalities with widespread application. You can all supply countless illustrations from our national and political scene and I shall mention one or two from the insurance field. Before doing so, in order to illustrate the ramifications of this trend of rejecting the recommendations of committees and agencies appointed ostensibly to advise, let me note an instance in an area which is comparatively restricted and which is in no sense of the word a vital factor in the structure of our economic society, namely, organized baseball. (I trust there are no Dodger fans with six-shooters in the audience.) The government in investigating the baseball salary controversy called in a special committee composed of Messrs. Kieran, Cobb and Byrd, but in the solution produced in Washington the findings of that special committee were utterly ignored.

The pattern is one of mere lip service to consultation with experts. I do not argue here that consultation involves abdication to the arguments of such experts but rather that if their viewpoint is rejected, then good and sufficient reasons for the rejection should be forthcoming. Anything that smacks of specious reasoning in such a situation should be indicated as such in plain terms.

Now for one or two illustrations from the insurance area. In giving these I am fully aware that there may be those within this body who consider me guilty of heresy in discussing a controversial subject in my capacity as an officer of this Society. On the other hand there are so many currents of thought today, and such strong currents, that it is impossible to speak of any situation in the insurance business without being to a certain extent controversial. With this apologetic explanation let me proceed to my object lessons.

Back in 1947 state supervisory officials spearheaded a movement toward the adoption of uniform accounting regulations, a movement with which none of us will quarrel in principle. In the initial discussion stage, members of the industry repeatedly made the point that the background of experience of individuals within the industry should be utilized from the outset, the more so since the impact of the regulations would be borne by the carriers and would affect the internal administration of the carriers markedly. Such tenders of cooperation were ignored and the industry was permitted to criticize only a finished product, with all the psychological and other difficulties normally attendant on such a procedure. A perfectionism in objective that could not have been possible for anyone experienced in company accounting and administrative problems led to the rejection of amendments that simple common sense cried out for. I will mention one illustration here, the differentiation of inspection cost, which is an extremely important item for some of the casualty lines. The argument against such differentiation was twofold: in the first place

inspection cost could not be differentiated by all carriers for all lines, and in the second place it could not be differentiated in any event because each time an underwriter looks at an inspection report he performs inspection work which must be assigned to the inspection item if inspection is to be differentiated at all. The only compromise then possible was the acceptance of a statement propagandizing the fact that the commissioners' uniform accounting committee were of the opinion that inspection costs could not be properly differentiated, thereby casting a stigma upon the production of information which was an indispensable adjunct to the rating of certain casualty lines.

Let me hasten to add that many of these difficulties are now ancient history, that a closer harmony has been established, and that time has smoothed out many problems. What I wish to emphasize is the sinister characteristic of the manner in which this development was forced upon the industry. The fact remains that, initially, regulations relating to the internal administration of the companies and running counter to the recommendations of all individuals with experience in the field were imposed arbitrarily upon the companies. And recent developments demonstrate the necessity of maintaining alertness in this respect.

Another illustration may be drawn from the proposal presently before the commissioners to include provision for unallocated claim expense in the rates as a percentage of losses rather than as a percentage of the final premium. The result to the insuring public is the same under either alternative. The proposal follows the principle developed and endorsed by the members of an All-Industry Committee. The separation between unallocated claim expense and the other elements of the premium dollar will be maintained equally under either alternative so that no case can be made to the effect that the carriers are attempting to pull the wool over anybody's eyes. Yet certain insurance departments in important states undertake to say that one of these paths to the answer must be used and that the other path cannot be used in the mechanical process of rate determination. This is not a case of state authorities regulating rates, but rather a case of state regulation usurping administrative functioning in the ratemaking field. The implications of the action are alarming.

These illustrations could be multiplied, and in selecting these two particular ones I do not wish to imply that they are more important than others that could have been used.

Nor are these statements to be considered in the nature of an accusation. They are merely observations. No one is questioning the good faith of the supervisory officials in their actions. But somewhere along the line there is confusion in thinking, a blurring of perspective, a short-sightedness in their absorption with the many problems which present themselves continuously to every supervisory authority. All of us, both in the industry and in supervisory circles, have been so overwhelmed with the pressure of immediate problems in recent years that we have become immersed in them. It has been next to impossible to stand off so as to view them in perspective. It is evident in the national scene that the philosophy of bureaucratic supremacy is currently in the saddle in this country. Let us not forget that that is the very process that has enveloped those countries behind the Iron Curtain to the point of strangulation—though under very different auspices than here. It is inevitable that the local governmental authorities should be infected with

this broad movement of the times. Only last week a well-known official called upon the carriers publicly to back legislation to turn over more tax money to insurance departments for the extension of regulatory controls. The real tragedy, however, lies in the apathy of those affected by such developments. It is not as though they consented to or agreed with such interference in the administrative functioning of private enterprise. We in the industry have been too conciliatory. While recognizing the trend in the national political and economic scheme, the average individual has been too conscious of a feeling of frustration in attempting to combat it, because he is so many degrees removed from the point of contact. We in the industry have not been sufficiently aware that the condition conducive to frustration does not apply in the situation to which I am talking, because our contact with this situation is immediate rather than several steps removed.

How many are there who realize the measurable cost of conciliation in the determination of rate levels, which is only a fraction of the total cost including the immeasurables? The carriers in ratemaking organizations have had manual rate levels for the automobile liability coverage effective in 1948, 1949 and 1950 that had been depressed 3% solely as a result of compromises or of unwarranted delays in action on filings, and the corresponding figure in 1951 was 2%. Most of the independent carriers follow the lead of the organized carriers in determining rate levels. If it be assumed that these percentages apply reasonably to the total writings of all carriers combined, the deficiency in the premium arising out of this source alone in the development of the 1951 revisions amounts to more than $30,000,000 a year.

Let me repeat that these remarks are not intended as an indictment of anyone. The industry must certainly share the blame, because the industry has not done the best possible job in emphasizing the facts and in presenting its case. Further, it must be admitted that much of the deficiency to which I have referred arises out of agreements of expediency. While such agreements may be immediately beneficial, they can easily deteriorate into a pattern that can be extremely costly to the carriers. There must be a limit somewhere to compromises based upon expediency.

I remember seeing a performance of Aida at the old Hippodrome in which the triumphal procession was prolonged probably fifteen minutes by parading the same two elephants and three horses down the center of the stage, off at the front right, and around behind the scenery to come down the center of the stage again time after time. The passing show we are viewing today has no such element of repetition. There is a shift of orientation occurring. This country is at the crossroads. Perhaps it has already been pushed unawares beyond the crossroads along a route which in theory we as a nation profess to abhor. Too few people are assuming the courage and the foresight to attempt to comprehend what is happening. I chose that word "assuming" carefully, to indicate the necessity of action in becoming alert. It is not a matter of intuition. We cannot remain passive, and hope to comprehend. The actuary has an obligation to grasp these developments and to be articulate and courageous in his interpretation of them relative to his own task. The private enterprise system has succeeded in making American industry the incomparable marvel of the modern world. The abrasion, the gradual wearing down, of this system, whether consciously or unconsciously motivated, is threatening in

the insurance field as certainly as it is threatening in other major industrial areas. If we believe in the maintenance of the system, we must clarify our vision, be alert to the dangers that threaten, speak out with conviction and understanding; and to succeed in these undertakings, we must have always before us the objective of seeking wisdom and the reason of things.

DISCUSSIONS OF PAPERS READ AT THE NOVEMBER 1951 MEETING

PROBLEMS OF FIRE INSURANCE RATE MAKING—L. H. LONGLEY-COOK

A CASUALTY MAN LOOKS AT FIRE INSURANCE RATE MAKING—M. H. MCCONNELL

Volume XXXVIII, Pages 94 and 103

WRITTEN DISCUSSION BY FRED DOREMUS

You have graciously invited me to comment on the two papers recently prepared on the subject of Fire Insurance Rate Making.

I have carefully reviewed "Problems of Fire Insurance Rate Making" by Mr. L. H. Longley-Cook and "A Casualty Man Looks at Fire Insurance Rate Making" by Mr. M. H. McConnell.

Both papers are stimulating to one familiar with the rating background and current problems confronting the fire insurance rate makers. Each author sets forth on known highways, yet detours on occasional by-paths that need further exploration. Each paper reflects the thoughtful preparation of men schooled in the tenets of the Society. Some suggested faults in the system are outlined. Some comparisons are drawn. Some general suggestions are made.

Each is a worthy contribution to the first "Chapter" now that the Society has added the broad subject of Fire Insurance Rate Making to its studies.

Rather than attempt a specific review of either or both papers, the thought was expressed that your membership would be more interested in some general comments looking towards the expansion of the whole subject. The challenge of generalization might inspire the preparation of additional papers, each dealing with a separate facet of this broad field.

In approaching the problem from the standpoint of the Society and its contribution to the thinking on the subject, it might be said that—

1. Fire Insurance Rating does not inspire mathematical precision because the element of judgment is too deeply rooted in the structure;
2. We deal with fixed property risks;
3. We insure owners; therefore the indemnity is direct and not to third parties involved in questions of negligence;
4. We are considering the peril of Fire, however caused.*

The historical background of Fire Insurance Rate Making revolves around the use of judgment. This single factor remains potent today, even though technical schedules were adopted many years ago for the determination of rate levels by measuring hazards. Judgment still prevails in setting debits for deficiencies and credits for proficiencies in the various types of rating schedules used throughout the country. Any attempt to measure the actuarial precision of these credits and debits would involve a cost of statistical preparation that would far outweigh any benefit derived. Therefore, Fire Insurance Rate Making cannot be made an exact science. No two risks are exactly the same

* Even though the fire insurance policy can be extended by endorsement to include many additional perils, some overlapping the field of Casualty insurance, each such extension or combinations thereof is worthy of separate research and study without confusing them with the rating of the basic fire peril.

in every degree of occupancy protection, construction, exposure and location.

Furthermore, while the fire insurance underwriter may use rate as a criterion in determining the acceptability of a risk, he is more interested in obtaining an average amount upon many risks of the same grouping but spread over a large geographical area. The principles of average and spread have always worked for the fire underwriters in their attempts to obtain an underwriting profit.

Another deterrent to actuarial precision in Fire Insurance Rate Making is the physical impossibility of acquiring statistical data as to amounts of liability exposed to loss; therefore, no burning rate can be established. Even if such data were available, it is submitted that the determination of the burning rate by class of occupancy, protection, construction and exposure would lead us down an actuarial pathway involving such a degree of mathematical accuracy that by the time the calculations had been made they would be useless for the guidance of rate makers.

A few decades have elapsed since text writers prepared objective treatment of present day Fire Insurance Rate Making methods.

None has developed the subject since the passage of "all industry" type of rate making legislation. Neither has anyone explored the facets of fire rate making as related to Multiple Line Operations.

The field of actuarial study leavened by practical aspects of the problems involved is wide open.

Messrs. Longley-Cook and McConnell are to be complimented upon their realistic treatment of the subject matter and under the guidance of the Society we can look forward to others, who will develop the many facets of Fire Insurance Rate Making in the same thoughtful and constructively critical manner.

WRITTEN DISCUSSION BY H. D. RICE

The distinction accorded me by election to Fellowship in your Society is very much appreciated, especially because of the opportunity afforded for participation in your studies and discussions. Today we specifically propose to discuss the two papers on fire insurance rating recently presented to you by Mr. Longley-Cook and Mr. McConnell. I have been very much impressed by these two papers expressing as they do the informed viewpoint of casualty men on our fire insurance rating practices. Your understandings and interpretations of our operations are becoming increasingly important under the current trend to multiple line underwriting, multiple peril policies, package coverages and the other innovations that are confronting us. Our community of interest is broadening and so it seems particularly important that we understand each other so that through coordination of the different phases of the insurance business our service to the public may be improved and increased.

As I reviewed the two papers that are the subject of today's discussion, I noted that neither one of them deals with the first fundamentals of rate making in the fire business, but rather with the treatment of the finished product and it might be helpful if I sketch for you some of the operations that take place before a rate can be quoted. First let me say that our Organization, which is one of the larger rating organizations because of the volume of written premiums in the State of New York, employs approximately 465 people dis-

tributed among six offices and spends approximately $2,000,000 a year of our companies' money. Aside from the function of calculating and promulgating rates, we also review policies written by agencies throughout our territory to make sure that they are written at the correct rate and premium and that the forms and clauses which express the coverage anticipated are in proper conformity with our adopted and filed rules.

We handle through our stamping offices somewhere around 4,000,000 daily reports and endorsements each year. New York City, which does not have a stamping office, but rather depends on a form of spot check for its verification of rates, premiums and forms, would produce an additional 2,000,000 daily reports if and when 100 per cent stamping is undertaken. It seems probable that some day such a stamping operation will be given consideration, although it presents some engineering problems that are not present in the upstate area. Our examination of daily reports and endorsements is made while these papers are in transit between the writing agency and the home office and because in most instances the company has had no notice of liability, we have a limit of forty-eight hours from the date of receipt within which we should dispose of all daily reports and endorsements.

Approximately 5 per cent of these units presented to us for examination are criticized because of incorrect rates, premiums or form details. It is probable that a preponderant majority of these criticisms are due to simple errors in writing the policy or its renewals. Our statute requires that such criticisms as remain uncorrected after a period of 60 days from the advices to the companies of such criticisms, must be reported to the Insurance Department. My recollection is that during the past twelve months it has not been necessary to report more than ten or twelve such cases to the Department and I feel that that evidences pretty complete compliance with our rates and rules.

Fire insurance rates in New York are predicated on physical data on the risk being rated which is gathered by actual inspection of those risks subject to specific rating. The data used include such information as to the detailed construction of the building, its walls, roof, roof covering, floors, floor openings and exposures; also such occupancy details as the description of the occupant, their finished products, raw materials, processes used, equipment used, the inherent hazard of such processes or materials and the degree or quality of protection afforded against the inherent hazards of the processes or materials. This information is collected by inspectors who then report at length on the risk being rated so that a rate can be calculated from a comparison of the inspector's report with the standards set up in our various schedules. The resultant rates are then printed on cards and distributed to the writing offices whose normal territory includes the risk in question.

Another phase of our activity in connection with the making of specific rates involves a service to the insuring public through the use of our facilities to make it possible for them to anticipate the features of rate charge and credit in connection with new buildings contemplated or in the course of construction. All of our several offices are busy almost continuously with architectural engineers who have plans or designs for new structures or detailed features of buildings or detailed plans for the construction of building and contents perhaps through the application of automatic sprinklers, and our services are

given freely so that the public may know in advance how their structures can be so built as to achieve the minimum cost of fire insurance.

There are a number of classes of risks, individual members of which present so many physical features and characteristics in common that they may reasonably and economically be rated by classes with broad subdivisions based on construction and protection distinctions. Such risks do not warrant specific rating or promulgation, and writing offices refer to class rate tables for the proper rate, and describe the risk in the policy so that checking is possible in the stamping office. Among the classes so rated are dwellings, gasoline service stations and summer hotels. Obviously the periodic adjustment of class rates is convenient and economical as it requires only the reprinting of manual pages instead of specific rate cards. After a building has been erected and such protective features as automatic sprinklers recognized in rate, periodical reinspections are necessary to insure that the protective devices are being properly maintained. Frequent reinspections also have to be made to bring rating data up to date in respect to occupancy changes which are constantly going on particularly in our larger cities.

New York Statute requirements and, for that matter those of most other states, stipulate that rates must not be excessive, inadequate or unfairly discriminatory. The implication is clear that some means must be available for the testing of rate levels to see that they meet these qualifications. Mr. McConnell's paper deals in detail with a specific test of rate levels. I believe he has very well covered what appears to be a rather intricate procedure, but surely not one beyond the understanding of the members of this Society who are so close to rate making in the other lines of insurance. I would like to make the observation, however, that fire insurance differs from the casualty lines, first, because of its relatively low loss frequency and, second, because of other characteristics of the business such as the preponderance of policies running for three or five year terms and the fact that frequently one company may have a multiplicity of policies on the same risk due to varying expiration dates or due to interim increases in values. So we frequently end up with a considerable number of policies written by different companies and different production offices on the same risk.

Right here I would like to say that one of our greatest problems in fire rating lies in the efforts of some well meaning folks who try to demonstrate that fire insurance rating is an exact science. Nothing could be further from the truth, and no branch of the business requires more experienced common sense and informed judgment than fire insurance rating. It also has been said that we do not demonstrate a proper relativity between physical elements in the rate structure. As a matter of fact we do not know what a proper relativity means in this connection. If you try to classify rate elements through their contribution to loss, it is obviously impossible to state as to a specific loss just what the contribution of physical elements has been. The presence of an open stairway or elevator or combustible finish may and frequently does contribute materially to loss, but the extent of such contribution or its relation to other features that may have contributed is indeterminable because after a loss most of the evidence as to the source and much of the evidence as to its progress has been destroyed. All of the scientific exactitude that might be possible could be applied to a given building only perhaps to discover, when it finally

burned, that the loss had been due to some other risk up the street that suffered a fire through some of its inherent hazards, and by the medium of a wind driven fire brand or direct exposure destroyed the risk upon which we had attempted to apply an exact rating science.

There is another characteristic of fire insurance rating that furnishes complications and that lies in the consistent consideration given existing rate levels when a change is in contemplation. It is within my personal recollection, and perhaps at some time I may have contributed to judgment rates, through the medium of a committee which walked down one side of the street and suggested in reference to the corner drug store or grocery store across the street $.75 or $1.50 depending upon the impression the risk made on our personal convictions. It is amazing how some of those old levels have stayed with us, particularly because there is a great and normal reluctance to disturb them any more than is absolutely necessary, and this, of course, means that you never get the full benefit of new items without some dilution because of the respect in which existing levels are held.

Reference has been made by Mr. Doremus to the figures collected by the National Board as a Statistical Agency for the New York Department and which we review from year to year to see what the loss experience has been. The method described by Mr. McConnell in his paper is employed in New York State and produces modifications in class and sub-class levels which are given careful study cooperatively by our Organization and the Insurance Department. I might add at this point that up to this time we have been dealing with a twenty-six class system which means with its subdivisions about 104 groups of risks. Under the new system of classification which became effective January 1, 1947, we have 115 classes or something more than 500 groups of risks whose figures will require careful analysis. Under the old classification system, a great majority of the class and subclass indications in New York State were incredible because of inadequate volume and while our efforts to make such appropriate changes in rate level as were indicated by the experience have been fairly reasonable, some curious results have been produced which indicate the fallacy of direct application of experience to rate. May I refer to the historic case of *unprotected* golf or sport clubs which seemed to merit a rate credit of approximately 20 per cent, whereas the *protected* risks of the same class did not appear to deserve such recognition. Rates produced by the application of this credit resulted in a situation where the extension of community protection limits to include the golf club resulted in an increase in rate because as an unprotected golf club it had been entitled to a recognition of its superior experience. I do not regard this kind of a silly situation as anything more than a normal result of the direct application of experience to rate, but in order to avoid it we have to put into our rate structure gimmicks of one kind or another to act as limits so that the protected risk will not rate any higher than it would if it were unprotected and the brick risk will not rate any more than if it were frame. These are artificial and temporary remedies and mainly serve to avoid complications which would confound our statistics. It might be appropriate to say at this point that perhaps this Society is in a position to make an important contribution to the science of fire rate making if the attention of your members or perhaps of our younger men could be focused on such problems as research in the field of credibility and the char-

acteristics of loss frequency as well as some of the other intangible factors with which you seem to be familiar, but which from a rating viewpoint are relatively new to our procedures.

I would like to make the further observation that reasonable stability in rate levels has characterized fire insurance over many years and is still a desirable and important feature of fire insurance rates. The relativities expressed by schedule applications and class rate tables are also the basic fundamentals of underwriting, and so underlie the principles of retention and liability distribution in company practice. Unless the companies are willing to have these principles in a constant state of flux, the frequent modification of rate levels by classes and subclasses to reflect current experience should be avoided or minimized. It is also recognized that from the insured's viewpoint, reasonable stability in fire insurance costs is desirable under contracts written for a term of years.

I have found Mr. Longley-Cook's paper unusually stimulating in the presentation of suggestions and ideas, some of which I must confess I cannot personally accept, but which surely merit careful and thoughtful study and consideration. This type of thinking and discussion is extremely valuable and helpful to the industry.

I hope that we can interest some of our younger men in the possibilities in the activities of your Society. I would like to see the examination which you may prepare as qualification for admission so framed as to direct their thinking to some of these fundamentals which have not as yet had adequate exploration. The development and presentation of more papers of the type under consideration today by your own members will, through their discussion stimulate thinking and help in the development of sound and equitable rating practices that can be kept in tune with modern developments. May I express again my appreciation of your courtesy and hospitality to those of us from the fire end of the business. I hope that it will be possible for us to participate actively with you in the future activities of your Society.

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PROCEEDINGS

November 21, 1952

NEW TEMPOS IN TECHNIQUES

PRESIDENTIAL ADDRESS BY THOMAS O. CARLSON

Everyone who read in the newspapers on that fateful Tuesday morning about the fate of Hiroshima sensed that that atomic explosion marked the inception of a new era in world history, a major division of historic time. Never has the emotional impact of an abrupt world-shaking incident been so great. It was a sober and a somber day indeed. Many people were immediately inspired to think of the peace-time industrial potentialities in the harnessing of atomic power. Before the week was out the phrase "atomic age" was on every tongue. The international insecurity and ideological warfare of the post-war period have postponed or at least minimized the anticipated constructive applications of this new source of energy, restricting them essentially to medical and research fields. Only this week, the H-bomb reports have reminded us that major attention is still focused upon destructive rather than constructive potentialities. For the time being the atomic age is a political rather than an economic division.

But history is marked by eras within eras. And we have more unobtrusively been entering upon a new industrial era, the basis of which is far more closely associated with our work in the insurance business. The technical developments that were so telescoped in time by the exigencies of World War II highlighted another field of invention, the benefits of which have already become fairly commonplace in our lives, and these developments have launched us into one of those eras within an era. I speak, of course, of electronics, and of what might well be called the "electronics age".

Most of you have by this time attended meetings, exhibits or demonstrations relating to the applications of these new developments to the performance of business machines. They did not burst upon the world overnight, as did the bomb. Many of the underlying scientific principles have been known and applied for years. For example, the flip-flop characteristic of vacuum tubes used in counting has been known since 1919. We have been hearing for a long time about the fantastic brain machines that outdid the combined mathematical efforts of scores of professorial geniuses in the solving of differential equations and other problems in higher mathematics. But these were laboratory giants, each a unique engineering project; and only within the past couple of years have any offspring of these intellectual behemoths been offered on the market for business use.

When I first witnessed the accomplishments of the parent machines I had

the feeling of sharing in the discovery of a new world, like the men of Cortez who, on their first sight of the Pacific Ocean, "Looked at each other with a wild surmise, Silent, upon a peak in Darien."

The expansion of our insurance industry that has taken place in the past twenty or thirty years might well not have been possible without the availability of mechanical equipment for handling punched cards in accounting and statistical work, equipment that is now taken for granted. Certainly procedures would have been far more cumbersome and costly and many of the analyses which we now have at our fingertips would not have been possible at all in their present refinement.

The introduction of punched card accounting procedures was a revolutionary development. It is probable, however, that the introduction of procedures involving the new electronic equipment now coming or soon to come on the market will constitute an equally revolutionary development. While a few individuals in the industry have been maintaining contact with this area of machine development for some time, the industry as a whole has taken little interest in the potentialities involved until quite recently. This inertia was merely an indication of the caution characteristic of good business sense in waiting to be shown. We are now being shown. This is no place for me to try to amaze anyone by reciting speeds of operations or listing in detail the accomplishments of these machines. Their advantage lies first in the greatly increased speed of the various processes they perform and secondly in the fact that instructions for a long series of operations may be read into a machine and those operations will thereupon be performed without the necessity of further human interference. Consequently, an entire series of operations within the capacity of a machine can currently be performed as rapidly as a single operation. Most of you have within the past year or year-and-a-half seen for yourselves, and our eyes are already as large as they can get. We are now conditioned to accept any new marvels as matter-of-factly as Alice accepted her adventures in Wonderland. I was told only this week by a manufacturer that work has progressed far on an adjunctive device to facilitate the now time-consuming job of programming, that is, of preparing the detailed instructions the computer is to follow. That seems to be an invasion of the precinct of the human brain to an unprecedented degree, but with all that has happened to date we sit back calmly waiting to be shown.

I think it is unfortunate that so much emphasis has been laid upon the phenomenal speeds of operation and so little emphasis upon the comparative slowness of the preparation of data for processing and of the input and output, that is, the feeding of data and instructions into the machines for their mechanical manipulation, and the recording of the results. At the present time the speed of processing work through the machines has little relation to the speed of the mechanical operations of addition, subtraction, multiplication, division and comparison performed, but rather is primarily controlled by the input and output speeds. On the giant installations, once the information is on tape, the input is satisfactory, and high speed printers are being developed for the output. On smaller units using punched cards for input and output, the disparity in speeds is still acute.

Ingenuity under the impact of competition being what it is in this land, we

can be certain that this retarding of the preemptive rush of electronic equipment will be only temporary. Science has already solved many of the basic technical problems. But there are also problems of manufacturing and marketing cost, of adaptation to a wide enough market to bring costs within reason, of adaptation through optional gadgetry to meet the specific requirements of smaller areas of business endeavor, and the continued maximum utilization conjunctively of the millions of dollars worth of equipment already in the field. The greatest gap seems to be in the area of machines for recording and preparing the raw data for processing. But even in this area, the scientific hurdles have been cleared and what remains are problems of design, adaptation and marketing.

We hear of other machines which are already in the experimental model stage. We hear of new types of units, the theory underlying which is not yet fully understood, that may soon replace the now familiar electronic tubes with resulting economy of cost and space and elimination of a serious heating difficulty. The papers only this week carried extensive articles on tests of these units in various equipment. We are having hurled at us a new vocabulary to master if we are to listen intelligently to salesmen and demonstrators: diodes, triodes, transistors, binary system, et cetera, et cetera, et cetera, as Lady Anna's King of Siam would say. We breathe the ozone of shared discovery, of pioneering. We stand upon a peak in Darien.

Lest this reaction sound rhapsodic, let me quote from a highly esteemed friend in the life actuarial field and a member of this Society, Henry Jackson, who wrote: "An actuary—may be defined as a practical Utopian, and if the word *Utopian* has come into disrepute as being a sort of synonym for *visionary*, it is well to remember the ancient admonition, 'Where there is no vision, the people perish.' "

These developments should constitute a challenge, and a fascinating challenge, to us as actuaries. We are on the threshold of a new era in accounting procedures and it is up to us to grow with the developments of that era. There is no segment of our economic structure that should have a greater use for such equipment than the insurance industry. Various industry committees have already been organized and some of them have taken long strides in exploration of the areas thus opened to research. It has been suggested to me that this Society might well establish a committee on electronics. Consideration of that suggestion will be one of the first items on the agenda of the new Council. The Society of Actuaries established such a committee four years ago, and the proceedings of their recent meeting in the Commodore Hotel constitutes the best introduction to an understanding of the potentialities of these new machines that has yet appeared. It may be decided that since there are a number of committees involving members of our organization that are already functioning in this field, it is sufficiently well covered to obviate the necessity of such a committee in this body. Regardless of what the decision may be, however, no member of this Society will be living up to his responsibilities professionally if he does not familiarize himself with these developments as they come along and study them so as to know how best to avail himself of the potentialities they open.

We have at hand a new tool, phenomenal in its accomplishments. Let it be

emphasized, however, that neither now nor in the future can any machine be developed which will have the adaptability or the flexibility of the human brain or which can replace the judgment functioning of man.

An incident occurred recently which strongly emphasizes this point. On the evening of Tuesday, November 4, a television broadcast was made which I consider as having significance for our actuarial profession, although perhaps few of you looked upon it in that light. An electronic computer was set in operation to produce predictions of the outcome of the presidential race as the returns from the various states were reported periodically throughout the evening. While the work of that computer is now commonplace in scientific circles, this was perhaps the first time that millions of people witnessed its operation in a field that they could understand and appreciate.

In the minds of most watchers, the debut may have seemed a fiasco. No one who knows the proper limitations of the machine will agree with that conclusion, but in any event the incident produced object lessons which are pertinent to our actuarial work. In order to emphasize these, let me review briefly the story of that evening, a review which I admit is on a hearsay basis but which I have checked rather carefully with several who listened in and with newspaper reports.

The corresponding periodic reports of election returns for the two preceding elections were read into the machine in advance and the machine was called upon to compare and project the results as they came in this year. Its initial prediction, produced at an early hour, came within four electoral votes of the ultimate result. But the scientists directing the machine could not believe such a landslide prediction and refused to put it on the air. They changed the directions and produced for broadcast a prediction of a close race. Unfortunately this modification was made public at about the time that expert news commentators in the studio had concluded that a landslide really was on the way. So once again the directors modified the instructions so that the machine came up with a prediction more in line with the views of everyone throughout the country who was listening to the returns. This was followed by a demonstration of its predictive efforts in a single state, the result being prediction of a Democratic victory in that state that was contradicted only a few minutes later when the Democratic Chairman in the state conceded victory to the Republicans. It is my understanding that that concluded the performance.

At first blush, the average observer might conclude that this confusion in its first major public performance discredited the machine. The impression of many TV watchers would probably coincide with that of a friend of mine who said "I prefer the news commentator who has fewer tubes to go wrong." My ferry-boat colleagues on the following morning were somewhat ribald in their comments and observed that insurance executives should be hard to convince of the efficacy of electronic computers after such a performance. I let them have their fun and then made the point that the incident demonstrated only that the popular term "mechanical brain" is an utter misnomer, and that no machine knows more than the minds directing it. All that the machine can do is to perform the mathematical operations of addition, subtraction, multiplication, division and comparison, with phenomenal speed, but as directed by a human.

You may be asking yourselves what bearing this has upon our actuarial work. The use of the machine on election night involved a predictive effort analogous to our predictive efforts as ratemakers. The prediction resulted from mathematical operations performed by the machine but the story of the evening signifies that the direction of those operations was very human indeed. The initial result was so startling and unbelievable that it was rejected by the brains behind the operation. Do I need to draw attention to specific analogies in our ratemaking developments? After some experimentation the directors of the machine readjusted their formulas so as to produce approximately the same results that had already been produced by the judgment of individuals watching the returns as they became known.

Actuaries should in fact derive great comfort from this demonstration, particularly in view of the pressure from supervisory officials and others to develop more mechanical or automatic and presumably more nearly infallible procedures for the prediction of insurance experience trends.

Consider in greater detail the analogy between election predictions and insurance experience predictions. The pollsters who make a profession of predicting elections amass a great amount of detailed information right up to the day of election. Actuaries in the ratemaking field on the other hand have to deal with statistics developed through a period that terminates some months prior to the period for which they are attempting to predict. Yet despite the difficulties introduced by this time lag element in our work, which is a serious handicap, are there any among us who do not derive encouragement from a comparison of the results of our actuarial efforts with the predictions of election pollsters in past national elections on the basis of their much more up-to-date information?

Coming back to the machine for a moment, there are a number of points to be noted. The final successful results of the machine's predictive efforts were based upon what could be termed as on-the-spot formularization of human judgment. Ratemaking procedures are similarly based upon formularization of human judgment. Further, the machine was unable of itself to recognize or reflect such peculiarities as the situation in those states where the early returns came from rural areas instead of cities while in past elections the early returns came from cities instead of rural areas. Similarly, in ratemaking, exceptions have to be made to reflect developments which would modify our conclusions based upon past experience. Even in that line of insurance in which ratemaking procedures have been crystallized to the greatest degree, workmen's compensation, the so-called "permanent" formulas of two decades ago proved to be little more permanent than sand dunes, shifting of necessity before the changing winds of varying economic factors and situations in successive years.

In our field of insurance, where contracts are customarily for short terms because the costs under those contracts are highly susceptible to the impact of changing economic conditions, such a need for flexibility is not only normal but completely reasonable. If we permit ourselves in these lines to become entangled in the folds of rigid formulas, they will inevitably strangle us. The natural inclination of the individuals who have the responsibility of reviewing our rate submissions is to attempt to mold them into a form which will make

that review as simple an operation as possible. While such a tendency is desirable to a degree, if carried to extremes it cannot produce proper results. I have many times quoted from Emerson in this connection: "A foolish consistency is the hobgoblin of little minds."

We have in our membership representatives from all viewpoints in the insurance business, companies, rating organizations, consulting firms and supervisory authorities. Regardless of affiliation, we should all be alert to this danger and keep our sights fixed upon the goal of equitable rates that properly reflect all of the factors contributing to costs that we feel can be reflected. The regulatory laws in most of the states were carefully drafted to make this goal attainable. While dissatisfaction has been expressed in many quarters with regard to certain aspects of these laws, this one aspect which seeks equity in the results should never be fundamentally disturbed.

It should not be forgotten that the realization of this goal depends also upon maintaining vigilance against any trend from regulation to direction under our regulatory laws. Both supervisory representatives and industry representatives should be equally vigilant in this regard if they are true to their responsibilities. The influence of developments in our federal government has percolated inevitably to state levels. Although the November 4 results are widely interpreted as a personal victory for President-elect Eisenhower, perhaps they will also be interpreted to give encouragement to those who believe that governmental regulation should remain regulation and not become direction of business affairs.

The final lesson for us to draw from the appearance of the electronic calculator on TV is its demonstration of the phenomenal speeds now possible in computation processes and the implication that it is only a short time before we shall have these potentialities harnessed for application in our everyday business.

But the important demonstration of the evening was that no machine can predict except upon the basis of formulas which have been devised by a human brain and is subject to error to the extent that the human brain directing it is subject to error. So much has been written about machines becoming masters of mankind that this incident is salutary in its emphasis to the contrary.

As the complexities of our social and economic structure increase, so will the scope of the actuarial field increase. The student who takes our examinations today is convinced that he has to know considerably more than the student who took the examinations twenty-five years ago. Far be it from me to disabuse him of this impression, and the student twenty-five years from today will have to be familiar with fields of knowledge in this economic sector which perhaps are as yet unconceived. If that prediction is true, its realization will depend upon refinements in analysis which will be made possible only by the extent to which actuaries will become the masters of these amazing new tools for research and analysis.

THE EXPENSE STUDY BY SIZE OF RISK

BY

M. H. MCCONNELL

Over the years, accurate determination of the loss portion of casualty insurance rates has claimed more of the attention of rate makers than accurate determination of the expense portion. In general, it has been deemed sufficient to determine the loss portion of the rate as accurately as possible and then to increase it by a flat percentage for expenses, such percentage being sufficient to cover the expenses of each line in the aggregate.

The First modification of this principle came with the introduction of Expense Constants. Then more recently the principle of graduated Expense Loadings for large premiums, mostly Workmen's Compensation, was introduced through the medium of premium discounts. These same expense graduations were built into the Standard Retrospective Rating Plans. These modifications, though generally accepted as logical, were based, for the most part, on judgment.

The desirability of more scientific treatment of the expense portion of casualty insurance premiums was called to the attention of this Society in consecutive presidential addresses by Mr. Perryman in November of 1940 and Mr. Pinney in May of 1941.

Both speakers expected such an analysis would be brought about by the forces of competition and by the necessity of justifying insurance charges, including the expense portion, to supervisory authorities and the public. Both felt that competition would be the more compelling force. Mr. Perryman summarized his remarks on the effect of competition as follows:

> "Competition makes its effects felt in casualty insurance in the same way as in any other field: if the price is too high the business goes elsewhere. If a carrier—or a group of carriers—erect a schedule of rates where the level is too high, say on account of too great an expense loading, competitors quoting rates at a more reasonable level will attract most of the business and the schedule of too high rates will have to be revised downwards if the users of it are to stay in business. This, however, is not the only or even the most common case: if the schedule of rates is not constructed on proper scientific lines as regards either the loss or the expense elements, the charges for some kinds of risks, may be those of some classifications, or those in some territories, or those of some sizes, will be too high, and others will be too low. Competitors will seize on the inequalities and will set out to write at lower, but yet profitable, levels, those risks for which the rates are too high. The first carrier will be left 'holding the bag' in the shape of the other risks at inadequate premiums."

But that was before Public Law 15. Actually it was the desire of the National Association of Insurance Commissioners to obtain information upon which to support the graduation in rates of expense provisions by size of risk that brought about the first comprehensive review of expenses by the industry.

Late in 1949 all companies writing annually more than $25,000,000. of Workmen's Compensation, General Liability and Automobile premiums combined were requested by the National Association of Insurance Commissioners to make an analysis of their expenses by size of risk to be submitted to the National Association of Insurance Commissioners. All but a few of the companies complied with this request.

The possibility of such an analysis of expenses by the companies had already been investigated by the New York Insurance Department in 1948. The investigation by the New York Insurance Department was an extensive investigation of the Workmen's Compensation operations of four companies, two stock and two mutual companies. All the field work was conducted by accountants on the staff of the New York Insurance Department under the supervision of Mr. Arthur L. Bailey, Chief Casualty Actuary of the New York Insurance Department.

Before beginning this investigation all of the accountants participating in the work took a course of study in the fundamentals of Workmen's Compensation insurance including rate-making, underwriting, engineering, claim, and audit practices.

The investigation required 513 man days in company offices plus 143 man days in the offices of the New York Insurance Department compiling and analyzing the data developed.

It was not the purpose of the New York Department's investigation to determine actual expense allocations. Its purpose was to determine whether an allocation of salaries by size and type of risk could be made and the problems inherent in such allocation.

This subject had been receiving the attention of the National Association of Insurance Commissioners even before 1948. The history of all the developments leading up to the Expense Study by Size of Risk was summarized by the Special Committee to meet with the Committee of the NAIC in its report to the Workmen's Compensation Committee of the NAIC dated November 21, 1950 as follows:—

"At the December 1946 session of the NAIC there was presented the report of the Actuarial Committee of the National Council on Compensation Insurance regarding the possibility of undertaking a study of the expenses by size of risk. * * * * * * At that session * * * * * * representatives of the Industry appeared before the Workmen's Compensation Committee and urged that a special committee of departmental experts be appointed at an early date to work with an industry committee to devise a call for a detailed breakdown of expense experience by size of risk.

"Following this session the National Council, in accordance with the action of its Actuarial Committee anticipating that a study would be undertaken and there might be some delay in the appointment of the suggested committee of departmental experts, issued a call to its members requesting a reporting of compensation expenses by size of risk as respects general administration expenses and payroll audit for calendar year 1946. * * * * *

"At the June 1947 session of the NAIC, the Chairman of the Workmen's Compensation Committee announced the appointment of the following to study with the industry the question of expenses by size of risk. * * * * *

California—C. C. Lloyd	Pennsylvania—George B. Elliott
Florida—Thomas Shands	Texas—Paul Benbrook
New York—Joseph F. Collins	Virginia—George A. Peery
James Higgins	Wisconsin—Lloyd Yaudes

"Accordingly, when the results of the call for size of risk expense data, authorized by the Actuarial Committee, became available they were presented to the Commissioner's Subcommittee and were reviewed at a number of joint meetings of the Subcommittee and the Actuarial Committee. The Subcommittee rendered a report on this item to the Workmen's Compensation Committee at the December 1947 session. * * * * *
"This report was adopted by the Workmen's Compensation Committee with the Statement.

* * * * *

> 'The Committee accepts the preliminary report of the Workmen's Compensation Special Subcommittee which contains valuable information on graduation of expenses by size of risk but is not complete because of the lack of essential statistical data. The Workmen's Compensation Committee has accorded the Special Subcommittee the necessary time to complete its study in time for a final report at the June meeting of the Association. The Special Workmen's Compensation Subcommittee was authorized to continue the study along the lines recommended in their report and to take advantage of the generous offer of the New York Insurance Department to furnish the personnel for field studies to be made in accordance with the program to be established by the Special Subcommittee.'

"At the June 1948 session of the NAIC, the Subcommittee reported that the procedure and details for conducting the field studies, authorized at the December 1947 session, had been perfected and the program was well under way. However, 'the complexity of the problem and the length of time required for the making of the field studies has made it impossible for us to meet this request' (i.e. in time for a final report to be made at the June 1948 session.***** The Workmen's Compensation Committee accepted this report with the understanding that the studies would be continued with the objective of making a report to the Workmen's Compensation Committee at the December 1948 Session.* * * * *)

"The report of the Subcommittee, rendered at the December 1948 session, expressed the opinion that the field studies had shown that there is a downward graduation of the ratios of total expense to premium as the size of the risk's premium increases, despite the fact that no such graduation exists for certain items of expense and despite a definite upward graduation for a few items of expense. Also, the actual graduations of expense ratios are nearer to those in the 1943 program than to flat expense provisions with no graduation by size of risk. However, the actual degree of graduation of workmen's com-

pensation expense ratios is not known and steps should be initiated immediately which will make available more complete factual data as to the extent of the graduation for the various types or groups of companies as soon as possible. The Subcommittee, therefore, recommended that a procedure setting forth minimum requirements for the analysis of expenses by size of risk, when such analyses are made on a sampling basis, be drafted for submission to the NAIC at the June 1949 meeting by a Committee of the NAIC after a review of proposals by the industry. It was also recommended among other items, that the procedure encompass other lines of business as well as workmen's compensation insurance as may be directed by the NAIC or appropriate Committees thereof.* * * * * *

"Later the report of the Subcommittee was amended to clarify some of the original phraseology and the amended report was accepted and approved by the Workmen's Compensation Committee.* * * * *

"In accordance with the foregoing, a Committee of the Industry was appointed by the Association of Casualty and Surety Companies, the Mutual Insurance Advisory Association and the National Council on Compensation Insurance. The Committee appointed consists of

American Mutual Liability Insurance Co.	Maryland Casualty Company
Hardware Mutual Casualty Company	National Surety Corporation
Liberty Mutual Insurance Company	Royal Indemnity Company
(Amer.) Lumbermens Mut. Cas. Co. of Ill.	Travelers Insurance Company

"Prior to the June 1949 session of the NAIC the Industry Committee submitted a report outlining procedures for obtaining actual analysis of expenses by size of risk.***** This report was reviewed at a joint meeting of the Commissioner's Subcommittee and the Industry Committee.

"In the subsequent report to the Workmen's Compensation Committee, the Subcommittee recommended a few changes in the details of the procedure outlined by the Industry Committee and further recommended:

> "3. Since the industry committee has gone to considerable effort to produce expeditiously a realistic procedure for obtaining expenses by size of risk, the sub-committee urges that the N.A.I.C. approve, at its June 1949 meeting, the report of the Industry Committee on Graduation of Expenses by Size of Risk and the 'Minimum Requirements to Obtain Actual Analyses of Expenses by Size of Risk' as amended by 1 and 2 above, in order that the companies and rating organizations involved may proceed immediately thereafter to initiate such analyses of expenses by size of risk.
>
> 4. It is recommended that those independent carriers and rating organizations now employing expense graduation by size of risk, as well as those contemplating the adoption of such graduation, initiate studies at the earliest possible date covering 'representative' groups of their carriers which are, for calendar year 1949, subject to the requirements of the uniform accounting regulations; that the expenses used as the basis for this analysis, with the necessary studies being made in the latter part of 1949 and early part of 1950, in order that

these studies may be completed by the fall of 1950. In this connection, it is suggested that such rating organizations report to the N.A.I.C at its 1949 meeting what steps they have taken in initiating such studies, and that they plan to present to the N.A.I.C. at its December 1950 meeting summaries of the results completed by that time.

5. It is suggested that this Special Sub-Committee make itself available to the industry or any group of companies within the industry during the summer and fall of 1949 to discuss with them the adequacy of the 'representative' groups of carriers for which studies are contemplated."

* * * * *

"Following the June 1949 session the Industry Committee reported to the Commissioner's Subcommittee that twenty carriers had agreed to undertake the study of expenses by size of risk in accordance with the program previously adopted.

"In the report of the Industry Committee, it was noted 'an analysis of expenses by size of risk is known to be a very substantial undertaking, involving not only thousands of dollars of direct cost but also unmeasurable indirect costs incidental to the deployment of key personnel away from their regular jobs and the interruptions of production departments. In response to a directive from the supervisory officials, the above representative carriers are willing to assume the burden of these studies for the entire Industry with the understanding that such studies will not need to be repeated for a substantial period of time.'

"The report of the Subcommittee to the Workmen's Compensation Committee at the December 1949 session contains the following:

> 'It is the recommendation of your Sub-Committee: (1) That you commend these carriers for their action, and (2) that you assure the rating organization involved that in your opinion such representation is considered adequate for the study of expenses by size of risk and that it would be an unreasonable burden for such studies to be required to be repeated except after an interval of time of such length that conditions may reasonably be assumed to have changed materially.'"

This was the situation existing at the time the companies were ready to begin their investigation of expenses by size of risk. How is it possible to make proper allocation of expenses? It "cannot be made from theoretical considerations or by taking thought, even enormous quantities of thought: No, a great amount of investigation has to be undertaken" said Mr. Perryman in his address.

A great amount of investigation did indeed have to be undertaken. The study was a cooperative effort by thirteen stock companies and five mutual companies, two of the original twenty companies having found it impossible to complete the study. It was a comprehensive study requiring detailed analysis of a multitude of operations in many different departments, both in the home offices and the branch offices. Because of the magnitude of the task

it required almost a year to complete the study which was brought to a conclusion in the Fall of 1950.

There were actually two separate studies. One conducted by the stock companies and one conducted by the mutual companies. This arrangement permitted companies, with similar methods of operation to work together and provided the benefits of two independent investigations.

In this paper I shall describe the procedure followed by the stock company group, as this is the procedure with which I am familiar. Quite likely, however, the mutual company study was similar to the stock company study in its general outlines.

To develop a logical and systematic procedure for the analysis of expenses by size of risk, the stock company group set up a special forum under the auspices of the Association of Casualty and Surety Companies which became known as the "Technical Forum to Study Expense by Size of Risk." This forum held regular meetings throughout the investigation under the chairmanship of Mr. Frank Lang, Manager of the Research Department of the Association of Casualty and Surety Companies. As each phase of the study was completed, results were compared at these meetings and plans were mapped out for proceeding with the next step of the investigation. These meetings were very helpful to the members who, for the most part, were sailing in uncharted seas.

The broad outlines of the study were laid down by the Industry Committee on Graduation of Expenses by Size of Risk in its report of April 26, 1949 to the National Association of Insurance Commissioners. This report was practically required reading for anyone taking part in the study.

It recommended that the expenses to be analyzed should first be allocated in accordance with uniform accounting requirements. It recommended that the analysis be made on the basis of expenses paid rather than expenses incurred. It recommended that commissions and investment expenses be excluded from the study. It recommended the inclusion of other lines of insurance in addition to Workmen's Compensation. All of these recommendations were followed by the companies taking part in the study.

The report also suggested certain techniques and methods to be employed in analyzing expenses. The report was constantly referred to every step of the way. Because of its importance, the report of the Industry Committee has been included in full in the Appendix.

The expenses analyzed were. Inspection Board and Bureau, Payroll Audit, Loss Adjustment, Other General, and Other Acquisition, including field supervision and collection. Each of these categories of expense was subjected to separate analysis.

The lines of insurance investigated were: Workmen's Compensation, General Liability and Automobile Bodily Injury and Property Damage Liability. The size intervals used in the investigation were those recommended for Workmen's Compensation by the Industry Committee as follows.

0	to	$49.
50.	to	99.
100.	to	499.
500.	to	999.
1,000.	to	4,999.
5,000.	to	9,999.
10,000.	to	24,999.
25,000.	to	99,999.
100,000.	and	over

The same size groups were used for Automobile and General Liability except that the first size group was subdivided into 0 to $19. and $20. to $49. for General Liability. This subdivision for General Liability was due to the great number of minimum premium risks which would fall in the 0 to $19. group. It was considered desirable to segregate this group.

As suggested by the Industry Committee, the expenses for these lines of insurance were first allocated in accordance with the requirements of uniform accounting regulations and then allocated according to size of premium. To do this, the companies relied mainly upon two methods of analysis, namely time studies and item counts of various sorts. These methods were supplemented by discussions with the employees performing the operations and their supervisors.

In general the operations susceptible to analysis by time studies were.

Underwriting
Policywriting
Audit
Engineering

The operations analyzed by item counts of various sorts were:

Statistical
Accounting
Filing

In a few instances expenses were apportioned according to premium volume where this seemed to be appropriate. Other expenses were apportioned according to the number of policies. The bulk of the expenses, however, were apportioned in accordance with time studies and item counts or combinations of these two methods.

To illustrate the program of a typical company, let us consider our company's program.

First, we determined the volume of premium and number of policies for each of the premium intervals. For Workmen's Compensation this was accomplished by a tabulation of all our unit report cards for policy year 1947. The results of this tabulation were then projected to the level of Calendar Year 1949. For Automobile, an actual record of our current business for a four week period was kept. This distribution was then projected to the level of Calendar Year 1949. A similar procedure was followed for General Liability except that we used a six week sample period. For all three lines a hand check for all

policies in excess of $5,000. was made to make sure that all such policies were included.

Next, Home Office time studies were begun in the underwriting, policy-writing, and audit departments and in some sections of the statistical department.

Simultaneously item counts were made in other sections of the statistical department and in our central filing department. These item counts were carefully thought out to provide an accurate basis for measuring the amount of work per policy for the various premium sizes. It was here that each company had to exercise its judgment in devising plans which would provide a satisfactory basis of analysis, keeping in mind its own peculiar methods of operation.

A simple example of such an item count was the item count used by our company as the basis of the distribution of salaries in the Unit Report Section of our Statistical Department. Obviously large policies will, on the average, require more unit report cards than small ones. We therefore determined, by actual count, the average number of unit report cards for all our policies producing premiums over $100,000. The average number of unit report cards per policy for each of the other premium sizes was then determined by sampling. These averages were multiplied by the number of policies in each size group to determine the distribution of unit report cards according to premium size. Salaries in the Unit Report Section were allocated in proportion to this distribution.

Another company in studying its Records Department made an activity distribution based on the number of withdrawals by size of risk from a sample analysis and the time of the employees in the department was distributed accordingly.

Next, visits were made to selected branch offices which were considered typical. Small as well as large branch offices were visited. During these visits general meetings of the office force were held, at which time the methods for making the time study were explained to the employees. Although these branch office time studies could have been conducted concurrently with the home office time studies, they were not begun until some experience with these studies had been gained in the home office.

At about the same time special time study sheets were sent out from the Home office to field auditors and engineers with specific instructions for keeping these records.

Finally, the results of all these studies were assembled and analyzed.

This final step is illustrated by the following chart which shows the procedure followed by our Company in allocating the salary portion of Other General Expense for Workmen's Compensation.

WORKMEN'S COMPENSATION—OTHER GENERAL EXPENSE

SALARIES

Size Group	*1* %	*2* %	*3* %	*4* %	*5* %	*6* %	*7* %	*8* %	*9* %	*Total* %	*Basis of Allocation*
Accts. Collection	27.6	18.0	27.6	13.7	11.3	0.6	0.7	0.3	0.2	100.0	Item Count
Accts. Other	4.2	4.4	16.0	12.6	28.4	5.9	5.9	4.6	18.0	100.0	Premium Volume
Agency	4.2	4.4	16.0	12.6	28.4	5.9	5.9	4.6	18.0	100.0	Premium Volume
Underwriting	13.0	10.6	13.7	12.2	17.5	3.5	2.9	3.7	22.9	100.0	Time Study
Central Files	68.1	24.9	5.0	0.9	0.7	0.1	0.1	0.1	0.1	100.0	Item Count
Files (Storage)	42.0	21.9	24.3	6.5	4.9	0.3	0.1	—	—	100.0	No. of Policies
Stenographic	13.0	10.6	13.7	12.2	17.5	3.5	2.9	3.7	22.9	100.0	Same as Undw.
Pol. Writing	21.4	11.7	23.3	7.9	22.9	3.3	0.8	2.3	6.4	100.0	Time Study
Statistical											
History	—	0.5	13.4	8.6	17.4	9.5	7.0	5.6	38.0	100.0	Time Study
Unt. Rpt.	38.4	21.0	23.1	7.0	7.5	1.0	0.9	0.4	0.7	100.0	Item Count
Code, Tab.	37.3	20.7	23.1	6.7	7.5	1.0	2.3	0.5	0.9	100.0	Item Count
Misc.	20.7	12.5	19.6	9.7	18.0	3.4	4.1	2.6	9.4	100.0	T.S. & Item Count
Cashier, Mail & Misc.	4.2	4.4	16.0	12.6	28.4	5.9	5.9	4.6	18.0	100.0	Premium Volume
Personnel Supply Systems & Exec.	OVERHEAD ON OTHERS										Overhead on Others
Total	TOTAL OF OTHERS										

The figures used in this calculation were actually the Dollar Amounts, corresponding to the percentages shown above. The amounts posted to the Total column were obtained from our Accounts Department, and had been previously allocated in accordance with Uniform Accounting Requirements. These amounts were then multiplied by the percentages shown above to allocate the salaries to the various size groups. For the bulk of salaries, these percentages were based upon Time Studies and Item Counts as shown in the final column of the Chart.

Once salaries were apportioned it was not difficult to apportion other expenses. Most expenses were allocated in the same proportion as salaries. A few, however, were not. In our Company the only exceptions were Legal, Company Audit and a few miscellaneous items, all of which were of minor importance. These items were allocated according to premium volume.

These expenses were then combined with salaries, resulting in our Company's figures for column (f) of Exhibit 1.

The final step was to express these expenses as a percentage of the premium; for each size group. This disclosed the following graduation of Other General expense:

Premium Size	*Other General Expense*
Under $50	21.0%
50 – 99	12.6
100 – 499	4.9
500 – 999	3.4
1000 – 4999	2.4
5000 – 9999	2.1
10,000 – 24,999	2.0
25,000 – 99,999	2.3
100,000 & over	2.8
Average	4.2%

Results of a single year for a single company, using limited samples cannot be considered completely reliable, especially for larger premium sizes. However, the significance of an individual company's results as an indication of the reliability of the combined results should not be overlooked. According to accepted statistical practice, the reliability of a sample may be tested by comparing results for segments of the sample with each other and with the combined results. It can be seen from the following comparison that the results for our Company were fairly consistent with the results for the thirteen stock companies combined:

Calendar Year 1949
Other General Expenses Paid
by Policy Size

Premium Size	*General Accident*	*13 Stock Cos. Combined*
Under $50	21.0%	23.8%
50 – 99	12.6	12.8
100 – 499	4.9	5.1
500 – 999	3.4	3.4
1000 – 4999	2.4	2.5
5000 – 9999	2.1	3.0
10,000 – 24,999	2.0	2.7
25,000 – 99,999	2.3	2.5
100,000 & over	2.8	2.3
Average	4.2%	4.1%

In general, the results obtained by the individual companies were fairly consistent for each type of expense analyzed, indicating reliable results for the group as a whole.

Allocations for other categories of expense were analyzed in much the same way as Other General Expense. When completed, the final results were filed with the various rating organizations for processing. The combined results for stock companies are shown in Exhibits 1 to 6. The combined results for the mutual companies are shown in Exhibits 7 to 12.

It was understood at the outset that these studies were not intended to test the overall adequacy of expense levels which can be tested in other ways. The studies were intended to test the graduation of expense loadings, other than commissions, in the rating structures.

The Workmen's Compensation program being tested was:

	Admin. & Audit	*Other Acqui.*	*Eng. & Bur.*	*Claim*
First $1000.	7.7%	7.5%	8.2%	2.6%
Next 4000.	4.1	5.0	8.2	2.6
Next 95,000.	4.1	2.5	8.2	2.6
Over 100,000.	4.1	1.0	8.2	2.6

Plus a $10.00 Expense Constant per policy whenever the policy premium is less than $500.00.

Exhibit 2 shows that a distinct graduation of expenses exists for the stock companies. The graduation demonstrated approximates the graduation in the stock company program under review.

The $10.00 Expense Constant which is part of the standard program was justified beyond all doubt. A much larger Expense Constant for premiums under $100.00 was, in fact, indicated.

A different, though definite, graduation was also demonstrated by the mutual companies. Other Acquisition was shown to decline even more sharply as the premium increased than for the stock companies. On the other hand the graduation demonstrated for Other General Expense was less pronounced than for the stock companies. For Audit and for Inspection Board and Bureau the trend revealed was not unlike the stock company trend. It appears that the difference in results for the two groups is greatest in those areas in which the two groups employ different methods of operation, namely Other Acquisition and Other General Expense. Where the two groups use similar methods of operation such as in Engineering and Audit the difference in results is not so great.

These conclusions were reported more fully by the National Council on Compensation Insurance in its report of May 16, 1951 to the Special Sub-Committee of the Workmen's Compensation Committee of the N.A.I.C. The National Council's report is a careful and detailed analysis of the results of the study. This report has been made a part of the Appendix.

The Special Sub-Committee of the Workmen's Compensation Committee of the N.A.I.C. which received the report was in substantial agreement with the conclusions of the National Council. The Sub-Committee's conclusions with respect to Workmen's Compensation were as follows.

"(1) A distinct graduation of expenses by size of risk, for both stock and non-stock carriers, has been demonstrated.

(2) Expense constants are an inescapable part of the mechanics of providing for graduation of expenses in the premium structure.

(3) For policies of less than $100 premium the experience of both stock and non-stock carriers indicates the need for an expense constant in excess of $10 as well as expense provisions in the rates in excess of those now provided. (Although many states now have a $10 expense constant, some have less than $10 and some have no constant at all.)

(4) Your Sub-Committee agrees with the Industry that, through cooperation with supervisory authorities, important operating economies can be achieved on small policies. Therefore, this approach is to be preferred to any attempt at this time to increase the expense constant beyond $10 or to increase the expense provision in the rates for such policies. In our interim report of March 15, 1951 it was suggested that your Committee may wish to make that subject a separate item on its agenda.

(5) Data of the type available cannot be expected to be such as to determine precisely the "breaking points" either at which expense constants should cease to apply or at which graduations in expense provisions should be made. Such 'breaking points' are not of great consequence if consideration is given to the overall average expense provisions produced by the combination of such breaking points and the graduations of expense provisions.

(6) Assuming that the overall expense provisions are now correct, the provisions for the large policies are excessive to the extent that the provisions for the smaller policies have been demonstrated to be inadequate.

(7) Because no data in this study is pertinent to the study of the overall expense provisions, it is believed by your Sub-Committee that data for that purpose should be prepared and analyzed for use in consideration of specific proposals as to changes in expense constants or other expense provisions."

For General Liability and Automobile graduation of expenses is recognized in stock company rates at present in only a few States. However, the study revealed a definite graduation of expenses for General Liability. With respect to Automobile, the graduation was less pronounced than for General Liability and Workmen's Compensation. Perhaps this was to be expected. The graduation demonstrated for Automobile in connection with Other General Expense and Other Acquisition was offset to a large extent by the fact that engineering and audit expenses do not occur for Automobile in connection with small premium sizes. However these results do not preclude the use of premium discounts for Automobile if they are largely a reflection of sliding scale commissions.

The original purpose of the study, to determine the graduation of expenses

according to premium size, was thus accomplished. But the study did more than that. It emphatically pointed up the Small Risk Problem.

Part of the solution to the Small Risk Problem was to press for approval of the $10.00 Expense Constant in all states. This step was taken immediately. As a direct result of the study all rate filings made by the National Council since September 1, 1951 have included a $10.00 Expense Constant to be charged whenever the policy premium is less than $500.00.

When Expense Constants were first introduced they were expected to yield 4% of the total premium, thus permitting a reduction of the expense loading from 40.0% to 37.5% including 2.5 points for taxes or 35.0% exclusive of taxes. This was years ago when the average premium was much smaller than it is today. Today, according to the premium distribution reported by the thirteen stock companies, the premium realized from a $10 Expense Constant even if applicable in all States would be only 2.5% of the total premium, requiring an expense loading of 36.0% exclusive of taxes. This becomes 38.5% when increased by the 2.5 points for profit and contingencies now a part of the standard loading.

The computation of this loading is as follows:

ADJUSTMENT OF STANDARD EXPENSE LOADING FOR $10 EXPENSE CONSTANT

Item	(1) *Values at Normal Loading*	(2) *Reduction For Expense Constant*	(3) *Revised % of Unadjusted Manual Rate* (1) − (2)	(4) *% of Revised Manual Rates* (3) ÷ .975	(5) *Expense Constant*
Acquisition	17.5%	.4375 (a)	17.0625%	17.5%	$1.75
Taxes	2.5	.0625 (a)	2.4375	2.5	.25
Profit & Conting.	2.5	.0625 (a)	2.4375	2.5	.25
Claim Adjustment	8.0	—	8.0000	8.2	—
Inspection & Bur.	2.5	—	2.5000	2.6	—
Admin. & Audit	9.5	1.9375 (b)	7.5625	7.7	7.75
TOTAL EX TAXES	42.5%	2.5%	40.0%	41.0%	$10.00

(a) Column (1) x .025
(b) 2.5 − (.4375 + .0625 + .0625) = 1.9375

Consequently, in addition to containing a $10. Expense Constant, all rate filings made by the National Council since September 1, 1951 have been based upon a loading for expenses, profit and contingencies of 38.5% plus the tax allowance. This was also a direct result of the study.

As mentioned earlier, the $10. Expense Constant seems to be seriously inadequate for premiums under $100. Rather than increase the Expense Constant for these policies, however, it was decided to attempt to reduce the cost

of handling small policies. A study of ways to achieve such economies is now being made by a committee of the National Council on Compensation Insurance. This is a problem of foremost importance which cannot be quickly solved. At present we can merely list the suggestions for reducing costs which are being considered by the National Council's Special Committee on Small Risks.

1. A simplified Small Risk Manual Supplement both with respect to rules as well as classifications. This would involve the use of a single classification per risk.
2. The introduction of a continuous policy or a three-year policy with certificate renewals.
3. No individual risk statistical reporting and no Administrative Bureau stamping of policies, except for notification of coverage and cancelation of same. (The Staff and the Actuarial Committee are currently working to develop some program in regard to the matter of statistical reporting. Also, with respect to the problem of stamping policies for small risks, further consideration is to be given to the comments received from the Bureaus, recognizing the current requirements of the State Industrial Commissions as to the use of information now in the Bureau files.)
4. Rates amended only for law level changes and for group classification experience reviews every three years. This would be entirely separate from the annual review of classification rates to be applicable to other than small risks.
5. Payroll reporting on a simplified basis. In this connection it was suggested that, possibly, social security reports could be used for this purpose.

CONCLUSION

The magnitude of this study precludes its repetition in the near future. The study was, in fact, undertaken by the companies with the understanding that it would not be repeated for some time. Nevertheless, it is probably safe to conclude that in the future more attention will be given to the expense element of rates than in the past.

It is generally agreed that the companies making this investigation have done a thorough and conscientious job and have developed useful and worthwhile information. However, the importance of this study should not be measured entirely by the statistical information obtained from it. Much of its importance lies in the fact that in making this study, cost accounting methods and techniques were employed for the first time on a wide scale in our industry. In the long run this may prove to be of more importance than the concrete results immediately obtained.

SPECIMEN EMPLOYEE'S DAILY TIME SHEET

The time sheet must be completed every day and will be collected by 9 o'clock the following morning. The amount of time in minutes spent on each piece of work is entered in the proper space. The small block is for the daily total. All time must be accounted for. For example: a ....hour day will total .... minutes. Overtime should be included.

Name			Individual Code		Date	
Code	Size of Risk	Compensation	B.I. and P.D. (Other than auto)		Automobile B.I. and P.D.	
1	0–49		0–19 / 20–49			
2	50–99					
3	100–499					
4	500–999					
5	1,000–4,999					
6	5,000–9,999					
7	10,000–24,999					
8	25,000–99,999					
9	100,000–and over					
		TOTAL		TOTAL		TOTAL
Total Assigned		Unassignable			GRAND TOTAL	

Form number

EXHIBIT 1

NATIONAL COUNCIL ON COMPENSATION INSURANCE

November 21, 1950

ANALYSIS OF EXPENSES PAID BY POLICY SIZE, CALENDAR YEAR 1949
(Excluding Commissions and Taxes)

Stock Companies—Workmen's Compensation

PART I

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
				Paid Expenses Analyzed by Size				
	Annual Premium Size	*No. of Policies*	*Direct Standard Earned Premium*	*Inspection, Boards and Bureaus*	*Payroll Audit*	*Other General*	*Other Acq. Field Sup. and Collection*	*Loss Adjustment*
(1)	Under—$ 50	206,382	5,435,637	128,020	707,498	1,295,163	1,222,367	381,217
(2)	50— 99	103,614	7,441,175	143,430	606,568	955,752	924,609	515,796
(3)	100— 499	145,865	32,327,720	592,918	1,313,969	1,662,123	1,684,765	2,218,527
(4)	500— 999	27,712	19,351,119	395,457	471,070	663,391	701,159	1,344,642
(5)	1,000— 4,999	20,608	41,496,960	824,076	639,621	1,027,891	1,176,115	2,837,173
(6)	5,000— 9,999	2,062	14,135,022	342,756	171,677	422,184	413,328	967,605
(7)	10,000—24,999	1,105	17,362,726	429,053	152,574	472,361	458,273	1,183,541
(8)	25,000—99,999	500	22,665,979	568,049	177,977	570,755	629,826	1,563,815
(9)	100,000 and Over	129	30,726,204	669,065	161,217	695,731	643,135	2,040,205
(10)	Total	507,977	190,942,542	4,092,824	4,402,171	7,765,351	7,853,577	13,052,521
(11)	Adjustment to Net Basis	—	13,241,392	—	—	—	—	—
(12)	Total, (Net)	507,977	177,701,150	4,092,824	4,402,171	7,765,351	7,853,577	13,052,521
(13)	0— 999	483,573	64,555,651	1,259,825	3,099,105	4,576,429	4,532,900	4,460,182
(14)	1,000 & Over	24,404	126,386,891	2,832,999	1,303,066	3,188,922	3,320,677	8,592,339

Companies included:

Aetna Casualty and Surety Company
Employers' Liability Assurance Corporation, Ltd.
General Accident Fire and Life Assurance Corporation, Ltd.
(Eagle Indemnity Company
(Globe Indemnity Company
(Royal Indemnity Company
Hartford Accident and Indemnity Company
Standard Accident Insurance Company
Travelers Indemnity Company
Travelers Insurance Company
United States Casualty Company
United States Fidelity and Guaranty Company
Zurich General Accident and Liability Insurance Co., Ltd.

EXHIBIT 2

NATIONAL COUNCIL ON COMPENSATION INSURANCE

November 21, 1950

ANALYSIS OF EXPENSES PAID BY POLICY SIZE, CALENDAR YEAR 1949
(Excluding Commissions and Taxes)

Stock Companies—Workmen's Compensation

PART II

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
			Paid Expenses Analyzed by Size					
	Annual Premium Size	*No. of Policies*	*Direct Standard Earned Premium*	*Inspection, Boards and Bureaus*	*Payroll Audit*	*Other General*	*Other Acq. Field Sup. and Collection*	*Loss Adjustment*
(1)	Under—$ 50	206,382	5,435,637	2.4%	13.0%	23.8%	22.5%	7.0%
(2)	50— 99	103,614	7,441,175	1.9	8.2	12.8	12.4	6.9
(3)	100— 499	145,865	32,327,720	1.8	4.1	5.1	5.2	6.9
(4)	500— 999	27,712	19,351,119	2.0	2.4	3.4	3.6	6.9
(5)	1,000— 4,999	20,608	41,496,960	2.0	1.5	2.5	2.8	6.8
(6)	5,000— 9,999	2,062	14,135,022	2.4	1.2	3.0	2.9	6.8
(7)	10,000—24,999	1,105	17,362,726	2.5	0.9	2.7	2.6	6.8
(8)	25,000—99,999	500	22,665,979	2.5	0.8	2.5	2.8	6.9
(9)	100,000 and Over	129	30,726,204	2.2	0.5	2.3	2.1	6.6
(10)	Total	507,977	190,942,542	2.1	2.3	4.1	4.1	6.8
(11)	Adjustment to Net Basis	—	13,241,392	—	—	—	—	—
(12)	Total, (Net)	507,977	177,701,150	—	—	—	—	—
(13)	0— 999	483,573	64,555,651	2.0%	4.8%	7.1%	7.0%	6.9%
(14)	1,000 and Over	24,404	126,386,891	2.2	1.0	2.5	2.6	6.8

Companies included:

Aetna Casualty and Surety Company
Employers' Liability Assurance Corporation, Ltd.
General Accident Fire and Life Assurance Corporation, Ltd.
(Eagle Indemnity Company
(Globe Indemnity Company
(Royal Indemnity Company
Hartford Accident and Indemnity Company
Standard Accident Insurance Company
Travelers Indemnity Company
Travelers Insurance Company
United States Casualty Company
United States Fidelity and Guaranty Company
Zurich General Accident and Liability Insurance Co., Ltd.

EXHIBIT 3

Association of Casualty and Surety Companies — December 6, 1950

ANALYSIS OF EXPENSES PAID BY POLICY SIZE, CALENDAR YEAR 1949
(Excluding Commissions and Taxes)
Stock Companies—Auto Liability and Property Damage
PART I

	(a) Annual Premium Size	(b) Estimated No. of Policies Written	(c) Direct Standard Earned Premium	(d) Paid Expense Analyzed By Size: Inspection, Boards and Bureaus	(e) Payroll Audit	(f) Other General	(g) Other Acq. Field Sup. and Collection	(h) Loss Adjustment
(1)	Under $ 50	3,321,114	113,534,582	597,090	92,910	5,968,555	6,902,757	10,091,871
(2)	50— 99	1,292,347	79,737,893	377,128	92,692	3,407,430	4,698,052	7,088,631
(3)	100— 499	248,996	41,712,479	367,928	311,620	1,643,422	2,320,010	3,780,494
(4)	500— 999	21,194	13,625,140	213,861	133,646	560,980	651,478	1,259,275
(5)	1,000— 4,999	13,192	24,432,790	539,224	216,027	808,182	929,620	2,278,632
(6)	5,000— 9,999	841	5,730,386	177,834	57,178	226,523	240,210	529,655
(7)	10,000—24,999	506	7,766,742	199,778	23,038	213,152	237,391	741,903
(8)	25,000—99,999	205	9,567,106	231,480	26,708	206,885	262,512	892,842
(9)	100,000 and Over	42	6,968,857	255,301	14,617	118,895	168,926	584,529
(10)	Total	4,898,437	303,075,975	2,959,624	968,436	13,154,024	16,410,956	27,247,832
(11)	Adj. to Net Basis	—	−4,901,707	—	—	—	—	—
(12)	Total, (Net)	4,898,437	298,174,268	2,959,624	968,436	13,154,024	16,410,956	27,247,832
(13)	0— 999	4,883,651	248,610,094	1,556,007	630,868	11,580,387	14,572,297	22,220,271
(14)	1,000 and Over	14,786	54,465,881	1,403,617	337,568	1,573,637	1,838,659	5,027,561

Companies Included:

Aetna Casualty and Surety Company
Employers' Liability Assurance Corporation, Ltd.
General Accident Fire and Life Assurance Corporation, Ltd.
(Eagle Indemnity Company
(Globe Indemnity Company
(Royal Indemnity Company
Hartford Accident and Indemnity Company
Standard Accident Insurance Company
Travlers' Indemnity Company
Travelers' Insurance Company
United States Casualty Company
United States Fidelity and Guaranty Company
Zurich General Accident and Liability Insurance Co., Ltd.

EXHIBIT 4

Association of Casualty and Surety Companies — December 6, 1950

ANALYSIS OF EXPENSE PAID BY POLICY SIZE, CALENDAR YEAR 1949
(Excluding Commissions and Taxes)
Stock Companies—Auto Liability and Property Damage
PART II

	(a) Annual Premium Size	(b) Estimated No. of Policies Written	(c) Direct Standard Earned Premium	(d) Ratio Paid Expenses to Direct Standard Earned Premium: Inspection, Boards and Bureaus	(e) Payroll Audit	(f) Other General	(g) Other Acq. Field Sup. and Collection	(h) Loss Adjustment
(1)	Under $ 50	3,321,114	113,534,582	.5%	.1%	5.3%	6.1%	8.9%
(2)	50— 99	1,292,347	79,737,893	.5	.1	4.3	5.9	8.9
(3)	100— 499	248,996	41,712,479	.9	.7	3.9	5.6	9.1
(4)	500— 999	21,194	13,625,140	1.6	1.0	4.1	4.8	9.2
(5)	1,000— 4,999	13,192	24,432,790	2.2	.9	3.3	3.8	9.3
(6)	5,000— 9,999	841	5,730,386	3.1	1.0	4.0	4.2	9.2
(7)	10,000—24,999	506	7,766,742	2.6	.3	2.7	3.1	9.6
(8)	25,000—99,999	205	9,567,106	2.4	.3	2.2	2.7	9.3
(9)	100,000 and Over	42	6,968,857	3.7	.2	1.7	2.4	8.4
(10)	Total	4,898,437	303,075,975	1.0	.3	4.3	5.4	9.0
(11)	Adjustment to Net Basis	—	−4,901,707	—	—	—	—	—
(12)	Total, (Net)	4,898,437	298,174,268	—	—	—	—	—
(13)	0— 999	4,883,651	248,610,094	.6	.3	4.7	5.9	8.9
(14)	1,000 and Over	14,786	54,465,881	2.6	.6	2.9	3.4	9.2

Companies Included:

Aetna Casualty and Surety Company
Employers' Liability Assurance Corporation, Ltd.
General Accident Fire and Life Assurance Corporation, Ltd.
(Eagle Indemnity Company
(Globe Indemnity Company
(Royal Indemnity Company
Hartford Accident and Indemnity Company
Standard Accident Insurance Company
Travelers' Indemnity Company
Travelers' Insurance Company
United States Casualty Company
United States Fidelity and Guaranty Company
Zurich General Accident and Liability Insurance Co., Ltd.

EXHIBIT 5

Association of Casualty and Surety Companies — December 6, 1950

ANALYSIS OF EXPENSES PAID BY POLICY SIZE, CALENDAR YEAR 1949
(Excluding Commissions and Taxes)
Stock Companies—Liability and Property Damage and Collision Other Than Auto
PART I

	(a) Annual Premium Size	(b) Estimated No. of Policies Written	(c) Direct Standard Earned Premium	(d) Paid Expenses Analyzed by Size: Inspection — Elevator	(d1) Inspection — Other than Elevator	(e) Boards and Bureaus	(f) Payroll Audit	(g) Other General	(h) Other Acq. Field Sup. and Collection	Loss Adjustment
(1)	Under $20*	868,821	10,578,305	62,584	237,299	23,514	253,240	1,321,694	1,478,553	1,086,441
(2)	20— 49*	351,846	11,568,026	117,195	363,576	25,779	315,809	888,161	1,047,742	1,181,002
(2a)	0— 49	1,411,210	25,358,659	233,426	683,734	59,472	714,147	2,829,669	3,116,912	2,681,518
(3)	50— 99	129,502	9,608,344	235,416	414,446	21,804	332,028	698,873	816,587	1,015,445
(4)	100— 499	100,736	21,507,714	546,655	712,971	49,384	589,729	967,516	1,118,299	2,300,116
(5)	500— 999	11,064	8,019,730	198,019	262,500	18,523	176,303	341,775	380,603	858,383
(6)	1,000— 4,999	6,454	13,116,368	223,559	342,655	31,206	228,096	449,869	538,134	1,449,900
(7)	5,000— 9,999	533	3,706,843	53,026	91,994	8,362	53,711	169,053	157,180	388,096
(8)	10,000—24,999	298	4,563,418	49,005	92,937	10,376	50,560	172,304	151,096	480,266
(9)	25,000—99,999	124	5,356,291	56,356	88,218	11,157	67,225	162,661	152,659	578,599
(10)	100,000 and Over	19	4,581,650	32,526	96,322	10,046	14,636	142,496	106,599	482,875
(11)	Total	1,659,940	95,819,017	1,627,988	2,785,777	220,330	2,226,435	5,934,216	6,538,069	10,235,198
(12)	Adjustment to Net Basis	—	2,612,334	—	—	—	—	—	—	—
(13)	Total, (Net)	1,659,940	93,206,683	1,627,988	2,785,777	220,330	2,226,435	5,934,216	6,538,069	10,235,198
(14)	0— 999	1,652,512	64,494,447	1,213,516	2,073,651	149,183	1,812,207	4,837,833	5,432,401	6,855,462
(15)	1,000 and Over	7,428	31,324,570	414,472	712,126	71,147	414,228	1,096,383	1,105,668	3,379,736

*Figures shown on lines (1) and (2) exclude one company which was unable to split policies whose annual premium size is under $50 in accordance with the call. Figures shown on line (2a) include this company.

Companies included:

Aetna Casualty and Surety Company
Employers' Liability Assurance Corporation, Ltd.
General Accident Fire and Life Assurance Corporation, Ltd.
(Eagle Indemnity Company
(Globe Indemnity Company
(Royal Indemnity Company
Hartford Accident and Indemnity Company
Standard Accident Insurance Company
Travelers' Indemnity Company
Travelers' Insurance Company
United States Casualty Company
United States Fidelity and Guaranty Company
Zurich General Accident and Liability Insurance Co., Ltd.

EXHIBIT 6

Association of Casualty and Surety Companies

December 6, 1950

ANALYSIS OF EXPENSES PAID BY POLICY SIZE, CALENDAR YEAR 1949
(Excluding Commissions and Taxes)
Stock Companies—Liability and Property Damage and Collision Other Than Auto
PART II

	(a) Annual Premium Size	(b) Estimated No. of Policies Written	(c) Direct Standard Earned Premium	(d) Ratio Paid Expenses to Direct Standard Earned Premium: Inspection — Elevator	Inspection — Other than Elevator	(d1) Boards and Bureaus	(e) Payroll Audit	(f) Other General	(g) Other Acq. Field Sup. and Collection	(h) Loss Adjustment
(1)	Under $20*	868,821	10,578,305	.6%	2.2%	.2%	2.4%	12.5%	14.0%	10.3%
(2)	20— 49*	351,846	11,568,026	1.0	3.1	.2	2.7	7.7	9.1	10.2
(2a)	0— 49	1,411,210	25,358,659	.9	2.7	.2	2.8	11.2	12.3	10.6
(3)	50— 99	129,502	9,608,344	2.5	4.3	.2	3.5	7.3	8.5	10.6
(4)	100— 499	100,736	21,507,714	2.5	3.3	.2	2.7	4.5	5.2	10.7
(5)	500— 999	11,064	8,019,730	2.5	3.3	.2	2.2	4.3	4.7	10.7
(6)	1,000— 4,999	6,454	13,116,368	1.7	2.6	.2	1.7	3.4	4.1	11.1
(7)	5,000— 9,999	533	3,706,843	1.4	2.5	.2	1.4	4.6	4.2	10.5
(8)	10,000—24,999	298	4,563,418	1.1	2.0	.2	1.1	3.8	3.3	10.5
(9)	25,000—99,999	124	5,356,291	1.1	1.6	.2	1.3	3.0	2.9	10.8
(10)	100,000 and Over	19	4,581,650	.7	2.1	.2	.3	3.1	2.3	10.5
(11)	Total	1,659,940	95,819,017	1.7	2.9	.2	2.3	6.2	6.8	10.7
(12)	Adjustment to Net Basis	—	2,612,334	—	—	—	—	—	—	—
(13)	Total, (Net)	1,659,940	93,206,683	—	—	—	—	—	—	—
(14)	0— 999	1,652,512	64,494,447	1.9	3.2	.2	2.8	7.5	8.4	10.6
(15)	1,000 and Over	7,428	31,324,570	1.3	2.3	.2	1.3	3.5	3.5	10.8

*Figures shown on lines (1) and (2) exclude one company which was unable to split policies whose annual premium size is under $50 in accordance with the call. Figures shown on line (2a) include this company.

Companies included:

Aetna Casualty and Surety Company
Employers' Liability Assurance Corporation, Ltd.
General Accident Fire and Life Assurance Corporation, Ltd.
(Eagle Indemnity Company
(Globe Indemnity Company
(Royal Indemnity Company
Hartford Accident and Indemnity Company
Standard Accident Insurance Company
Travelers' Indemnity Company
Travelers' Insurance Company
United States Casualty Company
United States Fidelity and Guaranty Company
Zurich General Accident and Liability Insurance Co., Ltd.

EXHIBIT 7

NATIONAL COUNCIL ON COMPENSATION INSURANCE

March 1, 1951

ANALYSIS OF EXPENSES PAID BY POLICY SIZE, CALENDAR YEAR 1949
(Excluding Commissions and Taxes)

Non-Stock Companies—Workmen's Compensation

PART III—REVISED

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
				Paid Expenses Analyzed by Size				
	Annual Premium Size	*No. of Policies*	*Direct Standard Earned Premium*	*Inspection, Boards and Bureaus*	*Payroll Audit*	*Other General*	*Other Acq. Field Sup. and Collection*	*Loss Adjustment*
(1)	Under—$ 50	34,137	960,838	36,411	153,014	104,314	303,606	53,466
(2)	50— 99	22,559	1,682,392	52,426	139,836	100,067	299,875	102,837
(3)	100— 499	56,393	14,164,700	447,479	587,652	449,304	1,422,994	872,565
(4)	500— 999	17,463	12,563,877	407,867	322,453	331,194	1,020,396	759,295
(5)	1,000— 4,999	20,133	46,301,007	1,409,651	672,643	969,701	2,948,066	2,702,323
(6)	5,000— 9,999	3,472	26,291,210	752,271	207,375	500,316	1,160,749	1,511,959
(7)	10,000—24,999	2,256	36,808,453	957,900	203,976	680,365	1,389,309	2,102,444
(8)	25,000—99,999	961	45,061,556	1,060,276	205,487	818,846	1,223,223	2,538,666
(9)	100,000 and Over	95	18,952,719	393,862	52,589	312,996	431,111	1,055,866
(10)	Total	157,469	202,786,752	5,518,143	2,545,025	4,267,103	10,199,329	11,699,421
(11)	Adjustment to Net Basis	—	−12,428,690	−28,906	+31,072	+19,660	−11,620	+2,211
(12)	Total, (Net)	157,469	190,358,062	5,489,237	2,576,097	4,286,763	10,187,709	11,701,632
(13)	0— 999	130,552	29,371,807	944,183	1,202,955	984,879	3,046,871	1,788,163
(14)	1,000 and Over	26,917	173,414,945	4,573,960	1,342,070	3,282,224	7,152,458	9,911,258

Companies included:

American Mutual Liability Insurance Company
Employers Mutual Liability Insurance Company of Wisconsin
Hardware Mutual Casualty Company
Liberty Mutual Insurance Company
(American) Lumbermens Mutual Casualty Company of Ill.

EXHIBIT 8

NATIONAL COUNCIL ON COMPENSATION INSURANCE

March 1, 1951

ANALYSIS OF EXPENSES PAID BY POLICY SIZE, CALENDAR YEAR 1949
(Excluding Commissions and Taxes)

Non-Stock Companies—Workmen's Compensation

PART IV—REVISED

	(a) Annual Premium Size	(b) No. of Policies	(c) Direct Standard Earned Premium	(d) Paid Expenses Analyzed by Size: Inspection, Boards and Bureaus	(e) Payroll Audit	(f) Other General	(g) Other Acq. Field Sup. and Collection	(h) Loss Adjustment
(1)	Under—$ 50	34,137	960,838	3.8%	15.9%	10.9%	31.6%	5.6%
(2)	50— 99	22,559	1,682,392	3.1	9.3	5.9	17.8	6.1
(3)	100— 499	56,393	14,164,700	3.2	4.1	3.2	10.0	6.2
(4)	500— 999	17,463	12,563,877	3.2	2.6	2.6	8.1	6.0
(5)	1,000— 4,999	20,133	46,301,007	3.0	1.5	2.1	6.4	5.8
(6)	5,000— 9,999	3,472	26,291,210	2.9	0.8	1.9	4.4	5.8
(7)	10,000—24,999	2,256	36,808,453	2.6	0.6	1.8	3.8	5.7
(8)	25,000—99,999	961	45,061,556	2.4	0.5	1.8	2.7	5.6
(9)	100,000 and Over	95	18,952,719	2.1	0.3	1.7	2.3	5.6
(10)	Total	157,469	202,786,752	2.7	1.3	2.1	5.0	5.8
(11)	Adjustment to New Basis	—	−12,428,690	xxx	xxx	xxx	xxx	xxx
(12)	Total, (Net)	157,469	190,358,062	xxx	xxx	xxx	xxx	xxx
(13)	0— 999	130,552	29,371,807	3.2	4.1	3.4	10.4	6.1
(14)	1,000 and Over	26,917	173,414,945	2.6	0.8	1.9	4.1	5.7

Companies included:

American Mutual Liability Insurance Company
Employers Mutual Liability Insurance Company of Wisconsin
Hardware Mutual Casualty Company
Liberty Mutual Insurance Company
(American) Lumbermens Mutual Casualty Company of Ill.

EXHIBIT 9

MUTUAL INSURANCE RATING BUREAU

March 15, 1951

ANALYSIS OF EXPENSES PAID BY POLICY SIZE, CALENDAR YEAR 1949 (Excluding Commissions and Taxes)

Exhibit B

Non-Stock Companies—Automobile Liability and Property Damage

REVISED

	(a) Annual Premium Size	(b) No. of Policies	(c) Direct Standard Earned Premium	(d) Paid Expense Analyzed By Size: Inspection, Boards and Bureaus	(e) Payroll Audit	(f) Other General	(g) Other Acq. Field Sup. and Collection	(h) Loss Adjustment
(1)	Under $ 50	924,094	35,460,992	126,019	11,511	1,365,247	4,422,546	3,442,962
(2)	50— 99	462,864	30,180,646	109,305	17,546	857,884	2,930,298	3,037,925
(3)	100— 499	94,399	15,420,834	125,855	91,170	555,616	1,421,186	1,533,481
(4)	500— 999	7,114	4,694,947	87,575	52,739	243,234	484,886	488,815
(5)	1,000— 4,999	3,723	7,230,761	191,288	38,943	313,167	662,385	783,506
(6)	5,000— 9,999	552	3,738,669	73,874	10,220	127,989	256,426	417,739
(7)	10,000—24,999	252	3,981,826	83,687	11,058	111,767	285,416	451,922
(8)	25,000—99,999	76	3,427,454	90,878	3,613	99,951	226,086	393,224
(9)	100,000 and Over	8	1,372,054	45,732	—	22,607	103,930	165,226
(10)	Total	1,493,082	105,508,183	934,213	236,800	3,697,462	10,793,159	10,714,800
(11)	Adjustment to Net Basis	—	+1,506,160	+26,803	−3,665	+117,305	+231,343	+202,472
(12)	Total, (Net)	1,493,082	107,014,343	961,016	233,135	3,814,767	11,024,502	10,917,272
(13)	0— 999	1,488,471	85,757,419	448,754	172,966	3,021,981	9,258,916	8,503,183
(14)	1,000 and Over	4,611	19,750,764	485,459	63,834	675,481	1,534,243	2,211,617

Companies included:

American Mutual Liability Insurance Company
Employers Mutual Liability Insurance Company of Wisconsin
Hardware Mutual Casualty Company
Liberty Mutual Insurance Company
(American) Lumbermens Mutual Casualty Company of Illinois

EXHIBIT 10

MUTUAL INSURANCE RATING BUREAU

March 15, 1951

Exhibit B

ANALYSIS OF EXPENSES PAID BY POLICY SIZE, CALENDAR YEAR 1949
(Excluding Commissions and Taxes)

Non-Stock Companies—Automobile Liability and Property Damage

REVISED

(a) Annua Premium Size	(b) No. of Policies	(c) Direct Standard Earned Premium	(d) Paid Expense Analyzed By Size: Inspection, Boards and Bureaus	(e) Payroll Audit	(f) Other General	(g) Other Acq. Field Sup. and Collection	(h) Loss Adjustment
(1) Under $ 50	924,094	35,460,992	0.4%	—	3.8%	12.5%	9.7%
(2) 50— 99	462,864	30,180,646	0.4	0.1%	2.8	9.7	10.1
(3) 100— 499	94,399	15,420,834	0.8	0.6	3.6	9.2	9.9
(4) 500— 999	7,114	4,694,947	1.9	1.1	5.2	10.3	10.4
(5) 1,000— 4,999	3,723	7,230,761	2.6	0.5	4.3	9.2	10.8
(6) 5,000— 9,999	552	3,738,669	2.0	0.3	3.4	6.9	11.2
(7) 10,000—24,999	252	3,981,826	2.1	0.3	2.8	7.2	11.3
(8) 25,000—99,999	76	3,427,454	2.7	0.1	2.9	6.6	11.5
(9) 100,000 and Over	8	1,372,054	3.3	—	1.6	7.6	12.0
(10) Total	1,493,082	105,508,183	0.9	0.2	3.5	10.2	10.2
(11) Adjustment to Net Basis	—	+1,506,160	xxx	xxx	xxx	xxxx	xxxx
(12) Total, (Net)	1,493,082	107,014,343	xxx	xxx	xxx	xxxx	xxxx
(13) 0— 999	1,488,471	85,757,419	0.5	0.2	3.5	10.8	9.9
(14) 1,000—Over	4,611	19,750,764	2.5	0.3	3.4	7.8	11.2

Companies included:

American Mutual Liability Insurance Company
Employers Mutual Liability Insurance Company of Wisconsin
Hardware Mutual Casualty Company
Liberty Mutual Insurance Company
(American)Lumbermens Mutual Casualty Company of Illinois

EXHIBIT 11

MUTUAL INSURANCE RATING BUREAU

March 15, 1951

ANALYSIS OF EXPENSE PAID BY POLICY SIZE, CALENDAR YEAR 1949

Exhibit C

(Excluding Commissions and Taxes)

Non-Stock Companies—Liability and Property Damage Other Than Automobile

REVISED

	(a) Annual Premium Size	(b) No. of Policies	(c) Direct Standard Earned Premium	(d) Paid Expense Analyzed By Size: Inspection, Boards and Bureaus	(e) Payroll Audit	(f) Other General	(g) Other Acq. Field Sup. and Collection	(h) Loss Adjustment
(1)	Under $ 50	186,173	3,426,360	172,141	200,283	295,062	957,977	340,318
(2)	50— 99	27,476	1,942,481	114,061	71,653	95,967	330,729	194,825
(3)	100— 499	25,454	5,272,328	287,999	239,341	223,041	686,975	545,143
(4)	500— 999	4,915	3,303,447	138,188	92,248	110,218	313,948	344,880
(5)	1,000— 4,999	3,543	6,942,655	249,888	144,863	192,781	544,316	791,869
(6)	5,000— 9,999	379	2,508,659	74,494	26,491	61,124	131,948	288,064
(7)	10,000—24,999	177	2,810,814	77,723	19,734	58,412	112,457	338,184
(8)	25,000—99,999	58	2,462,481	85,115	11,348	53,142	93,497	304,011
(9)	100,000 and Over	8	1,923,404	35,068	1,846	33,461	39,572	232,592
(10)	Total	248,183	30,592,629	1,234,677	807,807	1,123,208	3,211,419	3,379,886
(11)	Adjustment to Net Basis	—	−543,764	+13,126	−11,573	+3,373	+8,807	+4,485
(12)	Total, (Net)	248,183	30,048,865	1,247,803	796,234	1,126,581	3,220,226	3,384,371
(13)	0— 999	244,018	13,944,616	712,389	603,525	724,288	2,289,629	1,425,166
(14)	1,000 and Over	4,165	16,648,013	522,288	204,282	398,920	921,790	1,954,720

Companies included:

American Mutual Liability Insurance Company
Employers Mutual Liability Insurance Company of Wisconsin
Hardware Mutual Casualty Company
Liberty Mutual Insurance Company
(American) Lumbermens Mutual Casualty Company of Illinois

EXHIBIT 12

MUTUAL INSURANCE RATING BUREAU — March 15, 1951

ANALYSIS OF EXPENSES PAID BY POLICY SIZE, CALENDAR YEAR 1949 — Exhibit C
(Excluding Commissions and Taxes)

Non-Stock Companies—Liability and Property Damage Other Than Auomtobile

REVISED

	(a) Annual Premium Size	(b) No. of Policies	(c) Direct Standard Earned Premium	(d) Paid Expenses Analyzed By Size: Inspection, Boards and Bureaus	(e) Payroll Audit	(f) Other General	(g) Other Acq. Field Sup. and Collection	(h) Loss Adjustment
(1)	Under $ 50	186,173	3,426,361	5.0%	5.8%	8.6%	28.0%	9.9%
(2)	50— 99	27,476	1,942,481	5.9	3.7	4.9	17.0	10.0
(3)	100— 499	25,454	5,272,327	5.5	4.5	4.2	13.0	10.3
(4)	500— 999	4,915	3,303,447	4.2	2.8	3.3	9.5	10.4
(5)	1,000— 4,999	3,543	6,942,655	3.6	2.1	2.8	7.8	11.4
(6)	5,000— 9,999	379	2,508,659	3.0	1.1	2.4	5.3	11.5
(7)	10,000—24,999	177	2,810,814	2.8	0.7	2.1	4.0	12.0
(8)	25,000—99,999	58	2,462,481	3.5	0.5	2.2	3.8	12.3
(9)	100,000 and Over	8	1,923,404	1.8	0.1	1.7	2.1	12.1
(10)	Total	248,183	30,592,629	4.0	2.6	3.7	10.5	11.0
(11)	Adjustment to Net Basis	—	—543,764	xxx	xxx	xxx	xxx	xxx
(12)	Total, (Net)	248,183	30,048,865	xxx	xxx	xxx	xxx	xxx
(13)	0— 999	244,018	13,944,616	5.1	4.3	5.2	16.4	10.2
(14)	1,000 and Over	4,165	16,648,013	3.1	1.2	2.4	5.5	11.7

Companies included:

American Mutual Liability Insurance Company
Employers Mutual Liability Insurance Company of Wisconsin
Hardware Mutual Casualty Company
Liberty Mutual Insurance Company
(American) Lumbermens Mutual Casualty Company of Illinois

APRIL 26, 1949
(Revised March 6, 1950)

REPORT OF INDUSTRY COMMITTEE ON GRADUATION OF EXPENSES BY SIZE OF RISK

(Incorporating amendments recommended by Commissioner's Subcommittee at June 1949 session of NAIC)

At the December 1948 session of the NAIC a Subcommittee of the Workmen's Compensation Committee of the NAIC presented a Report which recommended in part.

"(1) A procedure setting forth minimum requirements for the analysis of expenses by size or risk, when such analyses are made on a sampling basis, be drafted for submission to the NAIC at the June 1949 meeting by a committee of the NAIC after a review of proposals by the industry. The procedures thus established should be practical and should be of such a nature that the results thereof and the steps followed would be subject to audit by Insurance Department examiners.

(2) The procedure encompass other lines of business as well as workmen's compensation insurance as may be directed by the NAIC or appropriate committees thereof.

(3) The procedure be designed to recognize characteristics of risks other than size (such as Contractors vs All Others for Workmen's Compensation Insurance) for which substantial differences in expenses might be expected.

(4) The cooperation of rating organizations and company associations be sought by the NAIC to obtain actual analyses by size of risk of the expenses of a representative group of their member companies within the year following June 1949."

In accordance with this action a Committee of the Industry was appointed by the Association of Casualty and Surety Companies, the Mutual Insurance Statistical Association and the National Council on Compensation Insurance to represent their membership. This Committee consists of:

American Mutual Liability Insurance Company
Hardware Mutual Casualty Company
Liberty Mutual Insurance Company
(Amer.) Lumbermens Mutual Cas. Co. of Ill.
Maryland Casualty Company
National Surety Corporation
Royal Indemnity Company
Travelers Insurance Company

The Committee met on February 10, March 1, March 2, March 17, March 18, and April 20, 1949 at the offices of the National Council on Compensation Insurance. The following report of the Committee is herewith submitted as an outline of minimum requirements to obtain actual analyses of expenses by size of risk.

It is assumed that prior to the actual analysis of expenses by size of risk the carriers will have made certain allocations in accordance with the instructions and procedures required by the Uniform Accounting Regulations where applicable, namely,

(1) Total salaries and other expenses will have been properly allocated between companies operating under the same management.

(2) Within each company salaries and other expenses will have been properly allocated to

(a) General Administration wherever incurred.
(b) Acquisition and Field Supervision wherever incurred.
(c) Exposure Audit wherever incurred.
(d) Inspection, Bureau and Safety Engineering.
(e) Claims Investigation.
(f) Investment Expense.

(3) For divisions (2a) to (2e), inclusive, salaries and other expenses will have been properly distributed to line of insurance.

(4) For each line of insurance salaries allocated to divisions (2a) to (2e), inclusive, will have been properly distribution to department.

MINIMUM REQUIREMENTS TO OBTAIN ACTUAL ANALYSES OF EXPENSES BY SIZE OF RISK

(1) The analysis will be made on expenses paid rather than on expenses incurred. Commissions and investment expenses will be excluded from the analysis, although the amount of commissions will be reported in total for all sizes of policies combined.

(2) For each line of insurance a premium size schedule should be established according to standard premium per policy, similar to the following schedule for workmen's compensation:

Less Than	$ 50	5,000— 9,999
50	99	10,000—24,999
100	499	25,000—99,999
500	999	100,000 and Over
1,000	4,999	

The carrier should determine its own distribution of premium to conform with the premium size schedule, for the period under study, by the following methods or equivalent:

(a) By using a recent policy year distribution with necessary adjustments,
or (b) By analysis of payroll audit earned premium data,
or (c) By analysis of written premium data on a sample basis.

(3) The carrier should determine the distribution of salaries and expenses for the line or lines of business being studied, using the methods indicated for the divisions of departments or functions listed below. In determining the expenses to be distributed to size in these divisions, as a minimum requirement traveling expenses should be added to the salary expense of each division. Other kinds of expenses may be distributed to the divisions in proportion to salary expenses of the divisions.

I. DISTRIBUTED BY SPECIAL RESEARCH

(a) Underwriting
(b) Actuarial and Statistical
(c) Individual Risk Experience
(d) Exposure Audit
(e) Inspection and Safety Engineering
(f) File
(g) Acquisition Other Than Commissions
(h) Executive

II. DISTRIBUTABLE ON THE BASIS OF PREMIUM

(a) Claims Investigation and Adjustments*
(b) General Accounting
(c) Taxes
(d) Bureau
(e) Agency and Production Supervision
(f) Advertising
(g) Corporate Legal

III. DISTRIBUTABLE IN PROPORTION TO EXPENSES OF DEPARTMENTS AND/OR FUNCTIONS SERVICED

(a) Personnel
(b) Comptroller
(c) Payroll (Company Payroll Department)
(d) Cafeteria
(e) Health and Welfare (Employee)
(f) Mail, Telegraph, Telephone, Messenger
(g) Printing and Photostating

* It is the opinion of the Committee that there is no significant difference by size of risk as respects claim expense for most casualty lines. Therefore, it is recommended that these expenses be distributed on the basis of premium, and that the limited time available for detailed expense studies be spent in ascertaining the facts on items which are assumed to have such variations. However, for a line or lines of business for which a carrier has reason to expect a significant difference in the expenses of claim investigation and adjustment by size of risk, such expenses may be distributed by special research.

(h) Purchasing and Supply

All departments or functions not listed above should be assigned to the appropriate category, I, II or III.

IV. SPECIAL RESEARCH

Attached hereto are two appendices to guide the carrier in the establishment of methods for distributing expenses of the items for which special research is required.

It should be stressed that differences in the organizations and procedures of carriers make it impossible to prescribe in detail the methods which must be used. It is possible only to state the basic objective and to illustrate appropriate approaches.

In general the objective is to ascertain the portion of the total time of employees which risks in each size group require. These portions should be converted to salary expense, and the salary expense loaded for other expenses. (It should be stressed that in making these determinations, actual time studies may not be necessary. In the survey of operations under consideration efforts should be made to utilize available work unit statistics to apportion the time of employees to the various size groups.)

Hence the items for which special research is required should be broken down, if necessary, into components for which a method can be found of distributing employee time. The disposition of the exposure audit expense and the similar inspection and engineering expense is illustrated in Appendix A.

In the use of sampling methods and time studies to obtain a means of distributing expenses, the carrier's knowledge of its own procedures and records will determine the extent and nature of the methods to be employed.

For some operations, such as the making of field audits, the average time per audit for each size group may be obtained from the auditor's time reports for a sample of policies in each size group. For other operations or groups of operations for which it is feasible to assemble samples of policies or units in various size groups for processing, it may be desirable to time the processing of such samples through the operating sections. Appendix B provides a description of the several steps which may be employed in using this form of sampling procedure.

(5) Having determined the allocation of salaries and other expenses by department or function in accordance with the methods described above, the expenses by size of risk should be summarized and related to the premium distribution to obtain expense ratios by size of risk.

(6) In the conduct of the analysis the carrier should prepare legible work-

sheets and such records should be maintained in good order and should be available for examination.

Respectfully submitted
on behalf of
Industry Committee on Graduation of Expenses by Size of Risk
A. Z. Skelding,
Secretary to the Committee.

April 26, 1949

APPENDIX A

ILLUSTRATION OF THE DISTRIBUTION OF EXPOSURE AUDITING EXPENSES

Item	*Basis*
(a) Field Audit Salaries and Expenses	(a_1) Sampling to determine number of field audits for various policy size brackets.
	(a_2) Time study or equivalent to determine time per audit for various policy size brackets.
	(a_3) Cost to be distributed in proportion to product of a_1 and a_2.
(b) Fee Audits	(b) Sampling to determine number and cost by policy size.
(c) Clerical Costs of Payroll Reports	(c_1) Sampling to determine number of payroll reports for the various policy size brackets.
	(c_2) Time studies or equivalent to determine time per payroll report for the various policy size brackets.
	(c_3) Cost to be determined in proportion to product of c_1 and c_2.
(d) Clerical Costs of Field and Fee Audits	(d_1) Time studies or equivalent to determine time per audit for the various policy size brackets.
	(d_2) Costs to be distributed in proportion to (a_1 + b) times d_1.
(e) Supervision and Miscellaneous Overhead	(e) To be distributed in proportion to foregoing costs by policy size.

DISTRIBUTION OF INSPECTION EXPENSES

Same as for exposure auditing. Time spent on "prospective" risks to be loaded as overhead on determined costs. Time spent on accident analysis for large risks to be distributed to size bracket groups by time studies or equivalent.

APRIL 26, 1949

APPENDIX B

OPERATIONAL COST STUDY

The operational cost study of departments (or functional subdivisions) for which the influence of premium size is measurable by the methods to be described involves the following steps:

1. List the operations performed in each department (or functional sub-division), numbering and arranging them insofar as possible in chronological order.
2. Describe each operation briefly.
3. Indicate the lines of insurance involved in each operation, and also indicate for which premium sizes the operation is (or is not) performed.
4. Determine the number of items (policies or units) that were serviced during the year under each operation. This can be obtained most readily by counting the items handled for a week or a month, then projecting to an annual basis, recognizing known seasonal or other variations.
5. Estimate the number of employee work hours spent during the year in performing each operation. The time allocated to all of the operations should be checked against the total hours of work performed in the department during the year.
6. Estimate the salaries and expenses allocatable to each operation. The total salaries and expenses allocated to all of the operations should balance with the total salaries and expenses of the department for the year.
7. Supervisory and executive time, salaries, and expenses can be classified into four divisions—(a) that applying to a limited number of the operations performed in the department should be allocated exclusively to these operations in proportion to the distribution of the salaries of the supervised workers, (b) that applying to all of the operations performed in the department should be allocated in proportion to the distribution of the salaries of all of the workers in the department, (c) that involved in performing a specific operation should be classified as such and analyzed in the same manner as that of other workers in the department, and (d) unallocatable executive time, salaries and expense, which in the absence of a better basis can be distributed in proportion to premiums.
8. In the case of operations that are recorded on the copy of the policy (or similar record), the number of operations per policy under each line and significant size bracket can be obtained by selecting representative samples of expired policies under each homogeneous classification, and be determining the average number of recorded operations under each classification. This procedure lends itself readily to the analysis of certain premium accounting and statistical operations in the case of

companies which record each such operation on a copy of the policy. The distribution of the total number of policies serviced under each line and premium size was previously obtained. Multiply the number of policies in each homogeneous classification by the average number of operations performed under each classification during the year.

9. In the case of operations that are not recorded on the copy of the policy (or similar record), the number of operations under each line and significant size bracket can be obtained by (a) sampling the work handled during a significant period of time and (b) projecting these figures to an annual basis.

10. To determine the relative variation in time per operation, carefully select homogeneous groups of policies that are representative of the policies that are serviced under each line and significant size bracket, and attach time sheets to each of these groups. These sheets should identify each operation and provide space for indicating the time required to perform each operation on each group. "Representative" clerks should be selected and instructed to perform the operations under "normal" conditions and speed. Two or more homogeneous groups of items under each line and significant size group should be routed through the department, so that the representativeness of the individual samples can be checked. By this process, a time factor per operation can be obtained for each line and significant size bracket.

11. Having previously obtained the total number of operations performed in each homogeneous classification (Step 8 and 9), multiply the number of operations by the average time per operation developed in Step 10 to determine the time spent on each line and size group.

12. Develop the cost for each line and significant size group by distributing salaries and expenses in proportion to time spent, however, if large policies are handled by higher paid employees, use a different time to cost conversion factor for small, and large policies.

13. Develop the average cost per dollar of premium and per policy for each line and significant size group by dividing the total cost by the dollars of premium and number of policies respectively.

NATIONAL COUNCIL ON COMPENSATION INSURANCE MAY 16, 1951

REPORT OF SPECIAL COMMITTEE TO MEET WITH COMMITTEE OF NAIC TO SPECIAL SUBCOMMITTEE OF WORKMEN'S COMPENSATION COMMITTEE OF NAIC

Study of Expenses by Size of Risk— Workmen's Compensation Insurance

In a report of this Committee dated November 21, 1950, distributions of premium and expenses by size of risk for Stock and Non-Stock Companies were presented to your Subcommittee. This report was presented to the

Workmen's Compensation Committee of the NAIC at its meeting in Los Angeles on December 12, 1950. At that session the special Subcommittee of the Workmen's Compensation Committee was requested to make a study of the report and to submit recommendations to the Workmen's Compensation Committee. At a meeting with members of this Subcommittee held at the National Council on March 13, 1951, it was agreed that an analysis of the workmen's compensation expenses by size of risk would be made and submitted to the Subcommittee at its meeting on May 16, 1951.

It is a recognized procedure in workmen's compensation ratemaking that basic expense loadings in the manual rates are predicated on the requirements of stock companies. The analysis which immediately follows is based upon the expenses reported by Stock Companies in Part I of the November 21, 1950 summary. This distribution is the result of a special study made of paid expenses for calendar year 1949 by thirteen of the leading Stock Companies. This study embraces the following items of expense:

(1) Inspection including Boards and Bureaus
(2) Payroll Audit
(3) Other General Expenses
(4) Other Acquisition, Field Supervision and Collection
(5) Loss Adjustment

No consideration was given to the distribution of commissions by size of risk since rates of commissions are a matter of contract between the companies and their agents.

The purpose of the present analysis and interpretation of the figures reported in the study is to determine the degree to which expenses graduated in accordance with the current Workmen's Compensation Rating Program correspond to the reported figures. It is emphasized that it is not proper to reach any conclusions as to the adequacy of over-all expense requirements on the paid expenses of thirteen companies covering only a single calendar year. This was recognized when the studies were initiated.

The program now being tested is presently in effect in several states contemplating a $10 expense constant for every policy of less than $500. The indicated provision for administration and payroll audit is 7.7%* for the first $1000 of premium for each risk and 4.1% for all premium in excess of $1000. That for "other acquisition" is:

First $	1,000	7.5%
Next	4,000	5.0%
Next	95,000	2.5%
Over	100,000	1.0%

There is no graduation of claim expenses or of inspection boards and bureaus.

The results of this analysis are shown on the attached Exhibit II. Column (1) of the exhibit shows the average premium per risk, including a $10 expense constant calculated as follows: The expense constants which were in effect in 1949 by state, on the basis of the 1949 distribution of premium for Stock Companies indicate an average expense constant of approximately $6.00. Six

* See Exhibit I for the derivation of this figure.

dollars of premium for each risk under $500 was first deducted and the remaining premium was increased pro rata to produce the original total premium.

The amount of premium that would be derived from a $10 expense constant applicable to every risk under $500 was then obtained and the remaining premium was reduced pro rata in order that the resulting premium plus the premium from the $10 expense constant would produce the original total premium. In other words, the distribution of premium by size of risk was adjusted from a $6.00 expense constant basis to a $10 expense constant basis. The average premiums shown in column (1) were based on the adjusted premium.

The provision for administration and payroll audit, shown in column (2) was obtained by taking 7.7% of the first $1000 of premium per risk and 4.1% of all premium over $1000. The resulting expense by size for all sizes of risks was pro-rated to produce the actual expense for this item for all risks.

The provision for other acquisition was obtained in a similar manner using the percentages shown previously in this report. These percentages represent the differences between full general agents' rates and brokerage rates. This calculation assumes that the distribution of business by type of producer will be the same for all premium sizes.

The provisions for claim expense and inspection were obtained by multiplying the average premium per policy minus the $10 expense constant by .068 and .021, respectively. These ratios were obtained from the exhibit headed Part II of the report of November 21, 1950.

Column (6) shows the total provision for the items of expense under consideration and is the sum of the figures shown in columns (2), (3), (4), and (5).

Column (7) shows the paid expense per policy obtained by dividing the total reported expense by the number of policies.

Column (8) shows the amount by which the reported expense per policy exceeds the provision for such expense.

Column (9) shows the ratio of this difference to the average premium for the size group.

This analysis indicates that the $10 constant on risks of less than $500 is fully justified. The use of a materially higher constant on risks under $100 seems indicated but a more satisfactory approach to this problem is to endeavor to reduce the cost of handling these small compensation risks. A study along these lines has been undertaken by a Committee of the National Council. For the larger risks, the differences between the reported expense and the provisions in the rating program for such expenses appear to be of minor importance.

The analysis herewith presented clearly demonstrates, in the opinion of the Committee, that the reported expenses by size of risk as contained in Part I of the November 21, 1950 summary produce a reasonably close approximation to the provisions of the expense graduation program under review. The Committee therefore, concludes that this program provides a wholly realistic and practical basis for the distribution of expense provisions in compensation premiums.

For convenience, the essential features of the program tested are repeated below:

Expense Constant — $10 on premium of less than $500
Administration & Audit — Provision in Expense Constant plus 7.7% of premium up to the First $1000 plus 4.1% over.
Other Acquisition — First $ 1,000 7.5%
Next 4,000 5.0%
Next 95,000 2.5%
Over 100,000 1.0%
Claim Expense — 8.2
Inspection — 2.6

NATIONAL COUNCIL OF COMPENSATION INSURANCE May 16, 1951

EXHIBIT I

Workmen's Compensation—Analysis of Expense by Size of Risk
Stock Companies

Annual Premium Size	*No. of Policies* (1)	*Standard Premium Without Expense Constant* (2)	*Premium from $10 Expense Constant* (3)	*Standard Premium With $10 Expense Constant* [(2) × .975] + (3) (4)
Under $50	206,382	4,258,344	2,063,820	6,215,705
50—99	103,614	6,918,597	1,036,140	7,781,772
100—499	145,865	31,909,621	1,458,650	32,570,530
500—999	27,712	19,632,343	—	19,141,534
1,000—4,999	20,608	42,100,024	—	41,047,523
5,000—9,999	2,062	14,340,442	—	13,981,931
10,000—24,999	1,105	17,615,054	—	17,174,678
25,000—99,999	500	22,995,377	—	22,420,493
100,000 and Over	129	31,172,740	—	30,393,422
Total	507,977	190,942,542	4,558,610	190,727,588

Indicated Offset Factor for $10 Expense Constant $= \frac{190{,}942{,}542 - 4{,}558{,}610}{190{,}942{,}542} = .976$ (Use .975)

Adjustment of Standard Expense Loading for $10 Expense Constant

Item (1)	*Values at Normal Loading* (2)	*Reduction Due to Expense Constant* (3)	*Revised % of Unadjusted Manual Rates* (2)—(3) (4)	*% of Revised Manual Rates* (4) ÷ .975 (5)	*Expense Constant* (6)
Acquisition	17.5%	.4375	17.0625%	17.5%	$1.75
Taxes	2.5	.0625	2.4375	2.5	.25
Profit & Contingency	2.5	.0625	2.4375	2.5	.25
Claim Adjustment	8.0	—	8.0	8.2	—
Inspection & Bureau	2.5	—	2.5	2.6	—
Administration & Audit	9.5	1.9375	7.5625	7.7	7.75
Total	42.5%	2.5%	40.0%	41.0%	$10.00

EXHIBIT II

Workmen's Compensation—Analysis of Expenses by Size of Risk

Stock Companies

Annual Premium Size	*Average Premium $10 Expense Constant*	*Basic Provision in Rates Adjusted to Reported 1949 Paid Expenses*				*Total*	*Reported Paid Expense*	*Difference*	
		Admin. & Audit	*Other Acquis.*	*Claim Expense*	*Inspection*	*(2)+(3)+(4)+(5)*	*Per Policy*	*Amount (7)−(6)*	*Ratio (8)÷(1)*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Under $50	$30.12	$9.00	$1.78	$1.37	$.42	$12.57	$18.09	$5.52	.183
50—99	75.10	11.79	4.43	4.43	1.37	22.02	30.36	8.34	.111
100—499	223.29	20.97	13.17	14.50	4.48	53.12	51.23	−1.89	−.008
500—999	690.73	42.83	40.75	46.97	14.51	145.06	129.03	−16.03	−.023
1,000—4,999	1,991.82	94.73	98.67	135.44	41.83	370.67	315.65	−55.02	−.028
5,000—9,999	6,780.76	252.77	254.62	461.09	142.40	1,110.88	1,123.93	13.05	.002
10,000—24,999	15,542.70	541.91	429.85	1,056.90	326.40	2,355.06	2,439.64	84.58	.005
25,000—99,999	44,840.99	1,508.75	1,015.82	3,049.19	941.66	6,515.42	7,020.84	505.42	.011
100,000 & Over	235,607.92	7,804.06	3,203.86	16,021.34	4,947.77	31,977.03	32,630.64	653.61	.003

NATIONAL COUNCIL ON COMPENSATION INSURANCE May 16, 1951

EXHIBIT III

Workmen's Compensation—Analysis of Expenses by Size of Risk
Mutual Companies♀

Premiums and Expenses per Policy

Annual Premium Size	*Number Of Policies*	*Direct Standard Earned Premium*	*Expenses Excluding Taxes*	*Average Premium Excluding $5 Expense Constant*	*Average Expense Per Policy*
Under $50	25,662	$ 737,537	$ 530,045	$ 23.74	$ 20.65
50—99	17,055	1,279,753	564,345	70.04	33.09
100—499	44,507	11,284,201	3,181,643	248.54	71.49
500—999	13,994	10,102,908	2,410,978	721.95	172.29
1,000—4,999	16,628	38,875,579	7,551,977	2,337.96	454.18
5,000—9,999	2,946	22,729,601	3,617,432	7,715.41	1,227.91
10,000—24,999	1,927	32,034,567	4,701,010	16,624.06	2,439.55
25,000—99,999	853	40,173,745	5,303,743	47,097.00	6,217.75
100,000 & Over	79	16,415,675	1,999,599	207,793.35	25,311.38

Distribution of Earned Standard Premium by Size Group

Annual Premium Size	*Distribution of Premium by Size Group*		
	First $1,000	*Next $4,000*	*Over $5,000*
0—$ 999	$22,967,880*	—	—
1,000—4,999	16,628,000	$22,248,000	
Over 5,000	5,805,000	23,220,000	$82,329,000
Total	45,400,880	45,468,000	82,329,000

*Excluding effect of $5 Expense Constant

Formula Distribution of Expenses Excluding Taxes by Size Group

Annual Premium Size	*Total Expenses*	*Expenses From $17 Expense Constant*	*Distribution of Expenses Excl. Taxes By Size Group*		
			First $1,000	*Next $4,000*	*Over $5,000*
0—$ 999	$6,687,011	$1,720,706	$4,966,305	—	—
1,000—4,999	7,551,977	—	3,591,648	$3,960,329	—
5,000 & Over	15,621,784	—	1,253,880	4,133,160	$10,234,744
Total	29,860,772	1,720,706	9,811,833	8,093,489	10,234,744
Formula		$17†	21.6%†	17.8%	12.4%

† Determined by fitting straight line to under $1,000 data.
♀4 Direct Writing Mutual Companies.

The second part of this analysis relates to the reported data for the non-stock carriers shown in the November 21, 1950 summary.

The figures of the one agency mutual that participated in the study were excluded from the following review of the data reported by non-stock carriers in order that total expenses could be combined on a consistent basis.

The data compiled by the direct writing companies strongly suggest that expense constants, which average only approximately $5 for non-stock carriers nationwide, are inadequate. The order of magnitude of the inadequacy is such that it is considered inadvisable, from the viewpoint of both the policy holders and the companies, to increase such constants to the point where they would cover the present servicing costs of small risks. A more satisfactory approach to the problem is to increase the expense constants in those states now having constants of less than $10, or none at all, and making significant simplifications in the procedures for servicing small policies. With the cooperation of state supervisory officials the carriers and rating bureaus, it is believed that important operating economies can be achieved on non-experience rated business. As mentioned in a preceding section of this report, this project is now being worked on and encouraging progress is being made.

Achieving realistic economies on small risks would affect the degree of gradation between small and large risks. The greatest influence would be felt on risks under $500 in premium size and relatively little influence would be generated on the gradation shown in the study for risks above the $1000 premium size.

Because the total expense requirements of the non-stock carriers are necessarily less than the pure premium loadings appropriate for these carriers, it is not possible to process the data reported by the four direct writing mutuals in the same manner as the stock company figures have been processed.

If the same premium boundaries as are currently in effect are used in the analysis, the figures of the four direct writing mutuals can be reproduced reasonably well by means of the formula which is outlined in Exhibit III.

This Exhibit indicates a gradation of company expenses of approximately 4% for the premium interval between $1,000 and $5,000, and 9% for the premium in excess of $5,000. These differences, of course, do not reflect tax loadings and the circumstance that the non-stock discounts are used by participating carriers.

It is the conclusion of the Committee that the relative premium levels produced by the prevailing non-stock discounts of about 2% and 5% in $10 expense constant states and 5% and 8% in non-expense constant states are in as close conformity to the 4% and 9% differences as could be expected in view of the nature of the study.

Respectfully submitted,

NATIONAL COUNCIL ON COMPENSATION INSURANCE

Special Committee to Meet With Committee of NAIC

A. Z. SKELDING,
Secretary.

NOTES ON THE EFFECT OF WAGE CHANGES ON WORKMEN'S COMPENSATION PREMIUMS AND LOSSES

BY

EDWARD S. ALLEN

For many years there have been extended discussions concerning the reflection of the effect of wage changes in the determination of workmen's compensation rate levels. The logic in favor of including such effect is as follows:

Workmen's compensation premiums are based on payrolls. When wage rates are increasing, payrolls are increased and more premiums are collected. Indemnity losses which are based on wages will increase, but not to the same extent as premiums. Therefore, rate levels as otherwise calculated should be reduced in order to avoid excessive premiums. It would follow from the same process of reasoning that a reduction in wage rates would require an increase in rate levels as otherwise determined.

This logic has a very strong appeal and, as a result, a wage factor is now used in some jurisdictions and is being considered in others. In view of this apparent trend toward the use of wage factors, it is important to inquire into why insurance companies have been experiencing some of the highest loss ratios in history during a period when wages have been increasing at a very substantial rate.

WAGE DATA

For such an inquiry it is necessary to calculate the assumed effect of wage changes on workmen's compensation premiums and losses taking account of all known factors affecting the relationship. The data used for the calculation of wage factors in this investigation are compiled by the New York Department of Labor. Wage statistics are published by the United States Department of Labor, but it would seem that individual state data should be used wherever possible in connection with the experience for such state in order to eliminate territorial fluctuations.

The New York Department of Labor statistics is a sampling study of wages in various industries. The data available include average weekly earnings, average hourly earnings and average weekly hours reported for each month. The percentages of all employees included in the samples for each industry group at a recent date are as follows:

Manufacturing	47%
Extracting	43%
Contracting	25%
Utilities	30%
Trade	23%
Finance and Insurance	14%

Manufacturing data have been published in relatively complete form since January, 1946. Other data have been made available more recently, but even now the only published data which can reasonably be used in the calculation of an all-industry wage factor are those for manufacturing, extracting, contracting and trade. The percentage of the sample varies rather widely by individual categories within industry group (20% to 100% for manufacturing). Reports are submitted each month by individual employers on a voluntary basis. The data are somewhat heavily weighted with large employers and, in general, the smaller the average reporting unit, the smaller will be the sample. There will naturally be some change in reporting units over a period of time and, since wage rates vary by territory, a change in territorial weighting due to such change in reporting units or to rapid employment expansion or curtailment in reporting units might affect the indicated statewide changes.

A review of the January, 1952, manufacturing data illustrates some of the variations to be expected. The data are for production workers only and average weekly earnings vary from $39.84 for leather gloves and mittens to $100.86 for fur goods. Average hourly earnings vary from $1.21 for men's and boys' shirts (excl. work), collars and nightwear to $3.31 for fur goods. Average weekly hours vary from 30.5 for fur goods to 46.9 for metalworking machinery.

In 1949, the classification system was revised to conform to a countrywide classification revision. The Labor Department indicates that many of the classifications, including the manufacturing group as a whole, are not comparable for the periods before and after the change.

The data cannot be used for the calculation of a wage factor without making certain adjustments. Average weekly wages include bonus overtime pay which is subject to exclusion in the determination of workmen's compensation premiums. An estimate must be made of the effect of limiting workmen's compensation payrolls to an average of $100 per week. An estimate must be made of the effect of wage changes on indemnity benefits which vary directly with total weekly wages subject to minimum and maximum limits.

CALCULATION OF WAGE FACTOR

The calculation of a wage factor must be made separately for the indemnity and medical portions of the premium. The factors below have been used in the illustrations which follow:

$$\text{Indemnity Factor} = \frac{\text{Effect on Indemnity} \times \text{Change in Average Weekly Hours}}{\text{Change in Adjusted Average Weekly Wages}}$$

$$\text{Medical Factor} = \frac{\text{Change in Average Weekly Hours}}{\text{Change in Adjusted Average Weekly Wages}}$$

Although medical costs tend to rise and fall with the cost of living, and, therefore, with wages, there does not appear to be a practical method of

measuring medical changes beyond the latest available experience period except by a projection procedure or by an assumption that the medical wage factor is unity. In New York, a measurement is made of changes in the minimum medical fee schedule and agreed hospital rates, so that the above medical factor appears to overstate the effect of wage changes only to the extent of residual medical changes such as in the costs of items not included in the fee schedule and in the fee charges in excess of the minimum schedule fees.

Exhibit A illustrates an adjustment of average weekly wages for the effect of bonus overtime wages and payroll limitation. The data were obtained from the *Labor Market Review* published by the New York State Department of Labor using weights of 56% for manufacturing, 7% for contracting and 37% for trade based on an estimate of total number of employees in each industry. Since complete data for the trade group are published only from August, 1949, the August data have been used for July. The period measured is from composite policy year July 1, 1949–June 30, 1950 to calendar year 1951. The weights for obtaining a policy year average are the usual policy year weights used in the reflection of law amendments. The calendar year average is obtained by giving each of the twelve months equal weight.

In adjusting for the elimination of bonus overtime wages, it has been asssumed that all hours in excess of an average of 37 are paid at time and one-half. Although overtime usually starts at 40 hours, the average is affected by employees who work less than 40 hours per week. Also, it is the practice of many employers to pay bonus overtime for all hours in excess of a normal work week of less than 40 hours. The adjustment is as follows:

$$\begin{aligned} \text{Let } W &= \text{Average Weekly Wages} \\ H &= \text{Average Weekly Hours} \\ R &= \text{Straight Time Rate of Pay} \\ \text{Then } \quad W &= HR + (H-37).5R = R(1.5H - 18.5) \end{aligned}$$

$$R = \frac{W}{1.5H - 18.5}$$

$$HR = \frac{HW}{1.5H - 18.5} \qquad H \geqq 37$$

It has been suggested that this flat overtime adjustment is not proper, since there is a tendency for bonus overtime pay to increase at a slower rate than hours in excess of 37. The Economic Statistics Bureau of the United States Department of Labor has published average wages both including and excluding bonus overtime pay. For the four years 1948–1951, the ratio of full wages to straight time wages has been determined by the method of least squares to be .007707 × Average Hours per Week + .7230. This method appears to be theoretically more proper. However, it gives a somewhat smaller overtime adjustment than the 37 hour assumption, and even the 37 hour assumption does not appear sufficient in many instances. For example, there is a drop in

average weekly wage in November, 1949 as shown in Exhibit A in spite of an upward trend in such average wages. The drop remains in the adjusted figures regardless of which adjustment is made and there are many similar instances in these and other data reviewed. The 37 hour assumption gives a slightly higher wage factor when average weekly hours are increasing and a slightly lower factor when average weekly hours are decreasing.

The adjustment which has been made for the payroll limitation rule makes use of the wage distribution tables in the National Council law amendment calculations. These tables show:

A: The proportion of employees paid wages up to C.
B: The proportion of payroll paid to employees in A.
C: Ratios of wages to average weekly wages in 5% intervals.

For policy year 1949, $100 is 169% of the average adjusted weekly wage of $59.20. In all calculations, these percentages have been rounded to the next higher 5% interval, in this case 170%, as a conservative procedure. The payroll up to $100 per week is, therefore, $B + C(1.0 - A)$. From the table, A is .9668 and B is .9350 and the limit factor is $.9350 + 1.70(.0332) = .9914$.

The National Council law amendment factor procedure is used again in the calculation of the effect of wage changes on indemnity losses as illustrated in Exhibit B. Limit factors have been calculated for the policy year and calendar year unadjusted average weekly wages. For each type of injury, the wage change is adjusted for the reduced effect of the calendar year wage as measured by the change in limit factors in order to estimate the effect on indemnity losses. An overall effect is then determined by weights representing the estimated distribution by type of injury. The wage factors are then calculated as follows:

$$\text{Indemnity Factor} = \frac{\text{Effect on Indemnity} \times \text{Change in Average Weekly Hours}}{\text{Change in Adjusted Average Weekly Wages}}$$

$$= \frac{1.016 \times 1.005}{1.062} = .961$$

$$\text{Medical Factor} = \frac{\text{Change in Average Weekly Hours}}{\text{Change in Adjusted Average Weekly Wages}}$$

$$= \frac{1.005}{1.062} = .946$$

Using the premium developed in the latest New York rate revision as necessary for indemnity and medical losses separately, the overall factor becomes .957. Since this factor indicates a premium reduction of 4.3% between two periods of time when experience indications were increasing, it is important that the subject be investigated somewhat further.

VARIATION IN WAGE FACTORS

One apparent conclusion is that there will be considerable variation in wage changes by industry and by territory and that a reflection of the overall effect

of wage changes is not proper. Wage factor calculations have been made by industry and by territory for manufacturing only for the period from policy year 1949 to composite calendar year July 1, 1950–June 30, 1951 and are shown in Exhibits C and D.

There is considerable variation in changes in unadjusted average weekly wages both by industry and by territory. These variations, however, are reduced to a great extent by the necessary adjustments in the calculation of the wage factors. Substantially more variation would be found, of course, in the individual classifications within industry groups.

Another set of wage factors has been calculated in Exhibit E illustrating, from available data, what variation in wage factors may be expected over a period of several rate revisions. These data are calculated for six-month intervals starting with policy year 1946 and composite calendar year July 1, 1947–June 30, 1948. Since the entire period covered was a period of generally rising wage levels, wage factors are, as would be expected, generally less than unity. It is interesting to note, however, that wages decreased between policy year 1948 and composite calendar year July 1, 1949–June 30, 1950 but the wage factor indicates a rate level reduction. Also, wages increased between composite policy year July 1, 1948–June 30, 1949 and calendar year 1950, but the wage factor indicates a rate level increase.

COMPARISON OF WAGE AND EXPERIENCE INDICATIONS

The whole purpose of considering the application of a wage factor is to come closer than otherwise possible to the experience which is expected to develop. Therefore, the test of the propriety of applying a wage factor is a comparison of past wage and experience changes.

In order to make such a test, calendar year loss ratios on a standard premium Board level basis for New York workmen's compensation insurance have been obtained for calendar years 1942 through 1951. These loss ratios have been adjusted to a common rate level and a common law level, so that a comparison of loss ratios for two calendar years will give the experience change due to unmeasured influences including wage changes. Each calendar year loss ratio has been related to the loss ratio for the preceding calendar year resulting in the experience factors shown in the table below.

Wage factors were calculated for corresponding periods in the manner described above. The manufacturing wage data only were used, since complete data for other industries are not available for the entire period. Complete manufacturing data are not available prior to 1942. For calendar years 1942 through 1945, complete monthly data are not available and the overtime adjustment has been made on an annual basis.

The resulting experience and wage factors are as follows:

Calendar Year Period	*Experience Factor*	*Wage Factor*	*Other Factors* (2) ÷ (3)
(1)	(2)	(3)	(4)
1942 to 1943	.959	.991	.968
1943 to 1944	.978	.959	1.020
1944 to 1945	1.015	.947	1.072
1945 to 1946	.966	.889	1.087
1946 to 1947	.930	.929	1.001
1947 to 1948	.996	.940	1.060
1948 to 1949	.985	.961	1.025
1949 to 1950	1.124	1.006	1.117
1950 to 1951	.992	.952	1.042

The introduction of a wage factor in the rate level calculation assumes that the wage factor represents the expected experience factor. Yet it is noted from the above table that the wage factor is consistently lower than the experience factor except for the 1942 to 1943 period. Either the wage factor calculation gives too much effect to wage changes or other factors such as claim frequency and severity have substantially offset the wage change effect.

Assuming that the wage factors, as calculated above, represent a proper measure of the effect of wage changes, it is noted that the average annual effect of wage changes during this period is a reduction of 4.7% whereas the average annual effect of other factors is an increase of 4.4%.

CONCLUSIONS

Several conclusions are suggested by the above investigation:

1. Present published wage data are naturally not compiled for the purpose of calculating wage factors for workmen's compensation insurance. As a result, they have certain defects such as possible sample bias and absence of complete data for several industries. Also, it is probable that a substantial amount of self-rated and self-insured data are included.

2. Wage data are external statistics subject to external control. They may be affected by a change in reporting units or, as happened in 1949, a change in the classification system. A wage factor based on data collected both before and after such change might be virtually impossible to adjust properly.

3. It would be difficult, if not impossible, for insurance carriers to obtain proper wage data from insurance statistics. Average weekly wages based on loss reports would be heavily weighted by the presumed high wage scales of high hazard employments. The compilation of such data from payroll audits would place a substantial additional burden on the auditors and, if done on a sample basis, would require a reporting by classification in order to obtain an appropriate overall average.

4. In the calculation of a wage factor, adjustments must be made for the bonus overtime and payroll limitation rules and for the effect of wage changes on indemnity losses. Such adjustments are necessarily approximations.

5. The adjustments in (4) above will probably result not infrequently in an increase in rate level during a period of rising wage levels or in a reduction in rate level during a period of falling wage levels. Both of these effects are illustrated in Exhibit E. To the uninitiated, such effects would be final proof of the actuaries' disregard of realities.

6. The published data show some very substantial monthly variations and, in some industries and territories, substantial seasonal variations as well. It would, therefore, seem prudent to consider no period less than twelve months in the calculation of a wage factor.

7. The measurement of changes in wage rates is comparable to the measurement of changes in loss costs other than those caused by law amendments. Wage changes occur at different times in different degrees in different localities in different industries and in different sections of the same industry. Under the present ratemaking system, wage changes are measured in the same manner and to the same point in time as changes in loss costs.

8. The available sample indicates little, if any, correlation between experience changes and the assumed effect of wage changes. It is probable that other factors such as claim frequency and severity have as much or more effect on experience changes. It does not seem proper, therefore, to reflect wage changes to a greater extent than other changes in the rate level determination.

9. Although corresponding wage and experience data are not voluminous, the available New York data indicate that the wage change effects tend to understate the experience requirements, so that the application of a wage factor would hold down rate increases and would magnify rate reductions. It appears that one reason for this effect may be the assumption that wage changes do not affect medical costs. This suggests that a wage factor should be used only in conjunction with a medical projection factor.

10. Aggregate insurance statistics in the form of calendar year premiums and losses are available to approximately the same point in time as are wage data. These aggregate statistics include the effect of wage changes and of all other factors which affect the rate level. Under the present procedure, the rate level adjustment factor gives partial weight to all factors entering into the calendar year results. It is not proper to measure only one factor when there are other equally important factors, and it is an unwarranted complication to attempt to measure all such factors individually when an aggregate measure is readily available.

EXHIBIT A
WORKMEN'S COMPENSATION—NEW YORK
Wage Data—Manufacturing, Contracting & Trade Combined

Month	Avg. Hrs. per Week (1)	Avg. Weekly Wage (2)	1.5 × (1) −18.5 (3)	(1) × (2) (4)	(4) ÷ (3) (5)	Limit Factors (6)	(5) × (6) (7)	Weights (8)
July '49	38.4	$57.99	39.10	2226.82	$56.95			.00347
Aug.	38.3	57.96	38.95	2219.87	56.99			.01042
Sept.	38.6	58.66	39.40	2264.28	57.47			.01736
Oct.	38.6	58.42	39.40	2255.01	57.23			.02431
Nov.	38.4	57.87	39.10	2222.21	56.83			.03125
Dec.	38.7	58.79	39.55	2275.17	57.53			.03819
Jan. '50	38.5	58.91	39.25	2268.04	57.78			.04514
Feb.	38.4	58.46	39.10	2244.86	57.41			.05208
Mar.	38.5	58.85	39.25	2265.73	57.73			.05903
Apr.	38.5	58.61	39.25	2256.49	57.49			.06597
May	38.8	59.19	39.70	2296.57	57.85			.07292
June	39.0	59.88	40.00	2335.32	58.38			.07986
July	39.0	60.44	40.00	2357.16	58.93			.07986
Aug.	39.6	61.89	40.90	2450.84	59.92			.07292
Sept.	38.8	61.08	39.70	2369.90	59.70			.06597
Oct.	39.4	62.39	40.60	2458.17	60.55			.05903
Nov.	39.5	62.86	40.75	2482.97	60.93			.05208
Dec.	39.7	63.67	41.05	2527.70	61.58			.04514
Jan. '51	39.4	64.44	40.60	2538.94	62.54			.03819
Feb.	39.0	64.06	40.00	2498.34	62.46			.03125
Mar.	39.2	64.34	40.30	2522.13	62.58			.02431
Apr.	39.2	64.45	40.30	2526.44	62.69			.01736
May	39.0	64.48	40.00	2514.72	62.87			.01042
June	39.1	64.61	40.15	2526.25	62.92			.00347
P.Y. '49–'50	38.9	60.68			59.20	.9914	58.69	
July '51	39.1	64.87	40.15	2536.42	63.17			
Aug.	39.0	65.21	40.00	2543.19	63.58			
Sept.	39.1	65.39	40.15	2556.75	63.68			
Oct.	38.6	64.49	39.40	2489.31	63.18			
Nov.	38.9	65.65	39.85	2553.79	64.09			
Dec.	39.4	66.21	40.60	2608.67	64.25			
C.Y. '51	39.1	64.85			63.17	.9868	62.34	
Ratio	1.005	1.069			1.067		1.062	

EXHIBIT B

WORKMEN'S COMPENSATION—NEW YORK

Wage Data—Manufacturing, Contracting and Trade Combined
Effect on Indemnity

Class of Injury (1)	Comp. Law (2)	% of Comp. (3)	Min. Weekly (4)	Max. Weekly (5)	Eff. Min. Wage (4)÷(3) (6)	Eff. Max. Wage (5)÷(3) (7)	Average Weekly Wage (8)	Ratios to Average: Min. (6)÷(8) (9)	Ratios to Average: Max (7)÷(8) (10)	Ratios to Average: Min. Rounded (11)	Ratios to Average: Max Rounded (12)
(a) Death (Widows & Children)	7/1/52	—	—	—	18	52.50	60.68	29.7	86.5	30	85
(a) Death (Others)	7/1/52	—	—	—	—	52.50	60.68	—	86.5	—	85
(a) Permanent Total	7/1/52	66⅔	15	32	22.50	48	60.68	37.1	79.1	35	80
(a) Perm. Part. & Temp. Total	7/1/52	66⅔	12	32	18	48	60.68	29.7	79.1	30	80
(b) Death (Widows & Children	7/1/52	—	—	—	18	52.50	64.85	27.8	81.0	30	80
(b) Death (Others)	7/1/52	—	—	—	—	52.50	64.85	—	81.0	—	80
(b) Permanent Total	7/1/52	66⅔	15	32	22.50	48	64.85	34.7	74.0	35	75
(b) Perm. Part. & Temp. Total	7/1/52	66⅔	12	32	18	48	64.85	27.8	74.0	30	75

B for (11) (13)	B for (12) (14)	(14)—(13) (15)	A for (11) (16)	A for (12) (17)	1.0–(17) (18)	(9)×(16) (19)	(10)×(18) (20)	Loss Limit (15)+(19)+(20) / 10,000 (21)	Indemnity Effect (21b)×64.85/60.68 (21a) (22)	Weights (23)
17	2684	2667	.65	39.39	60.61	19	5243	.7929		
—	2684	2684	—	39.39	60.61	—	5243	.7927		
37	2154	2117	1.24	33.15	66.85	46	5288	.7451		
17	2154	2137	.65	33.15	66.85	19	5288	.7444		
17	2154	2137	.65	33.15	66.85	18	5415	.7570	1.021	.06
—	2154	2154	—	33.15	66.85	—	5415	.7569	1.021	.07
37	1672	1635	1.24	27.13	72.87	43	5392	.7070	1.014	.02
17	1672	1655	.65	27.13	72.87	18	5392	.7065	1.015	.85
									1.016	

EXHIBIT C
WORKMEN'S COMPENSATION—NEW YORK
Wage Data
Policy Year 1949 to Composite Calendar Year 7/1/50–6/30/51

	Change in						
					Wage Factors		
Industry	*Average Weekly Wages*	*Average Weekly Hours*	*Indemnity Benefits*	*Adjusted Average Weekly Wages*	*Indemnity*	*Medical*	*Average*
Manufacturing and Contracting Combined	1.084	1.029	1.019	1.065	.985	.966	.980
Manufacturing Only	1.086	1.031	1.020	1.066	.987	.967	.982
Contracting Only	1.072	1.003	1.004	1.059	.951	.947	.950
Non-Metallic Mining and Quarrying	1.102	1.030	1.012	1.081	.964	.953	.961
Heat, Light and Power Companies	1.074	1.010	1.011	1.061	.962	.952	.959
Telephone and Telegraph Companies	1.056	1.005	1.013	1.051	.969	.956	.966
Local Railway and Bus Lines	1.071	1.008	1.007	1.059	.959	.952	.957
Laundries	1.048	1.005	1.034	1.045	.994	.962	.985
Cleaning and Dyeing	1.033	1.000	1.019	1.033	.986	.968	.981
Hotels (year-round)	1.052	.983	1.034	1.060	.959	.927	.950

EXHIBIT D

WORKMEN'S COMPENSATION—NEW YORK

Wage Data—Manufacturing Only

Policy Year 1949 to Composite Calendar Year 7/1/50—6/30/51

Territory	Change in Average Weekly Wages	Change in Average Weekly Hours	Change in Indemnity Benefits	Adjusted Average Weekly Wages	Wage Factors: Indemnity	Wage Factors: Medical	Wage Factors: Average
New York State*	1.086	1.031	1.020	1.066	.987	.967	.982
New York City	1.048	1.013	1.014	1.039	.989	.975	.985
New York State excl. N. Y. C.*	1.127	1.050	1.030	1.097	.986	.957	.978
Albany, Schenectady, Troy Area	1.152	1.061	1.031	1.116	.980	.951	.972
Binghamton, Endicott, Johnson City Area	1.099	1.050	1.029	1.072	1.008	.979	1.000
Buffalo Area	1.121	1.032	1.023	1.093	.966	.944	.960
Elmira Area	1.104	1.028	1.026	1.086	.971	.947	.965
Rochester Area	1.128	1.045	1.027	1.099	.977	.951	.970
Syracuse Area	1.167	1.062	1.038	1.131	.975	.939	.965
Utica, Rome, Herkimer, Little Falls Area	1.111	1.038	1.033	1.089	.985	.953	.976

* Includes data in addition to that reported for individual areas.

EXHIBIT E
WORKMEN'S COMPENSATION—NEW YORK
Wage Data
Manufacturing Only

Policy Year	Calendar Year	Change in: Average Weekly Wages	Change in: Average Weekly Hours	Change in: Indemnity Benefits	Change in: Adjusted Average Weekly Wages	Wage Factor: Indemnity	Wage Factor: Medical	Wage Factor: Average
1946	7/47–6/48	1.079	.993	1.027	1.081	.943	.919	.937
7/46–6/47	1948	1.069	.990	1.023	1.071	.946	.924	.940
1947	7/48–6/49	1.041	.977	1.014	1.050	.944	.930	.940
7/47–6/48	1949	1.001	.975	1.000	1.013	.962	.962	.962
1948	7/49–6/50	.994	.992	.999	.997	.994	.995	.994
7/48–6/49	1950	1.034	1.021	1.009	1.023	1.007	.998	1.005
1949	7/50–6/51	1.086	1.031	1.020	1.066	.987	.967	.982
7/49–6/50	1951	1.085	1.013	1.020	1.073	.963	.944	.958

NEW YORK COMPENSATION RESERVE SCHEDULE R

BY

MATTHEW RODERMUND

At one time, not so long ago, Schedule P in the casualty annual statement blank was considered a fair guarantor of the adequacy of a company's loss reserves for liability and workmen's compensation insurance.

That was in the days when loss ratios and loss adjustment expense ratios rarely totaled 60 percent for liability insurance or 65 percent for compensation insurance, and claims examiners were reasonably confident that current reserves in these lines were reliable estimates of the eventual costs of pending cases.

More recently, mounting premiums in these lines have been losing in a race to keep ahead of the more rapidly mounting losses; and today's loss reserves are being buttressed with this and that contingency reserve to insure a carrier's ability to meet the costs of judgments and awards that are unpredictable and entirely without precedent.

The effect on Schedule P has been that few carriers in recent years have been able to show statutory reserves in excess of case estimates in either liability or compensation insurance. Statements of loss reserve liabilities are now almost universally the accumulated totals of case estimates.

The consequence is that members of the casualty industry are busily, almost urgently, comparing notes on methods of insuring adequacy of loss reserves. Analysis of loss reserves, and testing for their adequacy, have become favorite topics at casualty insurance gatherings. Rightfully, the loss of the cushion in Schedule P has become a matter of great concern.

It seems appropriate, then, to examine an official workmen's compensation reserve schedule, other than Schedule P, that attempts to meet the tests considered desirable by the experts and that contains a few additional gimmicks to promote adequacy. This is Sechedule R, required of mutual casualty carriers domiciled in the State of New York on their New York State workmen's compensation business only.

Schedule R replaces Schedule P only in the annual statement filed with the New York State Insurance Department, and only on New York State workmen's compensation business. Thus, Schedule P is required of the New York mutuals in all states other than New York, and it is also required of them in New York on other than New York State business. They are willing to bear with these complications because of their pronounced preference for Schedule R.

Schedule R is fundamentally a reserve schedule based upon individual estimates of outstanding claims, and its chief requirement is that the claims be listed in detail in a variety of schedules according to claim classification defined in the Insurance Department regulations. It has been in effect since 1914, when the New York Workmen's Compensation Law was enacted. At that time a number of mutual companies were organized by groups of businessmen to insure their obligations under the new Act. Most of these new companies were "trade" mutuals, i.e., they were organized by interested business leaders in the lumber, brewing, utility, printing, and other industries to offer

workmen's compensation insurance to employers in their respective fields. All of these insurance ventures represented closely knit groups of employers who were prepared to exercise close control of such matters as safety work, prompt and proper medical care, and rehabilitation of injured workmen. It was the opinion of insurance supervisory authorities, therefore, that the developed loss ratios in such insurance companies would prove to be greatly below the 65 percent demanded in a Schedule P reserve—an opinion that subsequently was proved to be justified. And under the circumstances, permitting these insurers to provide reserves more closely related to their actual losses would aid them, in their beginning years, to establish financial stability.

Schedule R, therefore, was formulated by the Insurance Department as the reporting standard for these mutual carriers; and it was so designed that it would enable the Department to maintain a close check on the adequacy of the reserves. The pertinent provision of the New York Insurance Law (subdivision 8, section 326) is as follows:

> "The loss reserves . . . under workmen's compensation policies, issued by domestic mutual casualty companies shall be computed in accordance with regulations made from time to time by the superintendent, having due regard for the character of such insurance and the adequacy of such reserves."

Note that the New York Department's loss reserve regulations of 1914 ran counter to the usual assumptions as to the necessity of Schedule P for newly organized companies: the minimum reserve feature of Schedule P had generally been considered the best safeguard for the solvency of a new company's operations, at least in the workmen's compensation line.

The total Schedule R reserve reported by a New York State mutual casualty company now consists of the following elements (the following description will perhaps be clarified by studying the exhibit appended to this paper):

1. Case estimates of all open compensation and medical claims with accident dates prior to the six-month period immediately preceding the valuation date, plus actuarial valuations of the indemnity costs of death and statutory permanent total claims occurring in that six-month period [Items 1, 2, 3, 4, and 11 of the appended exhibit].

2. A percentage contingency loading on the gross incurred indemnity cost of all open claims (which involve estimates rather than Compensation Board awards), except death claims, with accident dates prior to the latest six months. The amount of this loading represents the estimated amount of adverse development expected of such cases, and it varies from year to year in accordance with the experience of the individual carrier [Exhibit item 5].

3. A percentage loading on the medical reserves on all compensable claims with accident dates prior to the latest six months. The amount of this loading represents the estimated amount of adverse medical development expected in compensable cases, and this factor also varies from year to year [Exhibit item 6].

4. A flat dollar reserve for reopened cases, indemnity and medical separately, based on past experience [Exhibit items 7 and 8]. This reserve also includes incurred-but-not-reported cases with accident dates prior to the latest six months.

5. The product of an indemnity loss constant and the number of compensable cases, *excluding* death and statutory permanent total cases, with accident dates in the six months immediately preceding the valuation date, less the total of indemnity payments made on such claims; or the case estimates of indemnity reserves on such claims (including reserves for incurred-but-not-reported claims), whichever is greater [Exhibit item 9]. The indemnity loss constant [Column 6, item E], called the "E4 factor" in Schedule R, comprises the average indemnity cost of compensable claims for the reporting carrier, plus a loading for the indemnity cost of incurred-but-not-reported compensable claims.

6. The product of a medical loss constant and the number of compensable cases, *including* death and p.t. cases, with accident dates in the six months immediately preceding the valuation date, less the total amount of medical expenses paid on such claims; or the case estimates of medical reserves on such claims (including reserves for incurred-but-not-reported claims), whichever is greater [Exhibit item 10]. The medical loss constant [Column 6, item F], called the "H3 factor," comprises the average amount of medical expense per *compensable* claim for the reporting carrier, plus a loading for the medical cost of incurred-but-not-reported *compensable* claims.

7. The product of the number of pending non-compensable medical claims reported in the six months immediately preceding the valuation date and the average cost of such claims, less the total amount of medical expenses paid on them. The average cost of non-compensable medical claims may not be taken at less than 10 dollars [Exhibit item 12].

It will be seen that the elements in Schedule R that promote adequate reserves are the contingency factors, the reopened case reserves, and the E4 and H3 factors. The eighteen loss development schedules required as of each September 30 by the New York Department for the calculation of these factors—different factors for each company each year—constitute Schedule R's greatest burden for both the carriers and the Department and are, perhaps, responsible for the Department's occasional suggestions that the carriers might now replace Schedule R with Schedule P. The New York mutual carriers have constantly indicated a marked preference for Schedule R, however, and their position gains some support in the current proposals to dispense altogether with Schedule P.

Calculation of the Indemnity and Medical Loss Constants: A brief description of the method by which Schedule R factors are calculated will demonstrate their function in the effort to obtain adequate reserves. Each year the carriers are required to submit to the Insurance Department a listing of the gross incurred cost, as of September 30, of each case appearing in the E4

schedule (latest six months' compensable cases) of the preceding December 31 statement, plus a listing of the gross incurred cost, as of September 30, of each incurred-but-not-reported compensable case with an accident date within the six-month period covered. Separate schedules for the indemnity costs and medical costs of these cases are required.

The sum of the developed indemnity costs of the E4 cases as of September 30 and the incurred-but-not-reported cases as of that date is then divided by the number of E4 cases in the original schedule. The result is an indemnity constant per case that takes into account developments on reported cases and on incurred-but-not-reported cases. [Exhibit item 9 (September 30 valuations of columns 3 + 5) ÷ (column 1).]

The H3 constant (the medical counterpart of the E4 constant) is obtained by dividing the sum of the developed gross incurred medical costs of the H3 cases as of September 30 and the incurred-but-not-reported cases as of that date by the number of H3 cases in the original schedule [Exhibit item 10, (September 30 valuations of columns 3 + 5) ÷ (column 1)].

Actually, the above operations are carried out each September 30 on the E4 and H3 cases of each of the two preceding years in order that note may be taken of developments affecting the average values per claim.

The Flat Dollar Reserves for Reopened Cases: Another schedule requires a listing of the additional incurred costs (indemnity and medical separately) since the preceding September 30 on reopened cases and incurred-but-not-reported cases with accident dates prior to July 1 of the preceding year. The reopened case reserves, indemnity and medical Column 6, items C and D, are based on a study of the respective schedules and of the corresponding ones for the three previous years as to indemnity and the two previous years as to medical.

The Contingency Factors: The companies are also required to submit to the Department lists of the developed gross incurred costs, valued as of September 30, of all open compensable cases (except death and statutory p.t. cases and E4 cases) that had been included in the December 31 reserves of the preceding three years. The summation of the developed incurred costs of such cases as of September 30 is then compared with the summation of their incurred costs as estimated at December 31 of the earliest of the three years called for, and the percentage increase (if any) becomes the contingency factor. (Claims representing Compensation Board awards are excluded from this survey).

For example, the incurred costs of open cases in the reserves as of December 31, 1948, 1949, and 1950 are compared with the developed incurred costs of these same cases at September 30, 1951. But, where any case appeared in the reserves in more than one of the three years, only its valuation at the earliest year is included for purposes of calculating the contingency factor. [Exhibit item 3, column 3 for the latest three years (less duplications) compared to developed costs at September 30].

Recently various refinements have been introduced into the calculation of the contingency factors and the flat dollar reserves for reopened cases. Weights have been applied to the indicated developments in such a way that adverse developments on the more recent cases affect the factors more than those on older cases.

Thus it can be seen that the application of the E4, H3, and contingency factors projects developments of any kind in the cost of compensable cases and

counteracts any tendency to under-reserve. The contingency factor, particularly, has the effect of loading a company's reserves in the current period by precisely the percentage its experience has shown it to be under-reserved in the previous three years combined. If a company's reserves have developed favorably in the past, no contingency factor is applied in the current period.

It has been stated that the method of averages per reported claim as exemplified in the E4 and H3 schedules is undoubtedly useful but is not practicable "for standard test purposes since counts are not uniformly made by all carriers and difficulty would probably be experienced in completing the count at an early date."* It is probable, however, that for any company that accumulates its reserves on punch cards, a count of compensable accidents in a given period is one of the simplest of operations. For companies with a small volume of losses that accumulate their reserves by manual means, a count of compensable cases by accident date presents less of a problem than a hand tabulation of reserves by policy year, which is required in Schedule P. The theory of basing reserves for the most recent accidents on a method of averages per reported claim is based on the premise that it is difficult to estimate with any degree of accuracy the value of many, if not most, compensable cases less than six months old.

A further comment with respect to a method of averages: "Moreover, changes in coverage and in claim administration may from time to time influence the definition and cost of a reported claim."* This possibility would affect chiefly the calculation of an adequate E4 or H3 factor. For example, the figures upon which such calculations were based in September, 1948, were derived from the period prior to December 31, 1947, when both compensation and medical benefits in New York State were lower than they were for the year beginning December 31, 1948, at which time the new E4 and H3 factors were to be applicable. In the calculation of factors under such circumstances, the results obtained from the development schedules would be loaded by an amount sufficient to take care of the increase in benefits.

The New York Department, in its latest review of experience submitted by the carriers, has added a further precautionary element to its consideration of ultimate costs—namely, a trend factor. The reason is that in recent years originally assigned E4 and H3 factors have tended to lag somewhat behind developed experience figures for the losses to which they were applicable; this lag, it is believed, is due not so much to an original underestimation of reserves as it is to operation of intangibles stemming from economic inflation. Therefore, before final allocation to the carriers, these factors were increased by a loading of not more than 5 percent.

Incidentally, Schedule R also contains a loss development exhibit similar in nature to Schedule P, Part 5, except that the Schedule R exhibit is on an accident year basis only, and represents the latest ten years instead of six years.

Schedule R is not offered as a replacement for Schedule P. But if the supervising authorities ever do agree to dispense with Schedule P and to approve compensation reserves based upon individual estimates, they are likely to insist on suitable safeguards for adequacy. The E4, H3, and contingency factors in Schedule R in New York State are one answer to the problem that undoubtedly would be studied by the insurance commissioners.

* From the Report of the Committee on Compensation and Liability Loss and Loss Expense Reserves to the Casualty Actuarial Society, November 8, 1948.

SUMMARY SCHEDULE R

NEW YORK STATE WORKMEN'S COMPENSATION RESERVES
DECEMBER 31, 1951

Exhibit Item	*Text Item*	*Class of Case*	*(1) No. Cases*	*(2) Amount Paid 1951*	*(3) Estimated Total Incurred Costs*	*(4) Estimated Reserves*	*(5) IBNR Reserves*	*(6) Special Reserve Factors*	*(7) Schedule R Reserves*
(1)	(1)	All death & stat. perm. total	—	—	—	736,000	—	—	736,000
		Temp. or perm. partial disability							
		Accidents prior to 7/1/51							
(2)	(1)	Unpaid Comp. Board awards	—	—	—	37,000	—	—	37,000
		Pending cases							
(3)	(1)	Indemnity	—	—	2,012,000	1,347,000	—	—	1,347,000
(4)	(1)	Medical (incl. death and perm. total)	—	—	—	111,000	—	—	111,000
		Contingency reserves							
(5)	(2)	Indemnity (incurred costs, item 3, × factor A)	—	—	—	—	—	(A) .0121	24,000
(6)	(3)	Medical (reserve, item 4, × factor B)	—	—	—	—	—	(B) .0788	9,000
		Reserve for reopened cases							
(7)	(4)	Indemnity	—	—	—	—	—	(C) 114,500	114,500
(8)	(4)	Medical	—	—	—	—	—	(D) 21,500	21,500
		Accidents 7/1/51–12/31/51							
		Open and closed compensable cases							
(9)	(5)	Indemnity	602	29,000	264,000	235,000	66,000	(E) 666	372,000*
(10)	(6)	Medical (incl. death and perm. total)	605	30,000	71,000	41,000	18,000	(F) 164	70,000*
		Non-compensable medical cases							
(11)	(1)	Prior to 7/1/51				2,000			2,000
(12)	(7)	7/1/51—12/31/51	656	1,000	—	1,000	—	20	12,000†
		Total							2,856,000

* (Column 1 × column 6)—column 2, compared with (column 4 + column 5)
† (Column 1 × column 6)—column 2

A STATISTICAL STUDY OF LARGE FIRE LOSSES WITH APPLICATION TO A PROBLEM IN CATASTROPHE INSURANCE

BY

L. H. LONGLEY-COOK

This study was undertaken in 1950 as part of an investigation into the problem of rating catastrophe fire insurance. It was subsequently put together as a paper and submitted, together with the paper I presented to the Society last year, as a thesis for Part III and IV of the Fellowship Examinations. Fortunately I managed to pass the examinations and did not need to rely on a thesis; but, since the study has been put together as a paper, it may prove of interest to members and encourage others to make investigations into the statistical aspects of catastrophe insurance, not only in the fire field but in all lines of insurance.

Certain large organizations have been for many years self insurers of their fire risks. Such an organization needs an insurance policy to cover it against fire losses of catastrophic proportions, the chances of which are so remote that no credible statistics are available to assess the cost of the cover. The most usual form of contract covers losses by fire up to a specified amount in excess of a fixed sum. Thus a policy might cover a loss up to $1,000,000. in excess of $200,000. In the case of a fire loss of less than $200,000. no payment would be made under the policy, but in the case of a fire loss of $500,000., a payment of $300,000. would be made. Under no circumstances would a payment in excess of $1,000,000. be made, however large the actual loss. The sum of $1,000,000. in the above example is referred to as the sum insured and the sum of $200,000. the attachment point. For simplicity, it is usual to employ the notation "$1,000,000/$200,000" to designate this cover. By definition catastrophe insurance requires the attachment point to be fixed sufficiently high so that the probability of a claim is remote. Catastrophe policies may cover other lines such as explosion and wind but this study is limited to the fire risk.

The assessing of a suitable premium for a catastrophe policy involves especial difficulties because the usual rating methods cannot, by the nature of the contract, apply. If sufficient data were available to determine the premium directly, the risk covered would not be a catastrophe, and hence the premium must be determined on a judgment basis. The premium required will not, as in ordinary insurance, vary in proportion with the sum insured and it is not possible therefore to develop a rate of premium.

The premium will depend not only upon the nature of the risk, details of the individual exposures, etc., but also the sum insured and the attachment point. The underwriter is presented with a difficult task in trying to take all these aspects into account. If it were possible to determine some approximate law concerning the distribution of catastrophe fire losses, it might be possible to simplify the underwriting by removing some of the special difficulties introduced by the non-linear relation between the sum insured and the premium and the effect of varying the attachment point. Clearly the distribution of large fire losses must be a function of the distribution of exposures and hence no exact law can exist. At the same time by studying a sufficiently

large body of data an empirical law may be found which will have some practical application.

The most suitable body of data for this purpose appears to be the analysis of large fire losses in the United States and Canada issued each year by the National Fire Protection Association. The figures are not perfect in that they are estimates and some of them include business interruption and rent insurance, but they do provide a body of statistics which is sufficiently accurate for this investigation and is free from the distortion due to under-insurance which makes ordinary insurance statistics difficult to handle.

It seems unwise to include in this investigation the experience of the war years, so that the data available are limited to the four years 1946–1949 (figures for 1950 were not available when this paper was drafted). It has been considered desirable to exclude from the data certain classes of fire losses which are not normally covered by policies issued by the fire department of an insurance company. These classes are:—

(1) Property of the Armed Forces,
(2) Forest fires,
(3) Those fires listed under the heading Transportation, which consist mainly of aviation and ship fire losses.

With these classes excluded, we are left with 759 fires, each with an estimated loss of $250,000 or more. This should provide a sufficiently large body of data for our purpose.

To simplify the study of these losses, they were grouped according to the size of loss. In view of the very large concentration of losses at the lower values, a logarithm scale was used, the lower limit of each group being fixed at 1.189 (the fourth root of 2) times the lower limit of the preceding group. The following table shows the distribution of losses.

TABLE 1

Distribution of large losses, 1946–1949, according to size

Size of Loss Group $	*No. of Losses*	*Size of Loss Group* $	*No. of Losses*
250,000—	248	1,420,000	10
297,000—	144	1,680,000	5
354,000—	77	2,000,000	9
420,000—	57	2,380,000	3
500,000—	85	2,830,000	3
595,000—	22	3,360,000	2
707,000—	33	4,000,000	1
841,000—	19	4,760,000	1
1,000,000—	28	5,660,000	1
1,190,000—	11	6,730,000	0

If we exclude the humps at $500,000, $1,000,000, and $2,000,000, which are obviously due to rounding in estimating the amount of loss, these figures reveal a fairly regular pattern which encourages further investigation.

Considering the figures for the four individual years, it is found that, allowing for the smallness of the data, each year follows the same distribution. It is found also that the total losses vary from year to year no more than would be expected as a result of chance variation, except for the first group, $250,000 to $296,999, which has higher figures for the last two years than the first two years. This may be due to difficulty in dealing with borderline cases around the $250,000 loss size.

For the period under consideration, values were fairly steady and it was not considered necessary to allow for inflationary trends.

In the following table, the expected has been taken as one quarter the four-year total.

TABLE 2

Number of losses in individual years by size
(A = Actual, E = Expected)

Size of Loss Group	*Expected Losses*	*1946*			*1947*			*1948*			*1949*		
		A	*A-E*	$\sqrt{E}$	*A*	*A-E*	$\sqrt{E}$	*A*	*A-E*	$\sqrt{E}$	*A*	*A-E*	$\sqrt{E}$
$													
250,000—	62	42	−20	8	47	−15	8	92	+30	8	67	+5	8
297,000—	36	28	− 8	6	36	0	6	43	+ 7	6	37	+1	6
354,000—	19	10	− 9	4	25	+ 6	4	25	+ 6	4	17	−2	4
420,000—	14	9	− 5	4	12	− 2	4	20	+ 6	4	16	+2	4
500,000—	40	41	+ 1	6	38	− 2	6	39	− 1	6	41	+1	6
1,000,000—	14	15	+ 1	4	9	− 5	4	21	+ 7	4	9	−5	4
2,000,000—	5	7	+ 2	2	5	0	2	4	− 1	2	4	−1	2

Instead of studying the distribution of these large losses in the form shown in Tables 1 and 2, it was decided to convert them into an excess of loss form. This procedure has four advantages:

1. Since we wish to use the results in relation to catastrophe insurance problems, results in this form will be easier to handle;
2. The financial affect of any graduation of the figures will be immediately apparent;
3. Full account can be taken of the distribution of the losses within the groups;
4. No weight will be given to the losses of exactly $250,000, and very little weight will be given to the other losses in the $250,000—$296,999 group. This is the only group which reveals unsatisfactory year to year variation.

The procedure adopted was to calculate the cost of the excess of loss over $250,000, $500,000, $750,000, and so on in steps of $250,000 for all the 759 losses studied. The calculation of those excess of loss costs is set out in Table 3, and the results summarized in Table 4.

TABLE 3

Calculation of Excess of Loss Costs for the 1946–49 Large Losses
(All figures in millions of dollars)

Size of Loss Group $	*No. of Losses*	*Total Amt. of Losses*	*First $250,000 of each loss*	*Total Excess of $250,000*	*Total Excess of loss over $250,000 in $250,000 steps*										
					1st	*2nd*	*3rd*	*4th*	*5th*	*6th*	*7th*	*8th*	*9th*	*10th*	*11th*	*Bal.*
250,000—	248	64.4	62.0	2.4	2.4											
297,000—	144	45.9	36.0	9.9	9.9											
354,000—	77	29.8	19.2	10.6	10.6											
420,000—	57	25.8	14.3	11.5	11.5											
500,000—	85	44.2	21.2	23.0	21.3	1.7										
595,000—	22	14.1	5.5	8.6	5.5	3.1										
707,000—	33	25.2	8.3	16.9	8.2	8.3	0.4									
841,000—	19	17.3	4.7	12.6	4.8	4.7	3.1									
1,000,000—	28	30.3	7.0	23.3	7.0	7.0	7.0	2.3								
1,190,000—	11	14.1	2.8	11.3	2.7	2.8	2.7	2.8	0.3							
1,420,000—	10	15.2	2.5	12.7	2.5	2.5	2.5	2.5	2.5	0.2						
1,680,000—	5	8.8	1.2	7.6	1.3	1.2	1.3	1.2	1.3	1.2	0.1					
2,000,000—	9	18.7	2.3	16.4	2.2	2.3	2.2	2.3	2.2	2.3	2.2	.7				
2,380,000—	3	8.1	.7	7.4	.8	.7	.8	.7	.8	.7	.8	.7	.8	.6		
2,830,000—	3	9.0	.8	8.2	.7	.8	.7	.8	.7	.8	.7	.8	.7	.8	.7	
3,360,000—	2	7.3	.5	6.8	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	1.3
4,000,000—	1	4.0	.2	3.8	.3	.2	.3	.2	.3	.2	.3	.2	.3	.2	.3	1.0
4,760,000—	1	5.0	.3	4.7	.2	.3	.2	.3	.2	.3	.2	.3	.2	.3	.2	2.0
5,660,000—	1	6.0	.2	5.8	.3	.2	.3	.2	.3	.2	.3	.2	.3	.2	.3	3.0
6,730,000—	—	—	—													
TOTALS	759	393.2	189.7	203.5	92.7	36.3	22.0	13.8	9.1	6.4	5.1	3.4	2.8	2.6	2.0	7.3

TABLE 4

Excess of loss costs of the 1946–49 large losses

Attachment Point	*Cost of $250,000 cover over attachment point*	*Cost of unlimited cover over attachment point*
$	$	$
250,000	92,700,000	203,500,000
500,000	36,300,000	110,800,000
750,000	22,000,000	74,500,000
1,000,000	13,800,000	52,500,000
1,250,000	9,100,000	38,700,000
1,500,000	6,400,000	29,600,000
1,750,000	5,100,000	23,200,000
2,000,000	3,400,000	18,100,000
2,250,000	2,800,000	14,700,000
2,500,000	2,600,000	11,900,000
2,750,000	2,000,000	9,300,000
3,000,000	.	7,300,000

It is to the last column of Table 4 that we shall turn our attention. The logarithms of the amounts shown decrease steadily and their first differences decrease rapidly at first and then become practically constant. As will be seen from the following table, a very satisfactory fit can be obtained by assuming that the second difference of the logarithms decrease in geometric progression.

TABLE 5

Graduation of Excess of Loss Costs

		Ungraduated				*Graduated*		
Attachment Point	x	*Cost in millions of dollars of unlimited cover over, attachment point.* λ'_x	$log\lambda'_x$	$\Delta log\lambda'_x$	$\Delta^2 log\lambda_x$	$\Delta log\lambda_x$	$log\lambda_x$	λ_x
$								
250,000	1	203.5	2.3086	−.264	.0800	−.2623	2.3086	203.5
500,000	2	110.8	2.0444	−.172	.0400	−.1823	2.0463	111.3
750,000	3	74.5	1.8722	−.152	.0200	−.1423	1.8640	73.11
1,000,000	4	52.5	1.7202	−.133	.0100	−.1223	1.7217	52.69
1,250,000	5	38.7	1.5877	−.116	.0050	−.1123	1.5994	39.76
1,500,000	6	29.6	1.4713	−.106	.0025	−.1073	1.4871	30.70
1,750,000	7	23.2	1.3655	−.108	.0012	−.1048	1.3798	23.97
2,000,000	8	18.1	1.2577	−.090	.0006	−.1036	1.2750	18.84
2,250,000	9	14.7	1.1673	−.092	.0003	−.1030	1.1714	14.84
2,500,000	10	11.9	1.0755	−.107	.0002	−.1027	1.0684	11.70
2,750,000	11	9.3	0.9685	−.105	.0001	−.1025	.9659	9.24
3,000,000	12	7.3	0.8633			−.1024	.8635	7.30

The graduated values of λ_x follow a law which is in form the same as Makeham's famous law of mortality

$$\lambda_x = ks^x g^{c^x}.$$

Where $c = .5$, $\log g = .6400$, $\log s = -.1023$.
The similarity is, however, in form only.

The following table shows the closeness of fit of the graduation.

TABLE 6

Comparison of Graduated and Ungraduated Values of Excess of Loss Cost

Attachment Point	x	*Cost of Unlimited Cover over Attachment Point (in millions of dollars)*			*Cost of $250,000 Cover over Attachment Point (in millions of dollars)*		
		Ungraduated	*Graduated*	*Difference*	*Ungraduated*	*Graduated*	*Difference*
$							
250,000	1	203.5	203.5	—	92.7	92.2	−0.5
500,000	2	110.8	111.3	+0.5	36.3	38.19	+1.9
750,000	3	74.5	73.11	−1.4	22.0	20.42	−1.6
1,000,000	4	52.5	52.69	+0.2	13.8	12.93	−1.1
1,250,000	5	38.7	39.76	+1.1	9.1	9.06	—
1,500,000	6	29.6	30.70	+1.1	6.4	6.73	+0.3
1,750,000	7	23.2	23.97	+0.8	5.1	5.13	—
2,000,000	8	18.1	18.84	+0.7	3.4	4.00	+0.6
2,250,000	9	14.7	14.84	+0.1	2.8	3.14	+0.3
2,500,000	10	11.9	11.70	−0.2	2.6	2.46	−0.1
2,750,000	11	9.3	9.24	−0.1	2.0	1.94	−0.1
3,000,000	12	7.3	7.30			1.53	
3,250,000	13		5.77			1.22	
3,500,000	14		4.55			.95	
3,750,000	15		3.60			.76	
4,000,000	16		2.84			.59	
4,250,000	17		2.25			.48	
4,500,000	18		1.77			.35	
4,750,000	19		1.42			.31	

It is necessary to investigate how the actual number of losses recorded in Table 1 compare with the losses expected by the foregoing graduation formula.

The total number of losses expected for the amount of $250,000 and over is

$$-4\frac{d\lambda_x}{dx} = 4\,\lambda_x\,\mu_x\,,$$

where $\mu_x = -\log_e s - \log_e g \,.\, \log_e c \,.\, c^x$
and the factor of 4 is introduced because λ_x is in units of $1,000,000 and the interval used for x is $250,000. The results are shown in Table 7.

TABLE 7

Comparison of actual and expected number of losses

Size of Loss Group $	*Actual Losses*	*Expected Losses*	*A-E*	*Σ(A-E)*	*Size of Loss Group* $	*Actual Losses*	*Expected Losses*	*A-E*	*Σ(A-E)*
250,000—	248	125.5			1,420,000—	10	9.2	+ .8	+ .6
297,000—	144	108.8	+35.2	+14.1	1,680,000—	5	7.1	−2.1	− .2
354,000—	77	91.3	−14.3	−21.1	2,000,000—	9	5.7	+3.3	+1.9
420,000—	57	74.4	−17.4	− 6.8	2,380,000—	3	4.3	+ .3	−1.4
500,000—	85	58.1	+26.9	+10.6	2,830,000—	3	3.2	− .2	− .1
595,000—	22	44.4	−22.4	−16.3	3,360,000—	2	2.2	− .2	+ .1
707,000—	33	32.7	+ .3	+ 6.1	4,000,000—	1	1.4	− .4	+ .3
841,000—	19	23.6	− 4.6	+ 5.8	4,760,000—	1	.7	+ .3	+ .7
1,000,000—	28	16.9	+11.1	+10.4	5,660,000—	1	.4	+ .6	+ .4
1,190,000—	11	12.3	− 1.3	− .7	6,730,000—	—	.2	− .2	− .2

The first group has negligible weight in the calculation of excess of loss costs and it is not surprising therefore that the graduation should provide an unsatisfactory estimate of the number of losses. For the number of losses over $300,000 the graduation has of course, removed the humps which occur at the $500,000, $1,000,000 and $2,000,000 points.

This distribution of large fire losses, depending as it does on the distribution of fire exposures, cannot be expected to apply to any particular group of properties for which a catastrophe cover is required but the pattern is of interest and may provide a valuable guide to underwriters in determining the correct premium for a particular cover when the premium for some other cover has been established.

DISCUSSIONS OF PAPERS READ AT THE NOVEMBER 1951 MEETING

THE NATIONAL DEFENSE PROJECTS RATING PLAN

WILLIAM LESLIE, JR.

Volume XXXVIII, Part II, Page 174

WRITTEN DISCUSSION BY CHARLES J. HAUGH

In setting forth the details of the National Defense Projects Rating Plan and its evolution, Mr. Leslie has made a very valuable contribution to the *Proceedings*. In attempting to discuss a paper of this nature one finds himself limited to calling attention to omissions, misstatements of fact, or, as a last resort, to quibbling. I find myself unable to call attention to any serious omissions or misstatements of fact. Therefore, I must quibble.

As Mr. Leslie states, this plan in essence is simply a revival of the Comprehensive Insurance Rating Plan which was in effect during World War II, but revised to correct defects and annoyances which were inherent in that plan. This present plan is a substantial improvement over its predecessor. The use of composite rates on a payroll basis for determination of the standard premium for automobile and general liability insurance; the inclusion in the fixed charge of a provision for profit and contingencies; and the treatment of the catastrophe hazard on risks involving manufacturing or handling of explosives are among the more important revisions which bring about substantial improvement in the plan.

Mr. Leslie has thoughtfully incorporated two statements with which one can disagree. I have no thought of injecting lexicography into this discussion, but I cannot refrain from expressing my unhappiness over his use of the word "wholesaling" in his statement to the effect that "the new plan, like its predecessor, provides for the wholesaling of automobile liability, general liability and workmen's compensation insurance. . . . " These coverages are combined in a retrospectively rated package, but I question the "wholesaling". Since the plan provides for the employment of an advisor regardless of the type of carrier involved, the advisor's fee is not a part of the insurance premium, but is treated separately. Aside from that, the charge and rating values are quite in accord with those developed generally on retrospective rating plans. This constitutes my first quibble.

Beginning on page 181, Mr. Leslie shows a series of calculations developing an indicated ratio of unallocated claim expenses to losses of .135. Actually in the table on page 181 on which there is developed the ratio of unallocated claim expense to losses, the permissible loss ratios used for lines other than compensation are not the permissible loss ratios for losses alone, but are the permissible loss ratios for losses plus allocated loss expense. Since the factor to be used is applicable to losses exclusive of allocated loss expense, this calculation to test the adequacy of the 1.12 factor should be based upon a permissible loss ratio exclusive of allocated claim expense. However, at this point I must confess to being engaged in my second quibble, for these liability lines constitute a minor part of the total hazard and the resulting effect is insignificant. However, as I indicated at the outset, a discussion of a paper is of no

value if it does not afford an opportunity to call attention to any slip which shows, however slightly.

Up to the present time the volume of business subject to the plan is relatively small. However, it is important that the plan be available, not merely for the relatively small volume of business currently written under it, but for use in the event conditions arise necessitating a rapid expansion of its use.

THE MAKING OF WORKMEN'S COMPENSATION RATES—1951 PENNSYLVANIA REVISION

GEORGE B. ELLIOTT

Volume XXXVIII—Page 141

WRITTEN DISCUSSION BY A. Z. SKELDING

Mr. Elliott has noted that the Pennsylvania ratemaking structure differs considerably from that used in many other jurisdictions. Had I Tom Carlson's erudition, or if a copy of "Bartlett's Familiar Quotations" had been on the shelf of our local library where it should have been perhaps I could inject here a more elegant quotation than the homely adage which now occurs to me, namely, "There's more than one way to skin a cat."

I take it that this is neither the time nor place to attempt to argue the relative advantages of one system as against the other. It may be of interest, however, to point out some of the principal differences between the ratemaking procedure of the National Council and of the system described by Mr. Elliott.

It appears to me that, perhaps, the most important difference is the use of wage factors, or payroll modifiers, in the Pennsylvania system which includes, not only a modification of payrolls on the basis of known changes in average weekly wages by broad industry groups during the five year experience period, but a projection to the midpoint of the period during which the new rates are to be effective.

Back in the early 1920's, the ratemaking procedure of the National Council also provided for the use of a wage factor. Without going into detail I merely mention that this program did not work at all satisfactorily. Finally, as noted in the report made to the NAIC by the late Clarence W. Hobbs at the September 1925 session of the NAIC, it was recommended "that the troublesome wage factor be eliminated."

Nevertheless, during the recent war period it became evident, because of skyrocketing payrolls coupled with the influence of other factors, some of which worked in a contrary direction, that some modification of the then current ratemaking program was desirable.

I do not want to take the time to expound at length upon the studies made by the staff of the National Council, its Committees, and Committees of the NAIC in investigating this problem. Those who are interested in the details will find a complete exposition in the reports of the Workmen's Compensation Committee in the Proceedings of the NAIC, beginning with the 1943 session and continuing almost to the present time.

Suffice it to say, that as a result of those studies the carriers reported to the NAIC, prior to the December 1947 session "Subject to approval and endorsement by the NAIC," the carriers will introduce into the compensation ratemaking structure a rate level adjustment factor giving overall recognition, state by state, to the aggregate effect of factors which produce underwriting results either better or worse than those contemplated by the rating structure. Such factor would be based on underwriting results in the individual state within a specified period of the recent past and would be limited in its effect to a moderate percentage of decrease or increase in the rate level otherwise determined. The present procedure of the National Council provides that the latest available 12 months of calendar year experience, which depending upon the time element may terminate either December 31 or June 30, shall be used in determining the rate level adjustment factor and such factor shall be limited to a maximum of 1.10 and a minimum of .900.

I suppose Pennsylvania and Delaware have had a longer continuing use of a wage factor in their ratemaking structure than any other states. I also suppose Texas, which promulgated such factor, beginning in 1943, is about the next in longevity although, in promulgating revised rates to become effective December 1, 1952, the Texas Board of Insurance Commissioners, the rate regulating authority for that state, has discarded its previous "wage trend formula" for the current rate level adjustment factor program of the National Council. It appears that the primary reason for this action, after some 9 years of adherence to a wage trend factor, is that the Board is convinced that, under current conditions, the wage factor fails to give proper recognition to all of the elements, subsequent to the policy year rate level period, affecting compensation costs, and a much more satisfactory recognition of all of those elements is made through the use of the latest calendar year data without the intricacies of further projection.

At this point it is, perhaps, desirable that I pause a moment to explain that I have not forgotten my previous statement that I believe this is neither the time nor the place, in an objective discussion of Mr. Elliott's paper, to argue the relative advantages of one system against the other. I have been trying to adhere to a factual presentation. We like our system and Pennsylvania presumably likes its system. All of which may be merely another way of saying "What's one man's meat or drink may be another man's poison."

There are other differences, some of detail, and some of principle. Merely for the purposes of information, without any attempt to comment thereon, it may be helpful to list a few of them.

(1) Pennsylvania uses five policy years, or 60 months of issue. Most states, although not all, use 24 months of issue.

(2) Pennsylvania excludes the experience of minimum premium risks and experience of rated risks with more than 75% credibility. Most other states do not make these exclusions, although I believe New York now excludes the experience of self-rated risks.

(3) Pennsylvania formula rates, in general, between the five year experience and the 15 year experience. Most states, although not all, formula rate between the two year experience and previous experience as reflected by the current rate.

(4) Pennsylvania assigns credibility on the basis of the average annual number of temporary total cases. The Council procedure uses expected losses, based on the two year payrolls and present rates, for this purpose.

There is also considerable difference in the Pennsylvania system of adjusting reported experience to current levels. I do not propose to comment on those details except to remark that the relatively small number of classifications in Pennsylvania compared to the almost 700 classes, not all of which develop exposure, in other jurisdictions may, perhaps, have something to do with the different method of treatment. The great number of classifications in the National Council Manual, to say nothing of the great number of exception classifications and special classifications in a number of states, many with extremely small exposure, is the bane of the ratemaker's existence.

I was interested in the example on page 155 of the derivation of the 1951 rate for classification 225, Rubber Goods and Fire Manufacturing, and the subsequent remark of Mr. Elliott that for the larger classes it makes very little difference in the final rate whether such rate is based on the five year experience or the combination of the five year and fifteen year period. The same observation could be made of procedures in effect in other jurisdictions. This leads one to wonder regarding the wisdom of the enormous detail and refinements we go through to come up with a rate which differs only slightly from the current rate or from that produced by one of the intermediate steps. On the other hand, I suppose this is a case of hindsight (after the answer has been ground out) being better than foresight (before we know the answer) and there is, of course, much to be said for following a uniform procedure, without discrimination, letting the chips fall where they may.

Reference is made to a change to be made in the use of the experience period for the 1952 revision, that is, to get away from the use of what we have previously known as policy year experience, so that the latest policy of the experience period will expire exactly 12 months prior to the effective date of the 1952 rates. This involves, instead of a January 1st starting date, the use of the experience of policies issued to become effective between July 1st of a given year and June 30th of the following year. The National Council has embarked on a similar program, except that it provides that the latest policy in the experience period shall have expired 14 months prior to the effective date of the new rates.

The trouble is that, for one reason or another, action on proposed rates is sometimes delayed and new rates become effective quite a bit later than was expected at the time of filing. In most cases this automatically establishes a new anniversary date for the next revision, or if the old anniversary date is maintained, means two revisions in less than a year. Either result gives rise to difficulties. With the new anniversary date we widen, beyond 14 months, the lag in experience because it is a practical impossibility, for the coming revision, to go back and retabulate the classification experience for the earlier years on a different experience period so as to maintain not more than a 14 month lag. The difficulty of two revisions in a 12 month period is obvious if rates are going up—as they are in most cases today.

In conclusion, may I express the thought that Mr. Elliott has performed a real service for many of us in his lucid description of the Pennsylvania rate-

making procedure. Many of us are reasonably familiar with the broad aspects of the compensation ratemaking procedure in other states and to some of us most of the details are also known. The Pennsylvania method did not seem to be so well known except among the people who actually worked personally with it through membership on Committees of the Pennsylvania Bureau. I am sure that those members of the Society who are interested in the problems of workmen's compensation ratemaking will welcome Mr. Elliott's careful and detailed explanation of the Pennsylvania system. It is going to be helpful to have that system set down in writing for ready reference in the *Proceedings* of the Society and, to drag in another quotation that, I believe, I read some place, but I don't know where, "with such lustre that he who runs may read."

REVIEWS OF PUBLICATIONS

CLARENCE A. KULP, Book Review Editor

Insurance: Accounts and Finance. J. B. Wilson and Hector K. MacIver. Buckley Press Limited, London, England, 1952. Pp. 214.

The reviewer was particularly interested in this book because he is currently engaged in a cooperative venture in the preparation of an American textbook on fire and casualty accounting. The contrasts in emphasis are remarkable.

This book is divided into 3 parts: Part One, *General Principles of Bookkeeping;* Part Two, *Accounts of Insurance Companies;* Part Three, *Taxation, Investments, Banking and Foreign Exchange.*

In the American textbook the inclusion of a section on the general principles of bookkeeping was considered and rejected. It was felt that such material would be better handled in standard accounting texts, and might in fact confuse the issue if dwelt upon here, the statutory rules of insurance accounting in America being what they are. Basically this matter of statutory rules is responsible for the widest divergence between the American and British approaches. A very large portion of the American textbook is devoted to the Uniform Accounting Regulations, the Annual Statement Blank, and the Insurance Expense Exhibit. Although the British seem to have certain reporting forms prescribed under the Assurance Companies Acts, they are few and comparatively simple in nature. Nothing remotely comparable to our Uniform Accounting Regulations and the Insurance Expense Exhibit seems to exist. Indeed, almost the entire emphasis in this book is toward the balance sheet. Expense analysis and control are hardly mentioned, and accounting for rate regulation is naturally mentioned not at all since there is no rate regulation in the British Isles. Expense analysis and control are deftly and completely handled in the following paragraph:

> An excellent test of satisfactory management is to analyze the revenue accounts and to ascertain the ratios or percentages which the claims, commission, expenses, and departmental profits respectively bear to the net premium income, and to compare them with the corresponding ratios for previous years.

There is no discussion of classification of accounts, nor yet of allocation of expenses by class of business, by function, or by company. How green the grass is in Britain!

Even in the balance sheet the British take such a reasonably practical approach as to leave us gasping. No mention is made of non-admitted assets nor of non-admitted reinsurance. Investment restrictions are disposed of with the following sentence:

> In most countries—the United Kingdom being a notable exception—the investment policy of insurance companies is controlled to a greater or less extent by legislation (as in the case of U.S.A. and Canada).

The liabilities also are treated quite liberally. Could anything be more simply stated than this?

> The percentages of premiums reserved for unexpired risks varies with

different companies, the most usual rate being forty percent. There is no doubt that a forty percent reserve is quite adequate for home business, where the premiums include a high proportion of annual business. Where, however, long-term business running for four or five years is transacted (as in the U.S.A.), the ordinary forty percent reserve requires to be supplemented, and it is significant to note that the larger companies have built up very substantial additional reserves.

Very little is said about outstanding claims except to point out where they are provided for in the revenue accounts and to state that "the general practice is to include all claims admitted or intimated, but not paid." There is no discussion of unpaid claims expense, nor of incurred but not reported, nor yet of the question of the adequacy of the provisions made for the discharge of liabilities. There is, however ,a detailed explanation of the statutory difference between the words "provision" and "reserve" which should be of interest to the American reader. Basically "the expression reserve shall not . . . include any amount . . . retained by way of providing for any known liability." Such amounts are "provisions." Thus the "provision" for unexpired risks is not a "reserve," though this statutory distinction seems not entirely honored in ordinary usage.

One could continue indefinitely cataloging the differences in principles and practice between our two countries. It is always an enjoyable sport to discover how normal "we" are and how peculiar "they" are. Perhaps, however, too great an accumulation of such evidence can boomerang, as too great a concentration of sweet perfume can become a stench. To be sure, a comparison between the emphasis in insurance accounting in America and that in Great Britain can be made to look at first glance like a contrast between a well-regulated society and anarchy; a second look, however, might produce the whiff of a contrast between an order so depraved as to require external coercion and a self-disciplined society. Certainly, for all our emphasis on statutory redundancies in reserves, etc., etc., etc., our record of insurance company insolvency gives an unfortunate smell to the comparison.

"Comparisons are odorous."

D. M. PRUITT

Principles and Practices of Accident Insurance. W. A. Dinsdale. Buckley Press Limited, London, England, 1952. Combined Edition Pp. 207.

Parts I and II of this book, originally published separately in 1946 and 1947, were very ably reviewed by A. H. Mowbray in Vol. XXXIV of the *Proceedings.* Part I covered *General Principles* and Part II *General Practice.* The combined edition now includes a Part III entitled *Application of Principles and Practices.*

The points made by Professor Mowbray at that time still hold true and do not require repeating here, except to remind the reader again that when our British cousins speak of "accident" insurance, they mean what we mean by "casualty" insurance.

There are 8 chapters in Part III, each one dealing with a different class of business, namely: *personal accident, disease and sickness; employers' liability; motor; burglary; fidelity guarantee; public liability; engineering; miscellaneous;* and each chapter treats its subject in the same sequence of study as was adopted in Parts I and II; i.e., *general principles; proposal forms; cover notes*

and premiums; policy forms; endorsements; renewal procedure; claims; other features. Here is a particularly valuable source of detailed information regarding the various classes of casualty insurance as underwritten in Great Britain. Its form is orderly and concise, and the unique system of additional notes commented on by Professor Mowbray makes for ease in digging out salient facts. This arrangement with the bare text on the right-hand page, and extensive notes on the left commends itself as particularly suitable for reference and for study. Perhaps it could be experimented with in this country.

In going through this book the reviewer was constantly reminded of how easy it is for British and Americans to do the same thing in different ways. The account of the development of the "reserve for unexpired risks" is so fascinating as to be worthy of extensive quotation.

> The majority of policies usually fall due at one of the four quarter-days and even if the insurers adopt the practice of arranging for policies to expire exactly twelve months from the date when they commence, the adjustment for unexpired risks set out below gives approximately correct results.
>
> If it is assumed that the books are closed on the 31st of December of each year, then policies falling due at the respective quarter-days will be affected as follows:
>
> | | |
> |---|---|
> | Policies due on 25th March | 1/4 of the risk still to run |
> | Policies due on 24th June | 2/4 of the risk still to run |
> | Policies due on 29th Sept. | 3/4 of the risk still to run |
> | Policies due on 25th Dec. | 4/4 of the risk still to run |
>
> By an addition of the vulgar fractions given above, it will be seen that 10/16ths (or 62½ percent) of the premiums received by the insurers have not been earned because they are in respect of liabilitities which may give rise to claims between the 31st of December and the respective expiry dates *in the following year.* It will be recognized that some of the policies issued during the year will have been short period contracts and in the circumstances, insurers usually take a round figure of 60 percent instead of 62½ percent. Part of the premiums received, however, must cover commission and expenses of management, which have already been earned, and these as a rule are regarded as representing one-third of the total premiums received. By a deduction of one-third from the figure of 60 percent, the proportion of 40 percent is arrived at and this is, of course, the percentage usually adopted as the reserve for unexpired risk.

It was necessary for this reviewer to consult our fellow member Mr. Longley-Cook in order to get even a confused understanding of the siderially inaccurate quarter-days. It seems that whereas a good New England farmer is unhappy in planting potatoes in the dark of the moon, a British man of property rather fancies governing his entry into contracts by the phases of the sun. Since leases on property are customarily effective with the quarter-days, fire insurance has also developed that pattern. Mr. Longley-Cook advises that the 4 quarter-days noted above are called respectively, Ladyday, Midsummer, Michaelmas and Christmas. Unfortunately the Scots, being rather independent members of the Union, have abandoned the sun's phases completely and have established quarter-days as follows: Feb. 2 (Candlemas), May 15

(Whitsunday), Aug. 1 (Lammas), Nov. 11 (Martinmas). With such a set of quarter-days the 62½ percent computed above becomes 50 percent and in order to maintain the same net of 40 percent the provision for commission and expenses must necessarily be reduced from one third to one fifth, a reduction thoroughly consistent with the proverbial Scottish thrift.

There is some question in Mr. Longley-Cook's mind, and also in this reviewer's, as to the influence of quarter-days on "accident", i.e., "casualty" insurance, however valid the approach may be in the fire insurance business.

D. M. PRUITT

Life Contingencies. C. Wallace Jordan, Jr. The Society of Actuaries, Chicago, 1952. Pp. xii, 331.

The publication of the first official text-book on *Life Contingencies* to be sponsored by an American actuarial society is a matter of considerable importance in the realm of actuarial literature. In the past the Society of Actuaries and its parent societies have recommended the British official textbook, written originally by George King and subsequently rewritten by E. F. Spurgeon, as the course of study for students because this was the only textbook available which was sufficiently full in its scope for the training of life actuaries. The Casualty Actuarial Society has been able to recommend one of the more elementary textbooks published in America because a less detailed knowledge of the subject is required.

The study of life contingencies is not an end in itself but the means to an end. A knowledge of the theory is valueless unless it can be applied to the solution of problems which arise in life insurance and similar work; hence it is most desirable that the development of the theory be paralleled with examples of its practical application. There are many differences in the practice of life insurance between this country and Britain and for a long time there has been a need for a modern text capable of being applied directly to the benefits commonly offered in the United States and Canada. Spurgeon's text, although it is in its third edition, differs little from the original text published in 1922 and a completely rewritten book is in course of preparation for the British societies.

When George King's book was first published in 1887 it received the following fully deserved tribute:

> It systematized and co-ordinated the presentation of the complex theory with which it dealt, thus elevating to the status of a definite branch of scientific knowledge a subject which though fully ripe for such recognition had up to that time suffered from the disadvantage of comparative inaccessibility.

All writers since that date have had their task considerably eased. The theory is fully established and it is only in the presentation of the subject, the elegance of the proofs, and the choice of illustrative examples that modern writers can contribute something new. So much has been written on the subject of life contingencies in the last 65 years that the author of a new text has a serious problem in deciding what to include and what to leave out.

The author of the Society of Actuaries' new text, Mr. C. Wallace Jordan, is an Associate Professor of Mathematics at Williams College and a Fellow of the Society of Actuaries. He has prepared a most able text which develops the subject clearly and logically and has provided ample exercises for the student at the end of each chapter. The book is divided into 3 parts, *Single-Life Functions; Multiple-Life Functions; Population Problems and Multiple Decrement Theory*. This plan is very close to that used in Spurgeon's text, except for the inclusion of a chapter on population problems in the third part. To the author of a text on life contingencies it is always a problem where to place the matter included in this chapter: the central death rate, the expectation of life, average age at death problems and stationary populations. None of these subjects arise in normal life insurance work, but with the exception of average age at death problems, they cannot be excluded from the text entirely. The central death rate is important because of its similarity to the form in which a measure of mortality of a group of actual persons is sometimes obtained in a mortality investigation. The complete expectation of life, since it is the first moment of the curve of deaths, is important for its statistical applications and provides the most elementary single index of the overall mortality from an individual age until death whenever it may occur. Stationary populations although of no great importance are occasionally valuable, in the stationary fund development, in considering the effect on a fund of changes in mortality and interest. Spurgeon left these subjects (with the exception of the central death rate) until the final chapter on single lives. This seems more logical than grouping them with the completely unrelated subject of multiple decrement theory.

It was a great disappointment to the reviewer to find that practically no attention had been paid to the fundamental problems of life contingencies. Actuaries are realizing more and more that the understanding of these fundamentals is an essential part of the subject of life contingencies. In Chapter 1, *The Measurement of Mortality*, the author starts from "the survival function" which he defines as the probability that a new life, aged o ,will survive until age x. Multiplying the survival function for each age by a suitable radix, the mortality table is obtained which is referred to as a "device for exhibiting mortality data." In proceeding to develop probabilities for ages other than age o the author merely states, "probabilities of death and survival may be obtained directly from the l_x and d_x columns of the mortality table. . . . " It is of interest to compare this terse statement with George King's original text:

> Now, in dealing with a group of unknown persons, all similarly circumstanced and all of the same age, we must assume that they all enjoy an equal chance of life and run an equal risk of death . . . the probability of anyone of them dying within a year is therefore . . .

To assume that the mortality table represents the experience of a group of lives all identical from the point of view of the various characteristics which influence mortality is obviously unrealistic and this assumption is rarely necessary or desirable. It is, however, necessary to assume instead that the life to which a probability applies is taken at random from an indefinitely large number of lives who are assumed to experience, as a whole, the mortality on which the table is based. The result of omitting all discussion of this problem is that the student gets no idea when he can and when he cannot use

the probabilities of the mortality table and this will sometimes lead him into error. For example, on page 272 the author gives a formula for the probability that a single man aged x will marry and then die before attaining age x + 1 which assumes that the mortality of men who have just married is identical with the mortality of all married men. The student is not even warned that this assumption is involved in the formula and in other formulae in the chapter. The student would be well advised to parallel his study of Jordan's text with reading Charles A. Spoerl's short paper on *Life Insurance and the Theory of Probability* in the Centenary Assembly Papers of the Institute of Actuaries.

Chapter 1 also includes a discussion of some famous laws of mortality (DeMoivre's, Gompertz's and Makeham's) and of select mortality tables. The remainder of Part I provides an orderly development of the single life annuity and insurance functions. Chapter 6—The Expense Factor—and Chapter 7—Premiums for Combination Benefits—interpret these problems against the background of American practice to the considerable advantage of the student. The presentation is generally admirable and calls for little comment. The introduction of the term "deferred immediate annuity" seems unfortunate and less space could have been devoted to that bugaboo of the student, Lidstone's Critical Function, which has little practical application.

Part II of the book develops the various formulae required for the evaluation of annuities and assurances involving two or more lives. For many years actuaries have felt that the space devoted to the more complex joint-life problems in both text books and examinations is out of all proportion to the frequency of occurrence of such problems in practical work. However it is most desirable that the various techniques should be clearly set out in the official textbook. This the author has done and the book provides an excellent, if rather too extensive, presentation of the subject.

For the development of the multiple decrement theory in Part III the author has introduced his own notation which differs from both the multiple decrement notation used in Britain and the not entirely satisfactory notation used for disability insurance. The discussion of this subject in the Spurgeon text was rudimentary but the subject was developed to a considerable degree by Bailey and Haycocks in 1946. It is again disappointing to find no discussion of fundamentals and in particular the significance of the related single decrement tables. The fact that the multiple decrement table is a mathematical model is however stressed. This chapter is followed by a chapter on combined tables which includes a useful explanation of the notation used for disability insurance.

The book has been prepared with considerable care and is generally well printed. There are useful appendices including a list of finite difference formulae and calculus theorems useful in life contingencies. The bibliography is unfortunately no more than a list of the references used by the author but the preparation of anything approaching a complete bibliography of life contingencies would be a task of considerable magnitude.

The author and the Society of Actuaries are to be congratulated on a book which will be a real help and value to the actuarial students of the future, providing them with a sound grounding in the techniques of life contingencies. Perhaps some day a second King will systematize and coordinate the techniques of the casualty actuary.

L. H. LONGLEY-COOK

Report of Committee on New Recording Means and Computing Devices. Society of Actuaries, Chicago, 1952. Pp. 107.

The Report of the Committee on New Recording Means and Computing Devices to the Society of Actuaries deals with the application of these new devices to life insurance work. It is probably the first piece of published literature on this subject. It should be of interest to members of our Society who are interested in the capabilities of electronic computing devices.

The report was submitted to the Society of Actuaries in September, 1952, at a special meeting called for the purpose of hearing the report. It is a summary of several years of study and investigation in this field.

The report is purposely limited to a discussion of equipment available in the commercial market. It contains a brief discussion of the rudimentary principles upon which these machines are based. The real meat of the report, however, is a description of the procedures developed by the Committee for processing the clerical work of a life insurance company by means of these machines.

To realize the full capacity of the machines, the Committee developed a routine which consolidates most of the computation at one time and place. In this routine almost all the policy figures needed are produced in one operation on an electronic computer. The other operations in the routine do not involve computation and are performed on standard, and therefore less expensive, equipment. The Committee calls the routine the consolidated functions approach.

The consolidated functions approach calls for the work for each policy to be done just prior to the anniversary date of the policy. The policy service work required on anniversary dates includes, among other things, the computation of the dividend, the amount of additional insurance that can be purchased with the dividend, interest due on loans and similar calculations as well as the preparation of the premium notice for the policyholder. In addition to policy service work the routine includes computation of cash values, premiums in force and other data for use in the preparation of the annual statement computed on the anniversary date. The annual statement figures for policies with anniversary dates other than December 31 have to be converted by formula to the basis of December 31.

The consolidated functions approach involves 3 basic records: a history card, a calculation card and a notice writing card. These cards are filed in separate departments by month according to anniversary date. The notice writing card and the calculation card are punched cards. The history card contains a small amount of punched information for identification, but is primarily a visual record. The cards are processed in monthly batches according to their anniversary dates.

Before the process can begin, the calculation cards must be brought up to date with respect to changes that have occurred during the previous year such as change of address. These changes have, of course, been recorded as they occurred during the year for internal records, and in the process a duplicate set of punched cards reflecting these changes has been prepared and placed in a file called the activity file. The calculation cards for the month being processed are combined with the corresponding change cards from the activity file and new up-to-date calculation cards are mechanically prepared.

This is preliminary work and is done by means of standard punched card equipment.

When the calculation cards are on a current basis the main operation can begin. The up-to-date calculation cards are processed through the electronic equipment which computes the premium due, the dividend, the additional insurance that can be purchased with the dividend, the interest due on loans and similar information. This information is punched on cards called policy answer cards, and at the same time punched cards containing the statistics for annual statement requirements and internal controls are prepared. These cards are called group answer cards. This completes the operations performed on electronic equipment, the remaining operations being performed on standard equipment.

The next step is to match the policy answer cards with the history cards. By a machine posting process the information on the policy answer cards is written across one line of the history card which is a visual record for general reference.

The policy answer cards with premium, dividend and other policy information interpreted across the face of the cards are sent to the billing department where they are matched with the notice writing cards. The notice writing cards contain the name and address of the policyholder in visual form. The notice writing cards and the policy answer cards properly overlapped are then passed through a photoelectric scanning machine which prepares premium notices.

It can be seen that this routine consolidates most of the arithmetic work in one operation so that the full capacity of the electronic equipment can be used. It also makes possible use of standard equipment, which is more economical for the other steps of the routine. In addition the procedure mechanically produces a visual history record and automatically prepares a premium notice for the policyholder.

Since all of the computation is consolidated at one point this routine can be applied either to electronic equipment which uses punched cards or to electronic equipment operated by magnetized tape. If it is desired to use electronic equipment operated by magnetic tape all that is necessary is to run the calculation cards through a machine which will convert them to a magnetic tape which is then processed through the electronic computer. The computer produces two tapes, one containing policy service figures and the other containing statistics for the annual statement. After the calculations are computed the tape containing policy service information can be run through a machine which will convert it to punched cards, in this case the policy answer cards. From this point on the operation proceeds as before with respect to the policy service work. The tape containing the statistics for the annual statement does not need to be converted to cards for the tape itself can be processed later on.

Although this routine was designed for life insurance work its general principles might be applied to fire and casualty operations. The anniversary policy service might be considered analogous to that required in renewal operations of fire and casualty companies. If the equipment can compute premiums due, dividends, additional insurance that can be purchased with dividends, interest on loans and other information in connection with life insurance, perhaps it could compute renewal premiums and similar data

in connection with relatively simple fire and casualty operations. If the equipment can cope with change of address and other changes in the life insurance business, perhaps it could also cope with change of address and change of car, etc., in the fire and casualty business. If the equipment can compute premiums in force and other statistics required for annual statements of life insurance companies, it should also be able to compute much of the data required for the annual statements of fire and casualty companies. As in the case of the life insurance companies, this data would have to be converted to a year-end basis.

The Report of the Committee on New Recording Means and Computing Devices is a logical and clear explanation of a carefully thought out and carefully checked routine. Not only was the routine carefully thought out and carefully checked, but most of the operations were submitted to actual tests on the equipment. A sample batch of the work of a large life insurance company was processed through most of these steps.

This review is merely a synopsis of the Report of the Committee on New Recording Means and Computing Devices. The report itself is a 107-page volume, full of interesting information on this subject. It contains many charts, diagrams and exhibits illustrating the procedures in minute detail.

Since this was the first attempt in this direction the objective was to develop a workable system, not necessarily the best system, for using electronic equipment in insurance work. The Committee expects that its investigation will furnish a "take-off point" for further investigations. No doubt we shall see further investigations in this field.

One question that comes to mind in reading the report is whether the full capacity of the tape processing electronic machine is realized when it is fitted into a routine designed primarily to handle punched cards. Since this is a radically different type of equipment perhaps a radically different approach is required to use it to full advantage.

The report probably is the beginning of a body of literature on the application of electronic machines to insurance work. It is a sound beginning based upon careful study and investigation. It is a clear and understandable explanation of a workable plan for using these machines in insurance work. A plan which has actually been tested. It is a report which is entitled to serious study and review by all segments of the business.

M. H. McCONNELL

PUBLICATIONS RECEIVED

Innkeepers and Carriers By Land. Their Liabilities and Their Insurance Requirements. Third Edition. W. A. Dinsdale. Buckley Press Limited, London, 1951. Pp. 56.

NOTE ON EXPERIENCE RATING CREDIBILITY

BY MARK KORMES

Mr. Perryman's extensive paper on "Experience Rating Credibilities"* forms the theoretical basis of the structure of the present multi-split experience rating plan used in Workmen's Compensation insurance. In my written discussion I have pointed out that the determination of Z and therefore W leads to a differential equation but Mr. Perryman ingeniously reduced the problem to a cubic equation for Z.

Recently I have had an occasion to design a rating plan where credibility would begin with a certain size of risk and would reach self-rating for another size both lower and upper limits selected by judgment. To make the formula as simple as possible I have selected the form

$$Z = \frac{E + fK}{E + K} \tag{1}$$

where E represents the size of risk, measured either by premium or expected losses or corresponding exposure and f is a function of E which varies from 0 when $E = Q$ to 1 when $E = S$. One can readily recognize that formula (1) corresponds to Mr. Perryman's formula (14B) and f corresponds to his $W = Z_e$.

The conditions for f are:

(a) $\frac{df}{dE} = 0$ for $E = Q$ and $E = S$

(b) $\frac{dZ}{dE}$ is positive

(c) $\frac{d(Z/E)}{dE}$ is negative

But condition (a) leads to a Bernoulian differential equation

$$\frac{df}{dE} = Af^2 + Bf \tag{2}$$

The solution of this equation is the well known logistic curve

$$f = \frac{C}{1 + e^{a + bf}} \tag{3}$$

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Since the constant C is usually very close to unity, $0 \leqq f \leqq 1$ and the constant b is always negative, simple differentiations show that conditions (a), (b) and (c) are satisfied. The actual determination of the constants also presents no

difficulty. If f_1, f_2 and f_3 are three suitably selected equidistant values of f we have the following relations

$$C = \frac{2f_1 f_2 f_3 - f_2^2 (f_1 + f_2)}{f_1 f_3 - f_2^2} \tag{4.1}$$

$$a = ln \frac{(C - f_1)}{f_1} \tag{4.2}$$

$$b = \frac{l}{n} ln \frac{f_1(C - f_2)}{f_2(C - f_1)} \tag{4.3}$$

where ln is the natural logarithm and n represents the number of units on the E axis. It is quite clear that for different selection of the three values f_1, f_2 and f_3 a differently shaped curve will be obtained but such a selection will be always determined by practical desiderata. Thus, for example, in the case of Wisconsin taking $W_1 = .05$, $W_2 = .48$ and $W_3 = .91$ (the corresponding values of E are 15,000; 90,000 and 165,000; the interval is 75 units) we obtain:

$$W = \frac{1.0781}{1 + e^{3.0233 - .0229E}} \tag{5}$$

Several test calculations show that formula (5) gives the results which are very close to those given in the table of W for Wisconsin.

OBITUARY

EDWARD BATHURST FACKLER

1879—1952

Edward Bathurst Fackler died suddenly on January 8, 1952, while on a trip to New York, thus terminating a long and noteworthy career as consulting actuary and life insurance executive.

Mr. Fackler was born in New York City, October 13, 1879. His father, David Parks Fackler (1841–1924), was a founder of the Actuarial Society of America—in fact, one of the most active proponents of its founding; he had the honor of calling its first meeting to order; and he became its second president. Mr. E. B. Fackler was graduated from Yale University in 1900. He passed the New York Bar examinations in 1905, and received the degree of LL.B. from New York Law School in 1906. He became a Fellow of the Actuarial Society of America in 1906, and of the Casualty Actuarial Society at its founding in 1914, as a Charter Member. The name of the Society was then "Casualty Actuarial and Statistical Society."

On graduation from Yale, he entered the actuarial consulting organization established by his father in 1865; he became a partner in 1907, and senior partner in 1924—the year of his father's death. The firm was merged with Wyatt and Company in 1950, when the Western and Southern Life Insurance Company felt the need of Mr. Fackler's full-time services as Vice President and Actuary. He was a Director of the Western and Southern from 1948 to 1952. He continued to serve the Wyatt Company as a consultant until his death.

The history of the Fackler firm—85 years from foundation to merger—under father and son, is itself the story of competent professional actuarial work in America. It was retained as consultant by state insurance departments, companies, individuals, and employers and employees. Its services embraced not only routine calculation but the more involved problems of company mutualization, receivership, and reinsurance. Mr. Fackler was consulting actuary to several fraternal benefit societies, notably the Knights of Columbus, with whom the firm had a consulting connection since 1899. He was consulted by assessment associations, by the Government asking for professional witness performance, by a Brazilian company wishing to open a New York branch—these show the scope and importance of the clients seeking the firm and its competent service.

Mr. Fackler was a consultant to the Veterans Administration; he helped to organize the Government Life Insurance program in World Wars I and II; he served as a member of the Actuarial Advisory Committee for the Railroad Retirement Board, and of the Board of Actuaries of the United States Civil Service Retirement and Disability Fund.

Besides being a Fellow of the Society of Actuaries and of the Casualty Actuarial Society he was a past President of the Fraternal Actuarial Association, a member of the Insurance Society of New York, of the New York Life Underwriters Association, of the American Statistical Association, and of the Yale Club of New York City.

He was editor of two editions of *Principles and Practice of Life Insurance.* The firm published eight volumes of net premiums and reserves, which are in general use throughout the business. In his office work, his mechanical mind and flair for short-cuts and ingenious devices greatly helped to create economies in operations.

He was deeply religious, giving much time to his church. He was modest and kindly, and generous to those lacking his self-restraint and high ideals. To the discerning eye, the sound basis of the love and respect shown him by his family, friends, and associates was clear—based on his own friendly understanding warmth. His later years were marked by a deep humanity, courage and resilience.

His record remains as a challenge to us all.

Surviving are his wife, Carrie Elizabeth Fackler, associate in the Fackler offices in recent years and associated with the Wyatt Company after the merger; two sons, David E. and John D. Fackler, now with the armed services in El Paso, Texas, two daughters, Mrs. Elizabeth Burtelsen and Mrs. Ruth Lawton, and eight grandchildren.

OBITUARY

HAROLD J. GEORGE

1918—1952

Harold J. George died in Boston, Massachusetts, on April 11, 1952, after a month's illness.

Mr. George was born in Kitchener, Ontario, on March 4, 1918. He attended Kitchener Collegiate Institute and Vocational School, and the University of Western Ontario.

At the age of seventeen he joined the Mutual Life Insurance Company of Canada, and when only twenty-three had completed the examinations for admission as a Fellow of the Actuarial Society of America and the American Institute of Actuaries, with the unique distinction of passing the last two examinations *cum laude* in one year. Later on Mr. George became an Associate by examination in the Casualty Actuarial Society. He was also an active member of the Insurance Accounting and Statistical Association, to whose "Proceedings" he contributed several papers.

Shortly after completing three years' service in the Canadian Army, where he achieved the rank of Captain, Mr. George joined the National Life Insurance Company of Montpelier, Vermont, and was immediately appointed Assistant Actuary.

He possessed a truly brilliant mind, a prodigious capacity for work, and a remarkable breadth of interests. Hence it was only natural that he made a real contribution to his Company and to his community in the course of a regrettably brief career.

Mr. George is survived by his wife, the former Jean Stewart, whom he married in 1948, two daughters, his parents, a brother, and a sister.

OBITUARY

CHARLES H. HOLLAND

1878—1951

Charles H. Holland, who will be remembered as President of the old Independence Company of Philadelphia and prior to 1923 as President of the Royal and Eagle Indemnity Companies, died on December 28 at age 73 in New York City.

Mr. Holland was born in London, England on April 25, 1878 and received his education in the famous old City of London School. His start in business was made with a firm of Chartered Accountants, after which he joined the financial department of a firm of solicitors, many of whose clients were of the nobility. In 1897 he began his insurance career with the Northern Accident Insurance Company, Limited of Glasgow, Scotland in its London office as Inspector of Agencies, the duties corresponding with those of a Special Agent in this country. He later became Superintendent of Agencies for London and the South of England. When the Royal Insurance Company, Ltd. purchased the Northern in 1907, Mr. Holland was sent to Australia to organize the casualty business in that country and in New Zealand. He spent several years in Australia and became widely known as Chairman of the Accident Underwriters' Association of Victoria.

In 1910 he came to the United States to organize the Royal Indemnity Company, of which he was General Manager from its inception and of which he later became President. He subsequently organized the Eagle Indemnity Company for the same interests. The Royal Indemnity Company which had been organized with assets of $1,000,000 had been built up by Mr. Holland to a firm with assets of $17,000,000 by 1922 when Mr. Holland resigned the Presidency of the Royal and Eagle Indemnity Companies to organize and become the President of the Independence Indemnity Company and its running mate, the Independence Fire, which he headed until his resignation in 1931. Thereafter Mr. Holland returned to New York City to enter the stock brokerage business, and at the time of his death was associated with Montgomery Scott & Company.

Mr. Holland became a Fellow of the Casualty Actuarial Society in 1915. Recognizing aviation insurance as a young line with a big future he pioneered in this field and contributed a paper on the subject to the Society.

In the early days of the Society Mr. Holland was one of the best known casualty company chief executives in the United States and was prominent in developing the young casualty insurance industry especially in the field of his special interest—Production and Underwriting. He was President of the International Association of Casualty and Surety Underwriters in 1913 and 1914. Since January, 1950, Mr. Holland had been President of the St. George Society of New York, a charitable organization for those of English origin. Besides this he was a Mason and a member of the Down Town Association, the Casualty and Surety Club of New York, the Racquet Club, the Down Town Club of Philadelphia, Sea View Golf Club, Chamber of Commerce of the United States, Chamber of Commerce of State of New York and Chamber of Commerce of Philadelphia. He was an independent in politics and an Episcopalian. He is survived by his son, H. Brian Holland of Wellesley Hills, Massachusetts, and a daughter, Mrs. Eunice K. King of Gerards Cross, England.

OBITUARY

CHARLES S. WARREN

1881–1952

Passing on from our numbers on May 1, 1952, was friendly, lovable Charles S. Warren, Secretary of the Massachusetts Automobile Rating and Accident Prevention Bureau. He was a man widely known and respected among his many insurance associates and friends encountered over a half century of business experience.

"Charlie", as all his friends knew him, was born in Danbury, Connecticut August 1, 1881, attending public schools there and in New Haven, and later Yale University.

He entered the business field as an accountant with Price Waterhouse attaining Certified Public Accountant rating, then was with the American Bank Note Company until 1909 in the capacity of Comptroller until appointed to President Taft's commission on Economy and Efficiency where he served until the end of the Taft administration. His contacts and association with executives of International Business Machines Corporation led to several research jobs with I.B.M. equipment in Chicago, Washington and New York.

His insurance career started with Fidelity and Casualty Company and after several years with this company he became for thirteen years Chief Statistician of the Ocean Accident and Guarantee Corporation. It was in this capacity that he became widely known in insurance fields often representing his company on National Bureau committees. On May 23, 1919 he became an Associate Member of the Casualty Actuarial Society. He was Treasurer of Lloyds Casualty Company for a short time before his appointment as Secretary of the Massachusetts Automobile Rating and Accident Prevention Bureau on January 1, 1932.

His work for twenty years as Secretary of the Bureau is widely known and appreciated. Probably his greatest contribution was in the area of public relations in the coordination of the Massachusetts Compulsory Insurance Law with the motor vehicle registering public through the Registry of Motor Vehicles. His contribution in assisting in widening company participation in accident prevention work is also worthy of mention.

He leaves a wife and two sons.

OBITUARY

ARTHUR B. WOOD

1870–1952

Arthur B. Wood died suddenly in Montreal on June 14th, 1952, in his 82nd year. He was a Fellow of the Casualty Actuarial Society.

The son of a country doctor in Knowlton, Quebec, Arthur Wood was tempted to follow in his father's footsteps but, after a brilliant mathematical career at McGill University, he joined the staff of the Sun Life Assurance Company of Canada in 1893.

During these early years he made a thorough study of actuarial science. He obtained his degree of F.A.S. in 1903, and his F.I.A. in 1904, both by examination. He was a Fellow of the Society of Actuaries and had served two terms as President of the old Actuarial Society of America. In the Sun Life, his responsibilities were increasing rapidly. He was appointed Chief Actuary in 1908; Vice-President and Actuary in 1923; Vice-President and Managing Director in 1932 and President in 1934. After guiding his company with great distinction through 16 years as chief executive, he was appointed Chairman of the Board in 1950.

At a ceremony that marked his fiftieth anniversary with the Company, Mr. Wood attributed his success primarily to "hard, hard work aided perhaps now and then by good fortune." A man of many interests, his energy and talents overflowed in several directions. He contributed to several insurance bodies, as well as to the "Transactions of the Actuarial Society of America." Not only did he serve as President of the Society for two terms, but he was also President of the Canadian Life Insurance Officers Association and Vice-President for Canada of the International Congress of Actuaries.

A firm believer in the value of sports, he was an enthusiastic golfer and curler, right up to the time of his death. He was a Rotarian of long standing, a 33rd degree Mason and an unfailing friend of the Salvation Army. He took the greatest pride in his affiliation with his old Alma Mater, McGill University. Appointed to the Board of Governors in 1936, he served for a decade as a member of its Senate, and was also Chairman of the Pensions Committee. In 1950 he was rewarded by a grateful University with the honorary degree of Doctor of Laws.

Arthur B. Wood was a man of honour and integrity, held both in the respect and deep in the affection of all who knew him. He combined rare qualities of leadership and intelligence, sound judgment and humour, sympathetic understanding and a keen interest in his fellowmen. The monuments he left behind him are legion. Certain it is that the actuarial world has lost one of its greatest members.

ABSTRACT FROM THE MINUTES OF THE MEETING
May 26 and 27, 1952

The semi-annual meeting of the Society was held at the Red Lion Inn, Stockbridge, Massachusetts, on Monday and Tuesday, May 26 and 27, 1952.

President Carlson called the meeting to order at 2:20 P.M. on May 26th and the roll was called showing the following 49 Fellows and 12 Associates present:

FELLOWS

ALLEN, E. S.
BARBER, H. T.
BERKELEY, E. T.
BLANCHARD, R. H.
CARLSON, T. O.
COGSWELL, E. S.
CONSTABLE, W. J.
CROUSE, C. W.
DOREMUS, F. W.
EDWARDS, J.
ELLIOTT, G. B.
FONDILLER, R.
FULLER, G. V.
GINSBURGH, H. J.
GODDARD, R. P.
GRAHAM, C. M.
HARWAYNE, F.
HEWITT, C. C. JR.
HAZAM, W. J.
HUGHEY, M. S.
HOPE, F. J.
JACKSON, H. H.
JOHNSON, R. A.
KORMES, M.
LINDER, J.
LIVINGSTON, G. R.
LONGLEY-COOK, L. H.
MASTERSON, N. E.
MATTHEWS, A. N.
MAYCRINK, E. C.
MCCONNELL, M. H.
MUNTERICH, G.
OBERHAUS, T. M.
PERRYMAN, F. S.
PETERS, S.
PRUITT, D. M.
RESONY, J. A.
RICE, H. D.
RODERMUND, M.
ROWELL, J. H.
SALZMANN, R.
SCHLOSS, H. W.
SKELDING, A. Z.
SMICK, J. J.
SMITH, S. E.
TARBELL, T. F.
UHTHOFF, D. R.
VALERIUS, N. M.
WIEDER, J. W. JR.

ASSOCIATES

BARKER, G.
BEVAN, J.
DOWLING, W. F.
FURNIVALL, M. L.
GRAVES, C. H.
GROSSMAN, E. A.
MACKEEN, H. E.
MAYERSON, A.
MENZEL, H. W.
MURRIN, T. E.
SMITH, A. G.
STOKE, K.

By invitation, a number of officials of Casualty and Fire Insurance Companies and other insurance organizations were present.

The reading of the minutes of the meeting held November 16, 1951 was dispensed with by motion.

The Secretary-Treasurer (Richard Fondiller) read the report of the Council and upon motion it was adopted by the Society.

President Carlson delivered his Presidential Address. There followed a panel discussion on "Ratemaking and Inflation", the members of the panel being H. J. Ginsburgh, C. J. Haugh and George H. Kline, with R. H. Blanchard as moderator.

Recess was then declared until the following day.

An Informal Dinner was held on the evening of May 26; the dinner group

was addressed by the Honorable Dennis R. Sullivan, Insurance Commissioner of Massachusetts.

On May 27th the meeting was called to order at 10 A.M., and was presided over by Vice President Smith. A discussion was held on the papers delivered at the last annual meeting.

A Panel discussion on "Automobile Merit Rating" followed. The members of the panel were Seymour E. Smith, Joseph H. Forest and L. H. Longley-Cook.

Upon motion, the meeting adjourned at noon.

ABSTRACT FROM THE MINUTES OF THE MEETING
November 20 and 21, 1952

The annual meeting of the Casualty Actuarial Society was held at the Hotel Biltmore, New York, on Thursday and Friday, November 20 and 21, 1952.

President Carlson called the meeting to order on November 20th at 2 P.M., the roll was called, showing the following 58 Fellows and 30 Associates present:

FELLOWS

ALLEN
AULT
BAILEY
BARKER
BARTER
BERKELEY
BURLING
CARLETON
CARLSON
CLARKE
COGSWELL
CORCORAN
CRITCHLEY
ELLIOTT
FONDILLER
GARDINER
GODDARD
GRAHAM, C. M.
GRAHAM, W. J.
HARWAYNE
HAZAM
HEWITT
HOPE
JOHNSON
KOLE
KORMES
KULP
LESLIE, JR.
LINDER
LIVINGSTON
LONGLEY-COOK
MARSHALL
MASTERSON
MATTHEWS
MAYCRINK
MCCONNELL
MILLS
MOORE
MUNTERICH
OBERHAUS
PERRYMAN
PRUITT
RODERMUND
ROWELL
SALZMAN
SCHLOSS
SCHWARTZ
SILVERMAN
SKELDING
SKILLINGS
SMICK
SMITH
TARBELL
VALERIUS
VERGANO
WIEDER
WILLIAMSON
WOLFRUM

ASSOCIATES

ACKER
BARKER
BEVAN
BLACK
BOYAJIAN
DOWLING
EGER
FAIRBANKS
FOSTER
FOWLER
FRANKLIN
FURNIVALL
GIBSON
GILDEA
HURLEY
JOHE
JOHNS
JONES
LINO
LISCORD
MACKEEN
MAGRATH
MAYERSON
MENZEL
MURRIN
POTOFSKY
RESONY
SAWYER
SIMON
UHL

By invitation, a number of officials of casualty and fire insurance companies and insurance organizations were present.

President Carlson turned the meeting over to Vice-President Linder, who introduced the members of the panel, Joseph J. Magrath (presiding), Joseph P. Gibson, Jr. and John A. Diemand, Jr. The panel discussion on fire reinsurance comprised (a) Introduction, (b) Pro rata and pools, (c) Spread loss and catastrophe.

Recess was then declared until the following day.

An informal dinner was held on Thursday evening, November 20 at the Hotel Biltmore. The principal speaker was Mr. Valentine Howell, Executive Vice-President and Actuary of the Prudential Insurance Company and a Past President of the Society of Actuaries.

On November 21st the meeting was called to order at 10:20 A.M.

Mr. Carlson read his presidential address.

The reading of the minutes of the meeting held May 26 and 27, 1952 was dispensed with by motion.

The Secretary-Treasurer (Richard Fondiller) read the report of the Council and upon motion it was adopted by the Society. Ralph S. Brindise, Douglas Critchley and Earl F. Petz, Jr. had passed the examinations and had been admitted as Fellows; a diploma was presented to each by the President. Charles M. Daniel, Robert B. Foster, Thomas W. Fowler, N. Matthew Franklin, Robert L. Hurley, M. Vernon Johns, Jr., Nathan F. Jones, Richard Lino, Paul S. Liscord, Roderick B. Pennycook and Allie V. Resony had passed the examinations and had been admitted as Associates. The Ninth Edition of the Recommendations for Study are included in this volume of the *Proceedings*. Reprints of "The Combined Fire and Casualty Annual Statement Blank" by Thomas F. Tarbell had been published to be sold to the insurance industry.

The President announced the deaths, during the last year, of four Fellows: W. B. Bailey, E. B. Fackler, C. H. Holland, A. B. Wood and two Associates, H. J. George and C. S. Warren. Obituary notices appear in this number of the *Proceedings*.

The Auditing Committee (Howard G. Crane, Chairman) reported that the books of the Secretary-Treasurer had been audited and his accounts verified.

The report of the Secretary-Treasurer was read and accepted. The report on finances follows:

CASUALTY ACTUARIAL SOCIETY
ANNUAL REPORT ON FINANCES

Cash Receipts and Disbursements from October 1, 1951 to September 30, 1952

Income			Disbursements	
On deposit in Marine Midland on October 1, 1951		$4,689.01	Printing & Stationery	$6,429.69
			Postage, Tel., Exp., etc.	232.39
Foreign Exchange	$ .32		Secretarial Work	671.00
Members Dues	4,551.00		Examination Expense	666.05
Sale of Proceedings	1,451.40		Luncheons & Dinners	1,883.32
Examination Fees	937.00		Storage of Proceedings	69.51
Luncheons & Dinners	1,490.00		Insurance	32.67
Michelbacher Fund	686.55		*Reprints*	
Interest on Bonds	125.00		Rate Reg. & Cas. Actuary	1,082.53
Sale—Reprints:			Tarbell-Comb. Fire & Cas. Annual Statement Blank	401.70
Rate Reg. & Cas. Actuary	619.56		Miscellaneous	135.00
Tarbell-Comb. Fire & Cas. Annual Statement Blank	579.03		Total	$11,603.86
Other Reprints	80.00	10,519.86		
			On deposit Sept. 30, 1952 in Marine Midland Trust Co.	3,605.01
Total		$15,208.87	Total	$15,208.87

Assets			Liabilities	
Cash in Bank	$3,605.01		Michelbacher Fund 9/30/52	$ 5,510.15
U.S. Savings Bonds	5,000.00		Surplus	3,094.86
			Total Liabilities & Surplus	$8,605.01
		$8,605.01		

The Examination Committee (Roger A. Johnson, General Chairman) submitted a report of which the following is a summary:

1952 EXAMINATIONS—SUCCESSFUL CANDIDATES

The following is a list of those who passed the examinations held by the Society on May 13 and 14, 1952:

ASSOCIATE EXAMINATIONS

PART I:	R. A. Bailey	A. C. Gill	J. W. McGinn
	N. J. Bennett	R. N. Goode	G. E. McLean
	M. T. Bergan	C. Harker	E. J. O'Boyle
	J. M. Berkman	A. Hazelcorn	P. L. Poston
	M. Bondy	J. W. Huntley	H. Redisch
	W. C. Bornmann	H. A. Jonasson	L. H. Roberts
	G. F. Boulet	P. B. Katz	H. Saffeir
	W. J. Carroll	W. L. Leahey	H. C. Schneiker
	R. V. Cruz	C. C. Ledger	J. Schulman
	R. M. Denham	R. Lino	R. J. W. Smith
	M. R. Drobisch	R. A. Mandat	L. M. Stankus
	K. Eaton	R. W. Masecar	P. M. Thexton
	K. Elstyne	R. J. Mills	F. W. Warber
	J. E. Faust, Jr.	J. D. Morrison	R. L. Whitney
	D. Finkel, (sec.l)*	M. Mudry	D. G. Williams
	P. R. Flack	J. H. Muetterties	P. A. Williams
	M. Fox	H. Muhlstock	J. C. Wilson
	B. Fratello	A. C. McCallum	J. W. Woodworth
PART II:	T. H. Barber	C. Harker	H. Nadler
	R. A. Bailey	A. Hazelcorn	P. L. Poston
	R. A. Berg	H. W. Hickman	H. Redisch
	W. C. Bornmann	J. W. Huntley	A. V. Resony
	G. F. Boulet	B. N. Joyner	O. D. Richmond
	J. R. Bruder	R. H. Kallop	C. W. Roy
	W. J. Carroll	A. S. Leight	H. Saffeir
	W. D. Coates	R. W. Masecar	J. Schulman
	R. M. Denham	D. E. Matzke	M. Stepanian
	T. L. Dunn	R. J. Mills	D. G. Stewart
	A. C. Gill	M. Mudry	F. W. Warber
	J. Gottesfeld	A. C. McCallum	R. L. Whitney
	G. P. Groft		J. C. Wilson
PART III:	R. A. Bailey	T. L. Dunn	P. B. Katz
	N. J. Bennett	D. Finkel, Jr.	R. W. Masecar
	M. Bondy	R. F. Flanders	J. D. Morrison
	G. F. Boulet	N. M. Franklin	A. C. McCallum
	W. J. Carroll	R. G. Hansen	H. Saffeir
	R. V. Cruz	C. Harker	J. W. Thomas
	M. R. Drobisch	W. V. B. Hart, Jr.	R. L. Whitney
		R. L. Hurley	
PART IV:	F. E. Abel	R. L. Hurley	P. S. Liscord
	C. M. Daniel	M. V. Johns	J. H. Muetterties
	R. B. Foster	N. F. Jones	C. L. Niles, Jr.
	T. W. Fowler	W. B. Kloppenberg	E. M. Ozanick
	W. S. Gillam	R. Lino	R. B. Pennycook
	C. G. Gilmore		B. Wright

*other section of this Part credited to veterans by the Council under Rule 4(d).

FELLOWSHIP EXAMINATIONS

PART I:	G. M. Barker	T. W. Fowler	R. L. Johe
	J. R. Bevan	N. M. Franklin	L. J. Simon
	D. Critchley	J. Harack	M. T. Wermel
PART II:	J. R. Bevan	D. Critchley	H. W. Menzel
	R. S. Brindise	C. H. Graves	J. A. W. Trist
PART III:	R. S. Brindise	J. B. Haley, Jr.	E. F. Petz, Jr.
		R. L. Johe	
PART IV:	R. S. Brindise	R. L. Johe	T. E. Murrin
	C. H. Graves		E. F. Petz, Jr.

The Secretary-Treasurer announced that the Council had elected the following officers:

Editor.....Emma C. Maycrink
Librarian.....Gilbert R. Livingston
Chairman, Examination Committee.....John W. Wieder, Jr.

The annual elections were then held and the following officers and members of the Council were elected:

President.....Thomas O. Carlson
Vice-President.....Joseph Linder
Vice-President.....Seymour E. Smith
Secretary-Treasurer.....Richard Fondiller
Editor.....Emma C. Maycrink
Librarian.....Gilbert R. Livingston
Chairman—Examination Committee.....John W. Wieder, Jr.

Members of the Council: (terms expire in 1955)
Roger A. Johnson
Arthur N. Matthews
Matthew H. McConnell

In accordance with Constitutional requirements, notice of the following proposed amendment had been given, and, upon motion, it was adopted to read as follows:

By-Laws—Article IV—Dues (Second Paragraph)

> He may, however, be reinstated by vote of the Council upon payment of arrears in dues, which shall in no event exceed two years.

The papers appearing in this Volume were presented.

A discussion was held on the papers delivered at the last annual meeting.

Recess was taken for lunch at the Hotel until 2:15 P.M.

President Carlson turned the meeting over to Vice-President Linder, who introduced the members of the panel. Clarence A. Kulp (moderator) Allen B. Thompson, A. M. Wilson and Donald D. Cody. The panel discussion on group accident and health insurance comprised (a) Blue Cross and Blue Shield (b) Multiple line casualty carriers and (c) Life insurance companies.

Upon motion, the meeting adjourned at 4:30 P.M.

1952 EXAMINATIONS OF THE SOCIETY

EXAMINATION COMMITTEE

ROGER A. JOHNSON - - - - - - GENERAL CHAIRMAN
JOHN W. WIEDER, JR. - - - - - - VICE-CHAIRMAN

ASSOCIATESHIP SECTION
RICHARD J. WOLFRUM, CHAIRMAN
JOHN A. RESONY
RUTH E. SALZMANN

FELLOWSHIP SECTION
STEFAN PETERS, CHAIRMAN
DUNBAR R. UHTHOFF
HAROLD W. SCHLOSS

EXAMINATION FOR ENROLLMENT AS ASSOCIATE

PART I

1. (a) Name and define five measures of central tendency, and give an approximate relationship between three of them for a mound shaped distribution of variates that is moderately asymmetrical.

   (b) Find the mean and standard deviation of the following distribution:

Variate	*Frequency*
3.0 - 3.9	1
4.0 - 4.9	7
5.0 - 5.9	28
6.0 - 6.9	78
7.0 - 7.9	84
8.0 - 8.9	45
9.0 - 9.9	28
10.0 - 10.9	7
11.0 - 11.9	2

2. (a) One hundred pairs of observations x, y are made, and it is determined that:

$$\Sigma (x-\bar{x})^2 = 400$$

$$\Sigma (y-\bar{y})^2 = 900$$
$$\Sigma x = 500$$
$$\Sigma y = 600$$

$$\Sigma (x-\bar{x})(y-\bar{y}) = 450$$

   (1) What is the coefficient of correlation?
   (2) Express the linear regression of y on x.

   (b) Prove that the standard error of estimate, S_y, can be expressed in terms of the observed values by the following formula:

$$S_y = \sigma_y \sqrt{1-r^2_{xy}}$$

3. If 10 coins are thrown, use the point binomial function to find the probability of obtaining exactly 6 heads. Find the approximate value of this

probability by using the normal curve and explain the reason for the difference in the two values.

$$\begin{aligned} \text{given} \quad \Phi(.63) &= .3271 \\ \Phi(.64) &= .3251 \\ A_\Phi]_0^{.63} &= .2357 \\ A_\Phi]_0^{.64} &= .2389 \end{aligned}$$

4. (a) In a study of fatal accidents by locality, it was found the 900 fatal accidents in State A cost on the average \$4000 with a standard deviation of \$300. In another State B, 1600 fatal accidents cost on the average \$3800 with a standard deviation of \$800. Are these differences sufficient to conclude that the severity of fatal accidents in State B are generally lower than State A, or are the differences due to chance?

   (b) Given the following formula, Fishers Ideal Index Number, show that it satisfies both the time reversal and factor reversal tests.

$$ {}_0P_t = \sqrt{\frac{\Sigma p_t q_0}{\Sigma p_0 q_0} \cdot \frac{\Sigma p_t q_t}{\Sigma p_0 q_t}} $$

5. (a) Prove: $\frac{1}{s_{\overline{n}|}} + i = \frac{1}{a_{\overline{n}|}}$

   (b) Derive the following formula, where x and y are positive integers and is the interest per period.

$$ s_{\overline{y}|} + s_{\overline{2y}|} + \cdots + s_{\overline{xy}|} = \frac{1}{i}\left[(1+i)^y \frac{s_{\overline{xy}|}}{s_{\overline{y}|}} - x\right] $$

6. (a) A loan of \$5,000, with interest at 6% payable semi-annually, is to be amortized by equal payments at the end of 6 months for 2½ years. What is the semi-annual payment and the outstanding principal just after the first payment?

$$\begin{aligned} \text{Given} \quad \frac{1}{a_{\overline{5}|}} \text{ at } 3\% &= .218355 \\ a_{\overline{5}|} \text{ at } 3\% &= 4.579707 \end{aligned}$$

   (b) A debt of \$10,000 with interest rate at 7% is to be paid at the end of 10 years by the accumulation of annual payments made into a sinking fund at the end of each year. If the sinking fund can be invested at 5% what is the total annual payment necessary to pay interest on the debt annually as due and to build up the sinking fund?

$$\text{Given} \quad s_{\overline{10}|} \text{ at } 5\% = 12.577893$$

7. (a) In the constant percentage of book value method of depreciation, express x in terms of S and C and n, where
C is the original cost of the machine.
S is the scrap value of the machine.
x is the percentage of book value at the beginning of the year, written off for the year, to reduce C to S in n years.

(b) What is the purchase price of \$10,000 serial bonds with 5% coupons payable annually and maturing in ten equal annual installments to net the purchaser an effective rate of 6%?

$$\text{Given} \qquad a_{\overline{10}|} \text{ at } 6\% = 7.360087$$

8. Find the present value of a 25 year annuity certain under which the annual payment is \$1000 for the first 5 years, \$1200 for the next 5 years, \$1400 for the next 5 years, and so on. The annuity is to be paid annually for the first 5 years, and half-yearly thereafter. Interest is to be taken at 5% per annum convertible half-yearly for the first 12½ years and at 4% per annum convertible half-yearly thereafter.

$$\text{Given} \qquad v^{25} \text{ at } 2\tfrac{1}{2}\% = .5$$
$$a_{\overline{10}|} \text{ at } 2\tfrac{1}{2}\% = 8.8$$
$$a_{\overline{20}|} \text{ at } 2\tfrac{1}{2}\% = 15.6$$
$$a_{\overline{25}|} \text{ at } 2\tfrac{1}{2}\% = 18.4$$
$$a_{\overline{5}|} \text{ at } 2\% = 4.7$$
$$a_{\overline{15}|} \text{ at } 2\% = 12.8$$
$$a_{\overline{25}|} \text{ at } 2\% = 19.5$$
$$s_{\overline{2}|} \text{ at } 2\tfrac{1}{2}\% = 2.0$$

PART II

1. (a) Find $\frac{dy}{dx}$ for the following function:

$$y = \sqrt{1 + \sqrt{x^2 + 1}}$$

(b) If $y = x^x$ find $\frac{dy}{dx}$

2. Integrate with respect to x

(a) $\int \left(\frac{5}{x} - 2^x + 4e^x\right) dx$

(b) $\int \frac{3 - 2x - 3x^2}{x^2 + x^3} dx$

3. (a) A straight line of length a is divided at random into two parts. Find the mean value of area of the rectangle whose sides are the two parts.

   (b) Find the limit approached by $x^2 \log x^2$ as x tends toward zero.

4. (a) A man 6 feet tall walks at the rate of 5 feet per second towards a lamp post 15 feet high.
   (1) How fast does his shadow shorten?
   (2) How fast does the end of his shadow move?

   (b) A window is in the shape of a rectangle with a semicircle covering the top. If the perimeter of the window be a fixed length p, find the dimensions of the rectangle such that the window will admit the most light.

5. (a) Use La Grange's formula to find the form of the function $y = f(x)$ given

x	0	2	3	6
$f(x)$	0	46	70	145

   (b) Given the following data, find the value for u_2

$u_1 = 1.884$ $\quad u_4 = 5.513$

$u_3 = 4.356$ $\quad u_5 = 6.620$

6. (a) Given the following table, find u_7 by using Newton's divided difference formula

x	0	1	3	6	11
u_x	34	42	94	118	218

   (b) Given the following values of $u_{x:y}$, estimate the value of $u_{1.8:0.4}$

x	$y = 0$	$y = 1$	$y = 2$
1	.836	− .693	− 1.564
2	.935	− .581	
3	1.033		

7. (a) Derive Simpson's 1/3 rule for approximate integration
   (b) Show that the following is approximately true:

$$\int_0^1 u_x dx = \frac{1}{12}\left[5u_1 + 8u_0 - u_{-1}\right]$$

8. Sum the following series to 20 terms: 5, 10, 17, 28, 47, 82 · · · · ·

PART III

1. (a) In a dice game, a person selects any number from 1 to 6 and then throws three dice. He wins an amount equal to his original stake if the number selected turns up on one die, X times his original stake if the number turns up on two dice, and Y times his original stake if the number turns up on three dice. In any other event, he loses his stake. If his expectation of winning and losing are equal, find the values of X and Y if X and Y are whole positive numbers and cannot be greater than 10.

   (b) Two players of equal skill, A and B, are playing a set of games in which a point is earned for each game won. They leave off playing when A needs 4 points and B needs 3 points to win the stake. If the stake is \$32, what share ought each take?

2. (a) A man has 10 coins and one of them is known to have 2 heads. He takes one at random and tosses it five times and it always falls head. What is the chance that it is the coin with two heads?

   (b) A and B have seen the contents of a bag containing five balls of different colors. A ball was drawn from the bag and witnessed by both A and B. When asked separately they both state that the color of the ball was green. If A speaks the truth three out of five times and B speaks the truth two out of three times, find the probability that the ball that was drawn was green.

3. (a) From a bag containing 3 white and 5 black balls, 4 balls are transferred to an empty urn. From this urn, 2 balls are taken and they both turn out to be white. They are returned to the urn from which they were drawn. What is the probability that a ball taken from the same urn will be white?

   (b) Five coins are tossed and n of them fall heads. These n coins are tossed again and three fall heads. What is the probability that n equals 4?

4. (a) A and B play for a stake of \$100 which is to be won by him who makes the highest score in four throws of a single die. In case of a tie, the stake is not divided. After two throws, A has scored 12 and B has scored 9. B is willing to buy out of the bet by giving A \$60. Should A accept in view of his expectation?

   (b) From an ordinary deck of 52 cards

      (1) A card is drawn, observed to be a Queen and laid aside. What is the probability that the next card drawn from the deck will be an Ace?

      (2) A card is drawn and is laid aside unobserved. What is the probability that the next card drawn from the deck will be an Ace?

      (3) Eight cards are drawn. What is the chance that at least one will be black. (do not evaluate factorials)

5. (a) Define the following:
   (1) l_x
   (2) d_x
   (3) n/q_x
   (4) ${}_nq_x$
   (5) ${}_{u|}q_x$

   (b) Prove $A_x u_x = A_{x+1} + \frac{q_x}{p_x}$

6. (a) Prove that D_x is always greater than M_x

   (b) Explain the payment provisions in the following
   (1) $\ddot{a}_{xyz}$
   (2) $a_{\underline{xyz}}$
   (3) $\ddot{a}_{y/x}$

7. (a) A man aged 20 agrees to pay \$50 at the beginning of each year for as long as he lives. What is the present value of the payments? If the last payment is to be made when he reaches 84, what is the present value of the payments?

   Given: $N_{20} = 984399.6$
   $D_{20} = 46556.2$
   $N_{85} = 908.0$

   (b) Develop a formula for the net level annual premium to be paid by a person now aged x for the following assurance:
   (1) \$1000 and return of all premiums paid if assured dies within 5 years, and
   (2) \$2000 if assured dies after 5 years

   Express answer in terms of D_x, N_x, S_x, C_x, M_x, or R_x values

8. Show that the nth year terminal reserve under any net level annual premium policy for an insurance of one person, premiums not having ceased is:

$$1 + \frac{\theta_x}{D_{x+n}} - (\pi_x + d)\,\ddot{a}_{x+n}$$

   where π_x = net annual premium
   and θ_x is an amount independent of duration of policy.

PART IV

1. (a) Explain the purpose and principles underlying the Workmen's Compensation loss constants and expense constants, and the rules determining them when several states are involved.

   (b) To provide coverage under the Federal Employers' Liability Act, two alternative forms of coverage are described in the National Council's Workmen's Compensation and Employers' Liability Manual. Describe briefly these two forms of coverage.

2. (a) In general, describe a Burglary loss as compared to a Robbery loss.

   (b) Distinguish between a Fidelity Bond and a Surety Bond.

3. (a) The coverage of an automobile liability policy may be voided if the insured intentionally misrepresents the place of garaging. Where would you find this provision in the policy? Why is this provision not true if a filing is made under a Financial Responsibility Law, and what redress has the insurance carrier in this instance?

   (b) *A* and *B* each own a car classified as "pleasure and business." Both *A* and *B* have individual automobile liability insurance policies providing benefits as follows:

Named Insured	*Coverage*	*Limits of Liability*
A	Bodily injury	$10,000 each person, $20,000 each accident
	Property damage	$10,000 each accident
B	Bodily injury	$5,000 each person, $10,000 each accident
	Property damage	$5,000 each accident

   B borrows *A*'s car (with *A*'s permission) for a pleasure trip and has an accident causing the following damages:

Claimant 1:	Bodily Injury of $4,000
Claimant 2:	Bodily Injury of $8,000
Claimant 3:	Bodily Injury of $12,000
Claimant 4:	Property Damage of $7,500

   Describe the provisions in the policy covering the payment of these damages:

   1. in *A*'s insurance policy.
   2. in *B*'s insurance policy.

4. (a) A concern has engaged an independent contractor to erect a building for it. What forms of Public Liability insurance are needed by the concern and by the contractor to cover the construction of the building?

   (b) Which of the following claims are covered by a basic CPL Policy on the assured's residence without endorsement under (1) liability coverage and (2) medical payments coverage?

   a. Damage to a neighbor's garage caused when the insured's maid carelessly burns rubbish.

   b. Injury to a caddy caused by the insured's golfing activity. (The golf club carries no Workmen's Compensation on the caddy).

   c. Injury to an aged aunt permanently residing with the named insured.

   d. Liability arising out of the construction of a new residence for the insured by an independent contractor.

e. Injury to the tenant of a one-family dwelling, rented to him by the insured.

f. Injury to a milkman while delivering milk to the insured's premises if Workmen's Compensation benefits are availble to him.

5. (a) What is the purpose of the following three items that are used in determining the change in the Workmen's Compensation Manual rate level?

1. Policy year average collectible loss ratio
2. Rate level adjustment factor
3. Change in correction for off-balance

(b) Given the following:

1. policy year average collectible loss ratio	.575
2. permissible loss ratio	.600
3. rate level adjustment factor	.960
4. change in correction for off-balance	1.010

compute the change in manual rate level that is indicated by these figures.

6. (a) A statutory disability law requires the payment of weekly benefits equivalent to 50% of the average weekly wage commencing with the eighth day of disability caused by accident or sickness (non-occupational) up to a maximum of 26 weeks and subject to a maximum weekly benefit of $25.00. Criticize the following exposure media as the premium base for this coverage: payroll, employe-years, restricted payroll, and value of product.

(b) Give at least three reasons why ordinary casualty insurance ratemaking procedures cannot easily be applied to making surety rates.

7. Discuss the adequacy for ratemaking purposes of experience reported on a policy year earned premium-incurred loss basis as opposed to experience reported on a calendar year written premium-paid loss basis with respect to

1. Automobile Bodily Injury Liability
2. Automobile Property Damage Liability
3. Automobile Collision

8. (a) During the six-month period 7/1/50 to 12/31/50, the XYZ Insurance Company covered continually, on the average, 1,000,000 employees under the New York Disability Benefits Law. The number of weeks of paid benefits was 250,000. The average claim was five weeks in duration. What was the average annual loss cost per employee for each $1 of weekly benefit on the basis of this experience? How many employees out of 1,000 could be expected to submit claims?

(b) What is the cause of the off-balance in the Experience Rating Plan of the National Council on Compensation Insurance, and how is this off-balance taken into account in the compensation ratemaking procedure?

EXAMINATION FOR ENROLLMENT AS FELLOW

PART I

1. From the standpoint of the insurance carrier's position in our economic system, discuss the propriety of insuring risks which demonstrate exercise of less than normal care in the prevention or reduction of losses.

2. (a) What effect does a trend toward multiple line underwriting have on the ratemaking and underwriting results of insurance?

   (b) The expectation of loss of an insured risk is represented approximately by the pure premium. Why then should the insured be willing to pay more than this for his insurance?

3. (a) Describe at least four factors which should be considered in conjunction with yield as a criterion of bond quality.

   (b) Apart from legal considerations, discuss the appropriateness for casualty carriers of:

      1. engaging in short selling
      2. purchasing commodity futures

4. During 1951 the Federal Reserve Board reduced its support price for U. S Government Bonds. What effect did this action have on casualty insurance carriers?

5. (a) What is the American doctrine on Concealment relating to casualty insurance contracts other than Marine? Why is the Marine Rule different?

   (b) Discuss under what circumstances an agent may bind a carrier, even though he may be acting in excess of his authority.

6. (a) Under what circumstances does issue of a policy result from offer by the insured and acceptance by the insurer? When does a policy result from offer by the insurer and acceptance by the insured?

   (b) Public Law 15 mentions seven other pieces of Federal Legislation. Name five of these Acts and explain their applicability to the insurance business.

7. Give your interpretations and discuss the application of the three criteria for casualty rates: Not unfairly discriminatory, adequate, and reasonable.

8. It has been said: "The degree to which regulation must be used to limit freedom of action is dependent largely on the manner in which the business regulates itself." Discuss the meaning of this statement and current possibilities for improvement of such self-regulation.

PART II

1. Derive formulas for the credibilities granted to the Primary, Excess and total risk losses from the formula for the experience modification under the National Council's experience rating plan.

2. The following is copied from an actual letter in the files of an insurance company. If it were turned over to you for reply, what reply would you make?

   "The above captioned policy expires July 1. We are arranging for the renewal, and we have your renewal rate showing an experience modification of 1.8% debit. Last year we had an experience modification of 9.6% credit. We naturally dropped the year of 1945 and used the years of 1946, 1947 and 1948. However, for 1945 we had a retrospective return premium of $4,134, and in 1948 a retrospective return premium of $6,203.

   "Now in analyzing the new rate you dropped 1945 and added 1948; in 1945 there was a return and in 1948 a larger return, yet in the experience rating procedure we have found that the losses charged for 1946 and 1947 are the same as they were in last year's rate, but we now add 1948 which had a return premium of $6,203 and we lose 9.6% credit in our rate and have a debit of 1.8%. This doesn't make sense, particularly in view of the fact that manual rates have been increased and your expected loss factors have been decreased. How come you increase the rate and then reduce your expected loss factor, when, after all, we are treating with dollars? I can't make head nor tail out of it."

3. What reasons are generally advanced for the present lack of a private passenger (nonfleet) automobile experience rating plan? Assuming such a plan were to be insisted upon, outline the details of a plan which you think would contain the least conflict with the reasons you have given above.

4. You are asked by the underwriting personnel of your company for guidance in the selection of maximum and minimum premiums in a Retrospective Rating Plan D. Prepare a memorandum which would serve as the basis for such guidance.

5. What are the arguments for and against reserve fund financing of an Old Age Security system?

6. What are the defects and merits of a Means-Test as a requirement for benefit in a relief system?

7. (a) List the various causes of unemployment.

   (b) Discuss the major eligibility requirements and benefit restrictions which are generally incorporated in a compulsory state unemployment system in order to make a part of the unemployment hazard insurable.

8. In 1950 Congress amended the Old Age and Survivorship part of the Social Security Act. What are the major provisions of this amendment?

PART III

1. Your Company is to issue a two-year policy with annual installments of 60% for the first year and 40% for the second year. Each installment, when due, is entered as Written Premium. Describe two methods of calculating the Unearned Premium Reserve, illustrating each with a policy for a total premium of $1,000 issued October 15, 1951, being reserved at December 31, 1951.

2. (a) A carrier formerly carried its reserves for loss expense for Schedule P lines in the block headed "Voluntary." When Schedule P was revised to provide a column for this reserve in the "Schedule of Experience," the company reserve was placed there. Describe the real and the apparent results of this move on the company operations as reported in the annual statement the first year the new Schedule P was adopted.

   (b) A carrier's annual statement shows a gain in surplus of $500,000 due to "decrease in excess of Liability and Compensation statutory and voluntary reserves over case basis and loss expense reserves." Explain.

3. Describe a formula by which incurred but not reported losses can be approximated for a relatively high frequency line such as compensation, for a carrier with substantial volume in that line. How would you adapt your formula for determining monthly reserves during the year? Discuss the use of your formula, or a modification thereof, for a low frequency line such as automobile liability.

4. Your Claims Department analyzes its activities in 1951 and informs you that losses of $29 million were paid on cases during the year and that $30 million was the value of the reserves which were carried on those cases. They conclude that the loss reserves are at least adequate. From your own studies you know that at the end of 1950 $24 million in case estimates and $3 million of incurred-but-not-reported reserves were carried. Of the case estimates $20 million are on cases reported in 1950. During 1951 losses of $19 million were paid on losses incurred and reported in 1951, and losses of $1 million were paid on losses incurred in 1950 and reported in 1951. At the end of 1951 case estimates totaling $27 million were carried, of which $12 million are on cases reported prior to 1951 and $2½ million on cases incurred in 1950 and reported in 1951. $4 million is carried for cases incurred in 1951 and not reported. What is your analysis of the reserve level?

5. (a) How could the Liability Statistical Plans be amended to improve the possibility of application of a Poisson Distribution in interpreting experience?

   (b) The Poisson formula may be used to obtain a theoretical distribution of accident frequencies in casualty insurance providing the accidents are distributed randomly. This condition is frequently not met. Discuss the effect of this lack of randomness in the use of the Poisson formula in predicting accident frequency distributions.

6. The United States Government produces a vast output of statistical data. From which Agency of the Federal Government would you obtain information on:

   (1) Population
   (2) Total Labor Force
   (3) Agricultural Employment and Wage Data
   (4) Non-Agricultural Employment and Wage Data
   (5) Industrial Production
   (6) Corporation Profits
   (7) Corporation Assets and Liabilities
   (8) Consumer Prices
   (9) Wholesale Prices
   (10) Farm Product Prices
   (11) Business Population and Mortality
   (12) Stock Prices
   (13) Money in Circulation
   (14) Social Security Benefits
   (15) Federal Budgetary Receipts and Expenditures
   (16) Federal Debt
   (17) Gross National Product
   (18) National Income
   (19) Retail Sales
   (20) Construction Activity

7. Do you believe it would be practical to submit Workmen's Compensation Unit Statistical Plan reportings in punch card form? Discuss the possible advantages and disadvantages of such a change.

8. You have available an actual distribution of the number and amounts of property damage claims by small-sized groups. Outline the steps necessary in fitting the Normal Logarithmic Distribution to these data and in testing the goodness of fit.

PART IV

1. The following data have been taken from the records of Company X, a casualty insurance company. All items except assets and liabilities are within the Calendar Year 1951.

   Assets and liabilities are as of December 31, 1951, unless otherwise noted. Items 1 through 8 are net as to reinsurance.

(1) Premiums earned	$50,000,000
(2) Unearned premiums	23,000,000
(3) Losses incurred	25,700,000
(4) Unpaid losses	26,050,000

(5)	Loss adjustment expenses incurred	6,500,000
(6)	Unpaid loss adjustment expenses	4,300,000
(7)	Other underwriting expenses incurred	18,000,000
(8)	Other unpaid expenses	200,000
(9)	Federal income taxes incurred	200,000
(10)	Unpaid taxes, licenses, and fees (including Federal income taxes)	1,400,000
(11)	Cash dividends declared to stockholders	1,000,000
(12)	Dividends declared and unpaid	300,000
(13)	Excess of liability and compensation statutory and voluntary reserves over case basis and loss expense reserves	2,500,000
(14)	Decrease in excess and liability and compensation statutory and voluntary reserves over case basis and loss expense reserves	700,000
(15)	Net investment income earned	2,000,000
(16)	Net realized capital gains	300,000
(17)	Net unrealized capital gains	2,000,500
(18)	Agents' balances or uncollected premiums	5,040,000
(19)	Ceded reinsurance balance payable	40,000
(20)	Net loss from agents' balances charged off	500
(21)	Bonds	50,000,000
(22)	Stocks	20,000,000
(23)	Real Estate	1,000,000
(24)	Cash and bank deposits	5,000,000
(25)	Interest, dividends and real estate income due and accrued	350,000
(26)	Contingency reserve	7,000,000
(27)	Capital paid up	3,000,000
(28)	Surplus as regards Policyholders 12/31/50	23,600,000

Prepare the statement of income of the Underwriting and Investment Exhibit of the Annual Statement (Association Convention Edition, 1951) of Company X for the year ended December 31, 1951. Use the numbers of the items given above, rather than their descriptions, in order to conserve time.

2. Using the data of question 1, prepare the following parts of the Annual statement.
   (a) Page 2 captioned "ASSETS."
   (b) Page 3 captioned "LIABILITIES, SURPLUS AND OTHER FUNDS."
3. What were the 1951 changes in Parts II and V of the Insurance Expense Exhibit? Discuss the result of these changes and the reasons for making them.

12/31/50

4. Discuss the background of having separate expense groupings for "Other Acquisition & Field Supervision Expenses" and "General Expenses" as defined by Regulation 30, New York Insurance Department, and take a position either for or against the continuance of such separation.

5. Describe the basic features of an alphabetical punch card method of premium accounting, and outline the necessary punch card.

6. Opponents of Compulsory Automobile Liability Insurance state that this will not bring monetary relief to all who are injured in motor vehicle accidents because of gaps in the coverage which will run to at least 25% of the number of automobile injuries and deaths. What are these gaps in coverage?

7. What steps are being discussed currently for the reduction in expense of writing small workmen's compensation risks? Discuss these proposals from the point of view of

   (a) a carrier having a predominance of small risks, and

   (b) a carrier having a predominance of large risks.

8. At proceedings before an official rate administrative body, you are asked to justify the expense provisions incorporated in a single set of rates filed for use by both participating and nonparticipating carriers, the expense provisions in the rates having been predicated upon the requirements of the nonparticipating carriers. What arguments would you present to justify the filing in this respect?

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INDEX TO VOLUME XXXIX (Con.)

CASUALTY ACTUARIAL SOCIETY

ORGANIZED 1914

1953 YEAR BOOK

(Addendum to Volume XXXIX of the *Proceedings*)

Corrected to February 15, 1953 No. 32

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, 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 casualty companies. "The Recommendations for Study" appear in *Proceedings* No. 71 and are in effect for the 1953 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 on the second Tuesday and following Wednesday during 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 291, consisting of 158 Fellows and 133 Associates. The annual meeting of the Society is held in New York in November.

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, 60 John Street, Room 901, NewYork 38, N.Y.

CASUALTY ACTUARIAL SOCIETY

NOVEMBER 21, 1952

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MATTHEW H. MCCONNELL 1955

*Terms expire at the annual meeting in November 1953.
†Terms expire at the annual meeting in November of the year given.

COMMITTEES

COMMITTEE ON ADMISSIONS

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MEMBERSHIP OF THE SOCIETY, NOVEMBER 21, 1952

FELLOWS

Those marked (†) were Charter Members at date of organization, November 7, 1914.
Those marked (*) have been admitted as Fellows upon examination by the Society.

Admitted	
*Nov. 21, 1930	AINLEY, JOHN W., Supervising Underwriter, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
*Nov. 14, 1947	ALLEN, EDWARD S., Actuary, New York Compensation Insurance Rating Board, 100 E. 42nd Street, New York 17, N. Y.
*Nov. 13, 1931	AULT, GILBERT E., Actuary, Church Pension Fund and Church Life Insurance Corporation, 20 Exchange Place, New York 5, N. Y.
Nov. 19, 1948	BAILEY, ARTHUR L., Assistant Actuary, Lumbermens Mutual Casualty Co., 4750 Sheridan Road, Chicago 40, Ill.
*Nov. 20, 1924	BARBER, HARMON T., Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 14, 1947	BARKER, LORING M., Actuary, Firemen's Fund Insurance Group, 401 California Street, San Francisco 20, Calif.
*Nov. 20, 1942	BART, ROBERT D., Assistant Treasurer and Statistican, West Bend Aluminum Co., 92 Island Avenue, West Bend, Wis.
*Nov. 18, 1932	BARTER, JOHN L., Vice-President, Hartford Accident & Indemnity Co., 690 Asylum Avenue, Hartford 15, Conn.
*Nov. 13, 1931	BATHO, ELGIN R., Associate Actuary, Berkshire Life Insurance Co., 7 North Street, Pittsfield, Mass.
*Nov. 22, 1934	BERKELEY, ERNEST T., Actuary, Employers' Liability Assurance Corporation, Ltd., American Employers' Insurance Company and Employers' Fire Insurance Company, 110 Milk Street, Boston 7, Mass.
†	BLACK, S. BRUCE, President, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 17, Mass.
Apr. 20, 1917	BLANCHARD, RALPH H., Professor of Insurance, Graduate School of Business, Columbia University, New York 27, N. Y.
†	BREIBY, WILLIAM, Vice-President, Pacific Mutual Life Insurance Company, 523 West 6th St., Los Angeles 14, Cal.
*Nov. 21, 1952	BRINDISE, RALPH S., Casualty Actuary, Standard Oil Company (Indiana) 910 So. Michigan Ave., Chicago 80, Ill.
*Nov. 18, 1927	BROWN, F. STUART, Superintendent Systems and Procedures Dept., American Insurance Group, 15 Washington Street, Newark 2, N. J.
Oct. 22, 1915	BROWN, HERBERT D., (Retired), Glenora-on-Lake Seneca, Dundee, New York.
†	BUCK, GEORGE B., Consulting Actuary, 150 Nassau Street, New York 38, N. Y.

FELLOWS

Admitted	
Apr. 20, 1917	BURHOP, WILLIAM H., President, Employers Mutual Liability Insurance Company, 407 Grant Street, Wausau, Wis.
*Nov. 23, 1928	BURLING, WILLIAM H., Assistant Secretary, Group Department, 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., Vice-President and Comptroller, American Title and Insurance Company, 901 N.E. Second Avenue, Miami 32, Florida.
†	CAMMACK, EDMUND E., Vice-President and Actuary, Aetna Life Insurance Company, Hartford 15, Conn.
*Nov. 17, 1938	CARLETON, JOHN W., 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., Associate Actuary, Life Actuarial Department, The Travelers Insurance Company, 700 Main St., Hartford, 15, Conn.
*Nov. 15, 1918	COATES, BARRETT N., Coates, Herfurth and England, Consulting Actuaries, 620 Market Street, San Francisco 4, Calif.
*Nov. 17, 1922	COATES, CLARENCE S., Third Vice-President, Lumbermens Mutual Casualty Company, 4750 Sheridan Road, Chicago 40, Ill.
Oct. 27, 1916	COGSWELL, EDMUND S., First Deputy Commissioner of Insurance Department of Banking and Insurance, Division of Insurance, 100 Nashua Street, Boston 14, Mass.
Feb. 19, 1915	COLLINS, HENRY, (Retired), Timberlane, Route 4, Easton, Md.
*Nov. 22, 1934	CONSTABLE, WILLIAM J., The Ocean Accident and Guarantee Corporation, Ltd., 1 Park Avenue, New York, 16, N. Y.
*Nov. 22, 1934	COOK, EDWIN A., Assistant General Manager and Secretary, Interboro Mutual Indemnity Insurance Company, 270 Madison Avenue, New York 16, N. Y.
†	COPELAND, JOHN A., Consulting Actuary, 1520-21 Candler Building, Atlanta, Ga.
*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, and North Star Reinsurance Corporation, 90 John Street, New York 38, N. Y.
*Nov. 21, 1952	CRITCHLEY, DOUGLAS, Actuarial Department, Royal-Liverpool Group, 150 William St., New York 38, N. Y.
*Nov. 22, 1946	CROUSE, CHARLES W., Consulting Actuary, C. E. Preslan & Co., Inc., 815 Superior Ave., N.E., Cleveland 14, Ohio.
*Nov. 18, 1932	DAVIES, E. ALFRED, (Retired), Falls Village, Conn.

FELLOWS

Admitted	
*Nov. 18, 1927	DAVIS, EVELYN M., Woodward, Ryan, Sharp & Davis, Consulting Actuaries, 55 Broadway, New York 6, N. Y.
Nov. 16, 1951	DOREMUS, FREDERICK W., Manager, Eastern Underwriters Association, 85 John St., New York 38, N. Y.
*Nov. 17, 1920	DORWEILER, PAUL, Actuary, Aetna Casualty & Surety Company, Hartford 15, Conn.
*Nov. 24, 1933	EDWARDS, JOHN, Actuary, Ontario Insurance Department, Parliament Buildings, Toronto 2, Ontario, Canada.
*Nov. 15, 1940	ELLIOTT, GEORGE B., General Manager, Pennsylvania Compensation Rating and Inspection Bureau, 620 Packard Building, 15th at Chestnut Street, Philadelphia 2, Pa.
*Nov. 17, 1922	ELSTON, JAMES S., Associate Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, 15, Conn.
*Nov. 15, 1935	EPPINK, WALTER T., Vice-President and Actuary, Merchants Mutual Casualty Co., Merchants Mutual Building, Buffalo 5, N. Y.
†	FALLOW, EVERETT S., (Retired), 28 Sunset Terrace, West Hartford, Conn.
*Nov. 15, 1940	FARLEY, JARVIS, Secretary and Actuary, Massachusetts Indemnity Insurance Co., 654 Beacon Street, Boston 15, Mass.
†	FARRER, HENRY, (Retired), 4 North Ave., Fanwood, N. J.
*Nov. 15, 1935	FITZHUGH, GILBERT W., Third Vice-President, Metropolitan Life Insurance Co., 1 Madison Avenue, New York 10, N. Y.
Feb. 19, 1915	FONDILLER, RICHARD, Consulting Actuary, Woodward and Fondiller, 524 W. 57th Street, New York 19, N. Y.
*Nov. 18, 1927	FREDERICKSON, CARL H., Actuary, Canadian Underwriters Association, 55 York Street, Toronto, Canada.
*Nov. 22, 1934	FULLER, GARDNER V., Second Vice-President and Assistant Manager, New York Division, Lumbermens Mutual Casualty Co., and American Motorist Insurance Co., 342 Madison Ave., New York 17, N. Y.
*Nov. 19, 1948	GARDINER, JAMES B., Assistant Actuary, Metropolitan Life Insurance Co., 1 Madison Avenue, New York 10, N. Y.
*Nov. 20, 1924	GINSBURGH, HAROLD J., Vice-President, American Mutual Liability Insurance Co., 142 Berkeley Street, Boston 16, Mass.
*Nov. 21, 1930	GLENN, J. BRYAN, 5214 First Street, N.W., Washington 11, D.C.
*Nov. 13, 1931	GODDARD, RUSSELL P., Assistant to the President, Pennsylvania Manufacturers Association Casualty Insurance Co., Finance Building, Philadelphia, Pa.
†	GOODWIN, EDWARD S., (Investment Counselor, Retired) 96 Garvan Street, East Hartford 8, Conn.
*Nov. 19, 1926	GRAHAM, CHARLES M., Chief Self-Insurance Examiner, New York State Workmen's Compensation Board, 55 Franklin Street, New York 13, N. Y.

FELLOWS

Admitted	
†	GRAHAM, WILLIAM J., Consultant, 1070 Park Ave., New York 18, N. Y.
†	GREENE, WINFIELD W., Reinsurance Consultant and Intermediary, 2400 Sedgwick Avenue, New York 68, N. Y.
†	HAMMOND, H. PIERSON, (Retired), 22 Vanderbilt Road, West Hartford, Conn.
*Nov. 17, 1950	HARWAYNE, FRANK, Chief Actuary, New York State Insurance Department, 61 Broadway, New York 6, N. Y.
Oct. 22, 1915	HATCH, LEONARD W., (Retired), 425 Pelham Manor Road, Pelham Manor, New York.
*Nov. 17, 1950	HAZAM, WILLIAM J., Assistant Actuary, American Mutual Liability Insurance Co., 142 Berkeley Street, Boston 16, Mass.
*Nov. 19, 1926	HAUGH, CHARLES J., Secretary, Compensation and Liability Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 16, 1951	HEWITT, CHARLES C., JR., New Jersey Manufacturers Casualty Insurance Co., 363 W. State Street, Trenton, N. J.
Oct. 22, 1915	HODGKINS, LEMUEL G., (Retired), 5 Whitman Road, Worcester 5, Mass.
*Nov. 22, 1934	HOOKER, RUSSELL O., Actuary and Director of Examinations, State of Connecticut Insurance Department, Hartford 15, Conn.
*Nov. 17, 1950	HOPE, FRANCIS J., Rating and Research, Hartford Accident and Indemnity Co., 690 Asylum Avenue, Hartford 15, Conn.
Nov. 18, 1932	HUEBNER, SOLOMON STEPHEN, Professor of Insurance, University of Pennsylvania, Philadelphia 4, Pa.
*Nov. 14, 1947	HUGHEY, M. STANLEY, Assistant Actuary, Lumbermens Mutual Casualty Company, 4750 Sheridan Road, Chicago 40, Ill.
†	HUNTER, ARTHUR, (Retired), 124 Lloyd Road, Montclair, N. J.
Feb. 25, 1916	JACKSON, CHARLES W., (Retired), 74 Quimby Avenue, White Plains, N. Y.
*Nov. 19, 1929	JACKSON, HENRY HOLLISTER, Vice-President, National Life Insurance Co., 131 State Street, Montpelier, Vt.
*Nov. 14, 1941	JOHNSON, ROGER A., Actuary, Utica Mutual Insurance Co., 185 Genesee Street, Utica, N. Y.
*Nov. 16, 1939	JONES, HAROLD M., Group Research Division, John Hancock Mutual Life Insurance Company, 200 Berkeley Street, Boston 17, Mass.
*Nov. 19, 1926	KELTON, WILLIAM H., Associate Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 21, 1919	KIRKPATRICK, A. LOOMIS, Manager Insurance Department, Chamber of Commerce of the U. S. A., 1615 H Street, N.W., Washington 6, D.C.
*Nov. 14, 1941	KOLB, MORRIS B., Principal Actuary, State Insurance Fund, 625 Madison Avenue, New York 22, N. Y.

FELLOWS

Admitted	
*Nov. 24, 1933	KORMES, MARK, Consulting Actuary, 285 Madison Avenue, New York 17, N. Y.
Nov. 23, 1928	KULP, CLARENCE A., Professor of Insurance, University of Pennsylvania, Logan Hall, 36th Street and Woodland Avenue, Philadelphia 4, Pa.
*Nov. 18, 1949	LA CROIX, HAROLD F., JR., Assistant Actuary, Accident and Group Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
Nov. 13, 1931	LA MONT, STEWART M., (Retired), Hotel Claremont, Berkeley, Calif.
*Nov. 24, 1933	LANGE, JOHN R., Commissioner of Insurance, State of Wisconsin, State Capitol, Madison 2, Wis.
†	LEAL, JAMES R., Vice-President and Secretary, Interstate Life and Accident Co., Interstate Building, 540 McCallie Avenue, Chattanooga 3, Tenn.
†	LESLIE, WILLIAM, General Manager, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
*Nov. 17, 1950	LESLIE, WILLIAM, JR., Assistant Manager, National Council on Compensation Insurance, 45 East 17th Street, New York 3, N.Y.
*Nov. 20, 1924	LINDER, JOSEPH, Consulting Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York 38, N. Y.
*Nov. 17, 1950	LIVINGSTON, GILBERT R., Assistant Actuary, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
*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., Second Vice-President, The Guardian Life Insurance Co. of America, 50 Union Square, New York 3, N. Y.
†	MAGOUN, WILLIAM N., (Retired), 390 Commonwealth Ave., Boston, Mass.
*Nov. 23, 1928	MARSHALL, RALPH M., Assistant Actuary, National Council on Compensation Insurance, 45 East 17th Street, New York 3, N. Y.
*Nov. 18, 1927	MASTERSON, NORTON E., Vice-President and Actuary, Hardware Mutual Casualty Co. and Hardware Dealers Mutual Fire Insurance Co., 200 Strongs Avenue, Stevens Point, Wis.
*Nov. 19, 1926	MATTHEWS, ARTHUR N., Associate Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
May 19, 1915	MAYCRINK, EMMA C., Secretary-Treasurer, Association of New York State Mutual Casualty Companies, 60 East 42nd Street, New York 17, N. Y.
*Nov. 15, 1935	MCCONNELL, MATHEW H., Associate Actuary, General Accident Fire and Life Assurance Company, Fourth and Walnut Sts., Philadelphia 5, Pa.
*Oct. 31, 1917	MCMANUS, ROBERT J., Assistant Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street Hartford 15, Conn.

FELLOWS

Admitted	
†	MICHELBACHER, G. F., President, Great American Indemnity Co., 1 Liberty Street, New York 5, N. Y.
*Nov. 17, 1938	MILLER, JOHN HAYNES, Vice-President and Actuary, Monarch Life Insurance Company, 365 State St., Springfield 1, Mass.
†	MILLIGAN, SAMUEL, Administrative Vice-President, Metropolitan Life Insurance Co., 1 Madison Avenue, New York 10, N. Y.
*Nov. 18, 1937	MILLS, JOHN A., Vice-President and Actuary, Lumbermens Mutual Casualty Co., American Manufacturers Mutual Insurance Company and American Motorists Insurance Co., Mutual Insurance Bldg., 4750 Sheridan Road, Chicago 40, Ill.
*Nov. 18, 1921	MONTGOMERY, VICTOR, President, Pacific Employers Insurance Co., 1033 So. Hope Street, Los Angeles 15, Calif.
†	MOORE, GEORGE D., Actuary, 13 Emerson Street, E. Orange, N. J.
*Nov. 17, 1920	MUELLER, LOUIS H., 2845 Lake Street, San Francisco 21, Calif.
†	MULLANEY, FRANK R., (Deceased)
*Nov. 17, 1950	MUNTERICH, GEORGE C., Actuary, Manhattan Casualty Co., 1775 Broadway, New York 19, N. Y.
May 28, 1920	MURPHY, RAY D., Executive Vice-President and Actuary, The Equitable Life Assurance Society of the U. S. A., 393 Seventh Avenue, New York 1, N. Y.
*Nov. 15, 1935	OBERHAUS, THOMAS M., Consulting Actuary, Woodward and Fondiller, 524 West 57th Street, New York 19, N. Y.
†	OLIFIERS, EDWARD, Consulting Actuary, 21 Rue Souveraine, Ixelles, Brussels, Belgium.
†	ORR, ROBERT K., (Retired), 226 S. Logan Street, Lansing 15, Mich.
*Nov. 21, 1919	OUTWATER, OLIVE E., (Retired), 1337 Fargo Ave., Chicago 26, Ill.
*Nov. 21, 1930	PERRYMAN, FRANCIS S., Assistant U. S. Manager and Actuary, Royal-Liverpool Insurance Group, 150 William Street, New York 38, N. Y.
*Nov. 14, 1941	PETERS, STEFAN, Actuary, Morse and Seal, 149 Broadway, Room 2110, New York 6, N. Y.
*Nov. 21, 1952	PETZ, EARL F., JR., Procedures Department, Lumbermens Mutual Casualty Co., Chicago 40, Ill.
Nov. 19, 1926	PHILLIPS, JESSE S., Director, Great American Indemnity Co., 1 Liberty Street, New York 5, N. Y.
*Nov. 24, 1933	PICKETT, SAMUEL C., (Retired) Macktown Road, Windsor, Conn.
*Nov. 17, 1922	PINNEY, SYDNEY D., 290 Wolcott Hill Road, Wethersfield 9, Conn.
*Nov. 13, 1931	PRUITT, DUDLEY M., Actuary, General Accident Fire & Life Assurance Corp., Fourth & Walnut Sts., Philadelphia 5, Pa.
*Nov. 18, 1949	RESONY, JOHN A., Casualty Rate Analyst, Connecticut Insurance Department, State Office Building, Hartford 2, Conn.

FELLOWS

Admitted	
Nov. 16, 1951	RICE, HOMER D., General Manager, New York Fire Insurance Rating Organization, 85 John Street, New York 38, N. Y.
May 23, 1919	RICHARDSON, FREDERICK, (Retired), Coombe, Bradford Abbas, Sherborne, Dorset, England.
*Nov. 19, 1926	RICHTER, OTTO C., Chief Actuary, American Telephone & Telegraph Co., 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, 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 Blvd., Los Angeles 54, Calif.
*Nov. 14, 1947	ROWELL, JOHN H., Actuary, California Inspection Rating Bureau, 500 Sansome Street, San Francisco 11, Calif.
*Nov. 17, 1938	RUCHLIS, ELSIE, 872 East 24th Street, Brooklyn 10, N. Y.
*Nov. 14, 1947	SALZMANN, RUTH E., Assistant Actuary, Hardware Mutual Casualty Company, Hardware Dealers Mutual Fire Insuarnce Co., 200 Strongs Ave., Stevens Point, Wis.
*Nov. 20, 1942	SATTERTHWAITE, FRANKLIN E., Consulting Statistician, Rath and Strong, Inc., 80 Federal Street, Boston, Mass.
*Nov. 19, 1948	SCHLOSS, HAROLD W., Superintendent, Actuarial Department, Royal-Liverpool 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. 13, 1931	SILVERMAN, DAVID, Partner, Wolfe, Corcoran & Linder, 116 John Street, New York 38, N. Y.
*Nov. 24, 1933	SINNOTT, ROBERT V., (Deceased).
*Nov. 19, 1929	SKELDING, ALBERT Z., Assistant Manager, National Council on Compensation Insurance, 45 East 17th St., New York 3, N. Y.
*Nov. 19, 1929	SKILLINGS, E. SHAW, Assistant Vice-President and Actuary, Allstate Insurance Co., 3245 W. Arthington St., Chicago 7, Ill.
*Nov. 18, 1932	SMICK, JACK J., Consulting Actuary, 38 Park Row, New York 7, N. Y.
*Nov. 15, 1940	SMITH, SEYMOUR E., Secretary, Casualty Department, The Travelers Insurance Co., 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 Company, 33 Broad Street, Boston 9, Mass.

FELLOWS

Admitted	
*Nov. 17, 1920	TARBELL, THOMAS F., Chief Actuary, Casualty and Fire Actuarial Departments, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
†	THOMPSON, JOHN S., Vice-Chairman of Board, The Mutual Benefit Life Insurance Co., 300 Broadway, Newark 4, N. J.
†	TRAIN, JOHN L., President, Utica Mutual Insurance Co., 185 Genesee Street, Utica 2, N. Y.
Nov. 17, 1922	TRAVERSI, ANTONIO T., 9 Balfour Street, Wollstonecraft, Sydney, Australia.
*Nov. 19, 1948	TURNER, PAUL A., 1350 North Highland Avenue, Los Angeles 28, Calif.
*Nov. 14, 1947	UHTHOFF, D. R., Associate Actuary, Employers Mutual Liability Insurance Co. of Wisconsin, Wausau, Wis.
*Nov. 23, 1928	VALERIUS, NELS M., Assistant Actuary, Aetna Casualty and Surety Co., Hartford 15, Conn.
*Nov. 21, 1919	VAN TUYL, HIRAM O., (Retired), 17 Coolidge Ave., White Plains, N. Y.
*Nov. 16, 1951	VERGANO, ELIA (Retired), 390 Central Park, W., New York 25, 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., Secretary, The Aetna Casualty and Surety Co. 151 Farmington Ave., Hartford 15, Conn.
Nov. 16, 1951	WATSON, LEON A., General Manager, The Fire Insurance Rating Organization of New Jersey, 31 Clinton St., Newark, N. J.
*Nov. 14, 1947	WIEDER, JOHN W., JR., Aetna Casualty and Surety Company, Hartford 15, Conn.
*Nov. 15, 1935	WILLIAMS, HARRY V., Secretary, Hartford Accident and Indemnity Co., 690 Asylum Ave., Hartford 15, Conn.
Nov. 14, 1941	WILLIAMSON, W., RULON, Senior Actuarial Consultant, The Wyatt Company, 3400 Fairhill Drive, Washington 23, D.C.
*Nov. 13, 1931	WITTICK, HERBERT E., Assistant General Manager and Secretary, Pilot Insurance Co., 199 Bay Street, Toronto 1, 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., Secretary, Southeastern Underwriters Association, 327 Trust Company of Georgia Bldg., Atlanta, Ga.

ASSOCIATES

Those marked (*) have been admitted as Associates upon examination by the Society.

Admitted	
May 23, 1924	ACKER, MILTON, Manager, General Liability Division, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
*Nov. 15, 1918	ACKERMAN, SAUL B., Professor of Insurance, School of Commerce, New York University, Washington Square, New York 6, N. Y.
*Nov. 16, 1939	AIN, SAMUEL N., Consulting Actuary, 120 Broadway, New York 5, N. Y.
Apr. 5, 1928	ALLEN, AUSTIN F., President, Texas Employers' Insurance Association, P.O. Box 2759, Dallas 1, Texas.
Nov. 15, 1918	ANKERS, R. E., Vice-President and Treasurer, Continental Life Insurance Co., Inc., Investment Building, 15 and K Streets., N.W., Washington 5, D.C.
*Nov. 21, 1930	ARCHIBALD, A. EDWARD, Vice-President and Actuary, Volunteer State Life Insurance Company, Chattanooga 1, Tenn.
*Nov. 16, 1951	BARKER, GORDON M., Actuarial Department, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 17, Mass.
*Nov. 24, 1933	BARRON, JAMES C., Asst. Treasurer, General Reinsurance Corporation and North Star Reinsurance Corporation, 90 John Street, New York 38, N. Y.
*Nov. 23, 1928	BATEMAN, ARTHUR E., c/o Arthur Q. Melendy, Southboro, Mass.
*Nov. 15, 1940	BATHO, BRUCE, Associate Actuary, Life Insurance Company of Georgia, 573 W. Peachtree St., N.E., Atlanta 1, Georgia.
*Nov. 16, 1951	BEVAN, JOHN R., Actuarial Department, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, Mass.
*Nov. 18, 1925	BITTEL, W. HAROLD, Chief Actuary, Department of Banking and Insurance, Trenton 7, N. J.
Nov. 17, 1920	BLACK, NELLAS C., Manager, Statistical Department, Maryland Casualty Co., Baltimore 3, Md.
*Nov. 15, 1940	BLACKHALL, JOHN M., California-Western States Life Insurance Company, 10th & J Sts., Sacramento, Calif.
*Nov. 22, 1934	BOMSE, EDWARD L., Supt. New York Met. Special Risks, Royal Indemnity Co., 150 William Street, New York 38, N. Y.
*Nov. 23, 1928	BOWER, P. S., Assistant General Manager and Treasurer, The Great-West Life Assurance Company, Winnipeg, Manitoba, Canada.
*Nov. 17, 1950	BOYAJIAN, JOHN H., Assistant Actuary, National Council on Compensation Insurance, 45 East 17th St., New York 3, N. Y.
*Nov. 15, 1918	BRUNNQUELL, HELMUTH G., (Retired), 1013 East Circle Drive, Milwaukee 11, Wis.
*Oct. 22, 1915	BUFFLER, LOUIS, Underwriting Director, The State Insurance Fund, 625 Madison Avenue, New York 22, N. Y.

ASSOCIATES

Admitted	
*Nov. 20, 1924	BUGBEE, J. M.. Manager, Automobile Department, Maryland Casualty Co., Box 1228, Baltimore 3, Md.
Mar. 31, 1920	BURT, MARGARET A., Office of George B. Buck, Consulting Actuary, 150 Nassau Street, New York 38, N. Y.
Nov. 17, 1922	CAVANAUGH, L. D., President, Federal Life Insurance Co., 168 N. Michigan Avenue, Chicago 1, Ill.
*Nov. 18, 1927	CHEN, S. T., Consulting Actuary, Wing On Life Assurance Co., 26 Des Voenx Road, Central, Hong Kong, China.
*Nov. 24, 1933	CRAWFORD, W. H., Treasurer, Industrial Indemnity Co., 155 Sansome Street, San Francisco 4, Calif.
*Nov. 18, 1932	CRIMMINS, JOSEPH B., Assistant Actuary, Metropolitan Life Insurance Co., 1 Madison Avenue, New York 10, N. Y.
*Nov. 21, 1952	DANIEL, C. M., Hardware Mutual Casualty Company, 200 Strongs Avenue, Stevens Point, Wis.
*Nov. 18, 1925	DAVIS, MALVIN E., Vice-President and Actuary, Metropolitan Life Insurance Co., 1 Madison Avenue, New York 10, N. Y.
*Nov. 14, 1941	DOWLING, WILLIAM F., Executive Vice-President, Lumber Mutual Casualty Co., 260 Fourth Avenue, New York 10, N. Y.
June 5, 1925	EGER, FRANK A., Secretary-Comptroller, Indemnity Insurance Co. of North America, 1600 Arch Street, Philadelphia 1, Pa.
*Nov. 16, 1951	FAIRBANKS, ALFRED V., Assistant Actuary, Monarch Life Insurance Company, 365 State Street, Springfield 1, Mass.
*Nov. 16, 1923	FITZ, L. LEROY, Group Department, John Hancock Mutual Life Insurance Company, Boston 17, Mass.
*Nov. 16, 1923	FLEMING, FRANK A., General Manager, Mutual Insurance Rating Bureau, 60 East 42nd Street, New York 17, N. Y.
*Nov. 21, 1952	FOSTER, ROBERT B., Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 21, 1952	FOWLER, THOMAS W., Actuarial Department, Royal-Liverpool Insurance Group, 150 William Street, New York 38, N. Y.
*Nov. 21, 1952	FRANKLIN, N. M., Actuary, Surety Association of America, 60 John Street, New York 38, N. Y.
*Nov. 13, 1936	FRUECHTEMEYER, FRED J., Assistant to Comptroller, The Andrew Jergens Company, 2535 Spring Grove Ave., Cincinnati 14, Ohio.
*Nov. 19, 1929	FURNIVALL, MAURICE L., Associate Actuary, Accident and Group Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 18, 1932	GETMAN, RICHARD A., Assistant Actuary, Life Department, The Travelers Insurance Co., 700 Main St., Hartford 15, Conn.
*Nov. 17, 1922	GIBSON, JOSEPH P., JR., Executive Vice-President, American Mutual Reinsurance Co., 919 North Michigan Ave., Chicago 11, Ill.

ASSOCIATES

Admitted	
*Nov. 16, 1923	GILDEA, JAMES F., Assistant Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 14, 1947	GINGERY, STANLEY W., Assistant Actuary, The Prudential Insurance Co., Newark, N. J.
*Nov. 16, 1951	GRAVES, CLYDE H., Actuary, Mutual Insurance Rating Bureau and Mutual Insurance Advisory Association, 60 East 42nd Street, New York 17, N. Y.
*Nov. 18, 1927	GREEN, WALTER C., Consulting Actuary, Continental Bank Building, Salt Lake City, Utah.
*Nov. 15, 1940	GROSSMAN, ELI A., Vice-President-Actuary, Union Labor Life Insurance Co., 200 East 70th Street, New York 21, N. Y.
*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., Supervisor, Permanent Disability Rating Bureau, Industrial Accident Commission, 965 Mission Street, San Francisco 3, Calif.
*Nov. 17, 1950	HALEY, JAMES B., JR., Fireman's Fund Group, 401 California Street, San Francisco, Calif.
*Nov. 17, 1922	HALL, HARTWELL L., Associate Actuary, Connecticut Insurance Department, 165 Capitol Avenue, Hartford 2, Conn.
*Nov. 13, 1936	HAM, HUGH P., Assistant General Manager, The British American Assurance Company, 40 Scott St., Toronto 1, Canada.
Mar. 24, 1932	HARRIS, SCOTT, Executive Vice-President, Joseph Froggatt & Co., Inc., 74 Trinity Place, New York 6, N. Y.
*Mar. 25, 1924	HART, WARD VAN B., Associate Actuary, Connecticut General Life Insurance Co., 55 Elm Street, Hartford 15, Conn.
Nov. 21, 1919	HAYDON, GEORGE F., Manager Emeritus, Wisconsin Compensation Rating & Inspection Bureau, 715 N. Van Buren Street, Milwaukee 2, Wis.
Nov. 17, 1927	HIPP, GRADY H., Executive Vice-President, Liberty Life Insurance Co., Greenville, S. C.
*Nov. 16, 1945	HOLZINGER, ERNEST, Actuary, Pension Planning Company, 260 Madison Avenue, New York 16, N. Y.
*Nov. 21, 1952	HURLEY, ROBERT L., Actuary, Liberty Mutual Fire Insurance Company, 175 Berkeley Street, Boston 17, Mass.
Nov. 19, 1929	JACOBS, CARL N., President, Hardware Mutual Casualty Co. and Hardware Dealers Mutual Fire Insurance Co., 200 Strongs Avenue, Stevens Point, Wis.
*Nov. 18, 1921	JENSEN, EDWARD S., Assistant Vice-President, Group Department, Occidental Life Insurance Co. of California, 1151 So. Broadway, Los Angeles 55, Calif.
*Nov. 16, 1951	JOHE, RICHARD L., Actuarial Department, U. S. Fidelity and Guaranty Co., Baltimore, Md.

ASSOCIATES

Admitted	
*Nov. 21, 1952	JOHNS, M. VERNON, JR., Actuarial Department, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
*Nov. 21, 1952	JONES, H. LLOYD, United States Manager and Attorney, Phoenix-London Group, 55 Fifth Avenue, New York 3, N. Y.
Nov. 21, 1930	JONES, LORING D., (Retired), 64 Raymond Avenue, Rockville Centre, Long Island, N. Y.
*Nov. 21, 1952	JONES, NATHAN F., Assistant Actuary, Prudential Insurance Company, Newark 1, N. J.
*Nov. 17, 1922	KIRK, CARL L., Deputy U.S. Manager, Zurich General Accident & Liability Insurance Co., 135 South LaSalle Street, Chicago 3, Ill.
*Nov. 15, 1935	KITZROW, E. W., Farmers Insurance Group, Administrative Department, 4680 Wilshire Boulevard, Los Angeles 54, Cal.
*Nov. 21, 1952	LINO, RICHARD, Actuarial Department, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
*Nov. 21, 1952	LISCORD, PAUL S., Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 14, 1947	LUFKIN, ROBERT W., Statistician, Liberty Mutual Insurance Co., 175 Berkeley Street, Boston 17, Mass.
*Nov. 13, 1931	MACKEEN, HAROLD E., Fire Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
Mar. 24, 1932	MAGRATH, JOSEPH J., Secretary, United States Guaranty Co., 90 John Street, New York 38, N. Y.
*Nov. 18, 1925	MALMUTH, JACOB, Associate Examiner, New York State Insurance Department, 61 Broadway, New York 6, N. Y.
Mar. 24, 1927	MARSH, CHARLES V. R., (Retired), 617 E. Surf Road, Ocean City, N. J.
*Nov. 13, 1936	MAYER, WILLIAM H., JR., Associate Manager Group Contract Bureau, Metropolitan Life Insurance Co., 1 Madison Avenue, New York 10, N. Y.
*Nov. 17, 1950	MAYERSON, ALLEN L., Principal Actuary, New York State Insurance Department, 61 Broadway, New York 6, N. Y.
*Nov. 17, 1922	MCIVER, R. A., Actuary, Washington National Insurance Co., 1630 Chicago Avenue, Evanston, Ill.
*Nov. 17, 1950	MENZEL, HENRY W., Actuarial Department, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
*Nov. 13, 1931	MILLER, HENRY C., Comptroller-Actuary, California State Compensation Insurance Fund, 450 McAllister Street, San Francisco 1, Calif.
*Nov. 19, 1926	MILNE, JOHN L., Vice-President and Actuary, Philadelphia Life Insurance Company, 111 North Broad Street, Philadelphia 7, Pa.
*Nov. 18, 1937	MINOR, EDUARD H., Manager Accident and Health Actuarial Division, Metropolitan Life Insurance Co., 1 Madison Avenue, New York 10, N. Y.

ASSOCIATES

Admitted	
Nov. 17, 1922	MONTGOMERY, JOHN C., Secretary and Treasurer, Bankers Indemnity Insurance Co., Treasurer, The American Insurance Co., 15 Washington Street, Newark 1, N. J.
May 25, 1923	MOORE, JOSEPH P., Mutual Life and Citizens Assurance Co., Ltd., P.O. Box 1770, Place D'arms, Montreal, Canada.
*Nov. 17, 1950	MURRIN, THOMAS E., Assistant Actuary, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
*Nov. 18, 1937	MYERS, ROBERT J., Chief Actuary, Social Security Administration, Washington 25, D.C.
*Nov. 15, 1935	NELSON, S. TYLER, Deputy in Charge Rating Division, Department of Insurance, State Capitol Building, Springfield, Ill.
*Oct. 27, 1916	NEWELL, WILLIAM, (Retired), 1225 Park Avenue, New York 28, N. Y.
*Nov. 18, 1925	NICHOLSON, EARL, Actuary, Joseph Froggatt & Co., Inc., 74 Trinity Place, New York 6, N. Y.
May 23, 1919	OTTO, WALTER E., President, Michigan Mutual Liability Co., Associated General Fire Co., Mutual Building, 28 West Adams Avenue, Detroit 26, Mich.
*Nov. 19, 1926	OVERHOLSER, DONALD M., Office of George B. Buck, Consulting Actuary, 150 Nassau Street, New York 7, N. Y.
Nov. 20, 1924	PENNOCK, RICHARD M., (Retired), 12 Lodges Lane, Cynwood, Pa.
*Nov. 21, 1952	PENNYCOOK, RODERICK B., Manager Underwriting and Statistical Department, Manitoba Hospital Service Association, Winnipeg, Man., Canada.
*Nov. 14, 1947	PERRY, ROBERT C., Vice-President and Actuary, State Farm Life Insurance Company, Bloomington, Ill.
Nov. 19, 1929	PHILLIPS, JOHN H., Vice-President and Actuary, Employers' Mutual Liability Insurance Co., 407 Grant Street, Wausau, Wis.
*Nov. 17, 1920	PIKE, MORRIS, Second Vice-President, John Hancock Mutual Life Insurance Co., Boston 17, Mass.
*Nov. 23, 1928	PIPER, K. B., Vice-President, Provident Life and Accident Insurance Co., 721 Broad Street, Chattanooga 2, Tenn.
*Nov. 17, 1922	POORMAN, WILLIAM F., President, Central Life Assurance Company, Fifth and Grand Avenues, Des Moines 6, Iowa.
*Nov. 13, 1936	POTOFSKY, SYLVIA, Senior Actuary, The State Insurance Fund, 625 Madison Avenue, New York 22, N. Y.
*Nov. 15, 1918	RAYWID, JOSEPH, Consultant, Woodward and Fondiller, Consulting Actuaries, 524 West 57th Street, New York 19, N. Y.
*Nov. 21, 1952	RESONY, ALLIE V., Actuarial Department, Hartford Accident and Indemnity Co., 690 Asylum Ave., Hartford 15, Conn.
Nov. 19, 1932	RICHARDSON, HARRY F., General Manager, National Council on Compensation Insurance, 45 East 17th Street, New York 3, N.Y.
*Nov. 18, 1932	ROBERTS, JAMES A., Accident and Group Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford 15, Conn.

ASSOCIATES

Admitted	
*Nov. 18, 1927	SARASON, HARRY M., Consulting Actuary, 1768 Maple Street, Pasadena 4, Calif.
Nov. 16, 1923	SAWYER, ARTHUR, Actuarial Department, Royal-Liverpool Insurance Group, 150 William Street, New York 38, N. Y.
*Nov. 14, 1947	SCAMMON, LAWRENCE W., Actuary, Massachusetts Automobile Rating and Accident Prevention Bureau, Massachusetts Workmen's Compensation Rating and Inspection Bureau, 89 Broad Street, Boston 10, Mass.
*Nov. 14, 1947	SCHWARTZ, MAX J., Associate Actuary (Casualty), New York State Insurance Department, Albany 1, N. Y.
*Nov. 20, 1930	SEVILLA, EXEQUIEL S., Manager and Actuary, National Life Insurance Co. of the Philippines, Regina Building, P.O. Box 2056, Manila, Philippines.
*Nov. 20, 1924	SHEPPARD, NORRIS E., Professor of Mathematics, University of Toronto, Toronto 5, Canada.
Nov. 15, 1918	SIBLEY, JOHN L., (Retired), 225 Amesbury Road, Haverhill, Mass.
*Nov. 16, 1951	SIMON, LEROY, J., Associate Actuary, Mutual Service Casualty Insurance Company, 1923 University Ave., St. Paul 4, Minn.
*Nov. 18, 1921	SMITH, ARTHUR G., Associate Manager, New York Compensation Insurance Rating Board, Pershing Square Bldg., 100 East 42nd Street, New York 17, N. Y.
*Nov. 19, 1926	SOMERVILLE, WILLIAM F., Secretary and Director, St. Paul-Mercury Indemnity Co., St. Paul 2, Minn.
*Nov. 18, 1925	SOMMER, ARMAND, Vice President, Accident and Health Department, Continental Casualty Co., 910 So. Michigan Avenue, Chicago 5, Ill.
*Nov. 15, 1918	SPENCER, HAROLD S., (Retired), 8 Chelsea Lane, West Hartford, Conn.
Nov. 20, 1924	STELLWAGEN, H. P., Executive Vice-President, Indemnity Insurance Company of North America, 1600 Arch Street, Philadelphia 1, Pa.
*Nov. 16, 1923	STOKE, KENDRICK, Actuary, Michigan Mutual Liability Company, 28 W Adams, Detroit 26, Mich.
*Nov. 21, 1930	SULLIVAN, WALTER F., Assistant Actuary, State Compensation Insurance Fund, 450 McAllister Street, San Francisco 1, Calif.
*Nov. 21, 1919	TRENCH, FREDERICK H., Manager, Underwriting Department, Utica Mutual Insurance Co., 185 Genesee Street, Utica 1, N. Y.
*Nov. 17, 1950	TRIST, JOHN A. W., Statistical Department, Lumbermens Mutual Casualty Company, Mutual Insurance Bldg., 4750 Sheridan Road, Chicago 40, Ill.
*Nov. 20, 1924	UHL, M. ELIZABETH, National Bureau of Casualty Underwriters, 60 John Street, New York 38, N. Y.
*Nov. 18, 1932	WEINSTEIN, MAX S., Actuary, New York State Employees' Retirement System, 256 Washington Avenue, Albany 1, N. Y.
*Nov. 18, 1925	WELLMAN, ALEXANDER C., Vice-President, Protective Life Insurance Co., Birmingham, Ala.

Admitted	
*Nov. 21, 1930	WELLS, WALTER I., Director, Accident and Sickness Branch, State Mutual Life Assurance Co., 340 Main Street, Worcester 8, Mass.
*Nov. 16, 1951	WERMEL, MICHAEL T., Consulting Actuary, Michael T. Wermel and Associates, 1406 G Street, N.W. Washington 5, D.C.
Mar. 21, 1929	WHEELER, CHARLES A., (Retired), 1023 Hillcrest Road, Ridgewood, N. J.
*Nov. 18, 1927	WHITBREAD, F. G., Vice-President, Reliance Life Insurance Company, Room 412, Farmers Bank Building, Pittsburgh 22, Pa.
*Nov. 19, 1948	WHITE, AUBREY, Ostheimer & Co., 1500 Chestnut St., Philadelphia, Pa.
*Nov. 16, 1939	WITTLAKE, J. CLARKE, Assistant to President, Business Men's Assurance Company, B.M.A. Building, Kansas City 10, Mo.
*Oct. 22, 1915	WOOD, DONALD M., Partner, Childs & Wood, 175 W. Jackson Blvd., Chicago 4, Ill.
*Nov. 18, 1937	WOOD, DONALD M., JR., Childs & Wood, 175 West Jackson Blvd., Chicago 4, Ill.
*Nov. 18, 1927	WOOD, MILTON J., Chief Actuary, Life, Accident and Group Actuarial Department, The Travelers Insurance Co, 700 Main Street, Hartford 15, Conn.
*Oct. 22, 1915	WOODMAN, CHARLES E., (Retired), The Brunswick, Waterville, N. Y.
*Nov. 22, 1934	WOODWARD, BARBARA H., The Rueben H. Donnelley Corporation, 305 East 45th Street, New York, N. Y.
*Nov. 17, 1950	WOODDY, JOHN C., Staff Actuary, American Telephone and Telegraph Company, 195 Broadway, New York 7, N. Y.
*Nov. 18, 1925	WOOLERY, JAMES MYRON, Vice-President and Actuary, Occidental Life Insurance Company, Raleigh, N. C.

SCHEDULE OF MEMBERSHIP, NOVEMBER 21, 1952

	Fellows	Associates	Total
Membership, November 16, 1951	160	127	287
Additions:			
By Election	...	...	...
By Reinstatement	...	1	1
By Examination	3	11	14
	163	139	302
Deductions:			
By Death	4	2	6
By Withdrawal	1	1	2
By Transfer from Associate to Fellow	...	3	3
Membership, November 21, 1952	158	133	291

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	*Howard 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

Secretary-Treasurer

1914-1917....*C. E. Scattergood
1918-1952.....R. Fondiller

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
1944-1952.....E. C. Maycrink

Librarian†

1914.....W. W. Greene
1915.....R. Fondiller
1916-1921.....L. I. Dublin
1922-1924.....*E. R. Hardy
1925-1937.....W. Breiby
1937-1947.....T. O. Carlson
1948-1950.....*S. M. Ross
1951-1952. Gilbert R. Livingston
Chairman—Examination Comm.
1949-1952.....Roger A. Johnson

*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
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
†	Raymond V. Carpenter	Mar. 11, 1947
Feb. 19, 1915	Gorden Case	Feb. 4, 1920
Nov. 23, 1928	Walter P. Comstock	May 11, 1951
†	Charles T. Conway	July 23, 1921
†	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	Jul. 31, 1951
May 19, 1915	Samuel Deutschbe ger	Jan. 18, 1929
†	Ezekiel Hinton Downey	July 9, 1922
May 19, 1915	Earl O. Dunlap	July 5, 1944
†	Edward B. Fackler	Jan. 8, 1952
†	David Parks Fackler	Oct. 30, 1924
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
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
†	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

FELLOWS WHO HAVE DIED—*Continued*

Admitted		Died
Nov. 19, 1929	Robert S. Hull	Nov. 30, 1947
†	Burritt A. Hunt	Sept. 3, 1943
Nov. 28, 1921	William Anderson Hutcheson	Nov. 19, 1942
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
Feb. 17, 1915	John M. Laird	June 20, 1942
Feb. 19, 1915	Abb Landis	Dec. 9, 1937
Nov. 17, 1922	Arnette Roy Lawrence	Dec. 1, 1942
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
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
Nov. 19, 1926	William L. Mooney	Oct. 21, 1948
Feb. 19, 1915	William J. Montgomery	Aug. 20, 1915
May 19, 1915	Edward Bontecou Morris	Dec. 19, 1929
†	Albert H. Mowbray	Jan. 7, 1949
†	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
†	Charles Grant Reiter	July 30, 1937
†	Charles H. Remington	Mar. 21, 1938
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
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. 22, 1934	Walter H. Thompson	May 25, 1935
Nov. 18, 1921	Guido Toja	Feb. 28, 1933
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

FELLOWS WHO HAVE DIED—*Continued*

Admitted		Died
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
†	Joseph H. Woodward	May 15, 1928
†	William Young	Oct. 23, 1927
May 24, 1921	Arthur B. Wood	June 14, 1952

ASSOCIATES WHO HAVE DIED

Admitted		Died
Oct. 22, 1915	Don A. Baxter	Feb. 10, 1920
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. 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
Nov. 15, 1918	Albert Edward Wilkinson	June 11, 1930

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 21, 1952)

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 for Associates. The payment of dues will be waived in the case of Fellows or Associates who have attained the age of seventy years or who, having been members for a period of at least twenty years, shall have attained the age of sixty-five years. 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 the second Tuesday and following Wednesday during the month of May in each year in such cities as will be convenient for three or more candidates.

2. Filing of Application.

Application for admission to examination 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 fifteenth day of February preceding the dates of examination. Applications should definitely state for what parts the candidate will appear.

3. Fees.

The examination fee is $3.00 for each part or portion thereof taken, subject to a minimum of $5.00 for each year in which the candidate presents himself; thus for one part, $5.00, for two parts, $6.00, etc. Examination fees are payable to the order of the Society and must be received by the Secretary-Treasurer before the fifteenth day of February preceding the dates of examination.

4. Associateship and Fellowship Examinations.

(a) The examination for Associateship consists of four parts and that for Fellowship consists of four parts. A candidate may take any one or more of the four parts of the Associateship Examination. A candidate may present himself for part of the Fellowship Examination either (a) if he has previously passed the Associateship Examination and all preceding parts of the Fellowship Examination, or (b) if he concurrently presents himself for and submits papers for all unpassed parts of the Associateship Examination and all preceding unpassed parts of the Fellowship Examination. Subject to the foregoing requirements, the candidate will be given credit for any part or parts of either examination which he may pass.

(b) A candidate who has passed the Associateship Examination Parts I-IV prior to 1941, but who has not been enrolled as an Associate because of lack of the experience qualifications required by the examination rules effective prior to 1941, will be enrolled as an Associate upon passing the current Associateship Examination Part IV.

(c) An Associate who has passed no part of the Fellowship Examination under the Syllabus effective prior to 1941 is required, in order to qualify for admission as a Fellow, to pass the current Associateship Examination Part IV and Fellowship Examination Parts I-IV.

(d) A candidate who has passed one or more parts of the Associateship or Fellowship Examinations under the Syllabus effective prior to

1948 will receive credit for the corresponding parts of the new Syllabus in accordance with the following table:

Parts Passed Under Old Syllabus (Effective Prior to 1948)	*Parts Credited Under New Syllabus (Effective in 1953)*
Associateship, Part I	Associateship, Part I—Section 2
" " II	" " II
" " III	" " I—Section 1
" " IV	" " III
" " V	" " IV
Fellowship, Part I	Fellowship Part I
" " II	" Parts III & IV—Section 15
" " III	" Parts II & IV—Section 16

Partial examinations will be given to those students requiring same in accordance with the foregoing credits.

(e) A candidate who has passed one or more parts of the Associateship or Fellowship examinations under the Syllabus effective during the period 1948 to 1952 will receive credit for the corresponding parts of the new Syllabus effective in 1953.

5. Alternative to Passing of Fellowship Parts III and IV.

As an alternative to the passing of Parts III and IV of the Fellowship Examination, providing that the candidate presents himself in the same year for Parts I and II, or has previously passed Parts I and II, the candidate may elect to 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 Parts III and IV of the Fellowship Examination, and shall not consist primarily of data of an historical nature. The thesis should be of a character which would qualify it for printing in the Proceedings. Candidates electing this alternative should communicate with the Secretary-Treasurer and obtain through him approval by 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 must be in the hands of the Secretary-Treasurer before the second Tuesday 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.

6. Waiver of Examinations for Associate.

The examinations for Associate will be waived under Article III of the Constitution in part or in whole only in case of those candidates who meet the following qualifications and requirements:

1. PARTIAL WAIVER

In case of a candidate who, for a period of at least two years preceding date of application, has been in responsible charge of the actuarial or statistical department of an insurance organization (other than a life insurance organization) and who has passed examinations of other recognized Actuarial Societies at least equivalent to Parts I, II and III of the Associateship examinations of this Society, the passing of such parts of the Associateship examinations of this Society will be waived upon approval of the Examination Committee.

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 original research and knowledge of insurance (other than life insurance) and shall not consist primarily of data of an historical nature.

Candidates electing this alternative should communicate with the Secretary-Treasurer and obtain through him approval by 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.

LIBRARY

The Society's library contains all of the references listed in the Recommendations for Study, including the books noted as being out of print with the exception of certain periodicals and publications subject to periodical revision. It also contains numerous other works on actuarial matters. 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 two weeks upon payment of a small service fee and necessary postage.

The library is in the immediate charge of Miss Ruby Church, Librarian of the Insurance Society of New York, 107 William Street, New York 38, N. Y.

SYLLABUS OF EXAMINATIONS

(Effective 1953 and Thereafter)

ASSOCIATESHIP

Part	*Section*	*Subject*
I	1	Descriptive and Analytical Statistics.
	2	Compound Interest and Annuities Certain.
II	3	Differential and Integral Calculus.
	4	Calculus of Finite Differences.
III]	5	Probabilities.
	6	Life Contingencies, Life Annuities and Life Assurances.
IV	7	Policy Forms and Underwriting Practice
	8	Rate Making Methods. (Manual or Class Rates).

FELLOWSHIP

I	9	Insurance Economics.
	10	Insurance Law and Regulation.
II	11	Individual Risk Rating.
	12	Social Insurance.
III	13	Determination of Premium, Loss and Expense Reserves.
	14	Advanced Problems in Insurance Statistics.
IV	15	Advanced Problems in Insurance Accounting.
	16	Advanced Problems in Underwriting and Administration.

RECOMMENDATIONS FOR STUDY

The examinations for admission to the two grades of membership in the Society are designed to establish the qualifications of candidates. The following Recommendations for Study are provided as a guide for the candidates in their preparation for the examinations. It should be realized that although the examination questions will be based upon the textual material cited, they will not necessarily be drawn directly therefrom. The examinations will test not only the candidate's knowledge of the subject matter but also his ability so apply that knowledge.

Under the mathematical parts (Sections 1-6) of the Associateship Examination, there are listed a few sources of examples in addition to those found in the texts cited. Candidates are advised to work out as many examples as possible in their study of these sections in order to acquire facility in the application of the mathematical principles and methods to specific problems.

In preparing for the Associateship Part IV and the Fellowship Examinations, the candidate should be familiar with pertinent papers published in the Proceedings of the Casualty Actuarial Society subsequent to November 1951, in addition to the references cited. The candidate should also read at least one insurance journal for the year preceding his examination in order to be familiar with current developments.

In order to accommodate those candidates taking the examinations in the next few years who are trained essentially in casualty insurance or property insurance, three casualty insurance questions and three propperty insurance questions will be set for each of Sections 7, 8, 11, 14 and 16, and candidates will be required to answer any four questions.

The references to papers in the Proceedings of the Casualty Actuarial Society (denoted by P.C.A.S.), in the Transactions of the Actuarial Society of America (denoted by T.A.S.A.) and in the Transactions of the Society of Actuaries (denoted by T.S.A.) are considered to include all discussions of these papers in these publications, though the page references cited refer to the papers only.

Description of texts cited will be found in the Index at the end of these Recommendations.

Candidates can review the examinations given in previous years by referring to the reprints contained in the Proceedings of the Society. Copies of examinations for recent years as well as sample questions for the new fields added to the Syllabus may be obtained from the Secretary-Treasurer.

ASSOCIATESHIP: GENERAL

The candidate should have adequate preparation in business arithmetic and in algebra as a prerequisite to study for Parts I, II and III of these examinations. The preparation in algebra should include the equivalent of chapters 1-5, 8-14, 16 and 24 of "Higher Algebra" by Hall and Knight (published by Macmillan) with particular emphasis upon permutations and combinations and the binomial theorem. Questions on the mathematics of life insurance will be set in terms of the revised International Actuarial Notation, which appears in P.C.A.S., XXXVI, p 123.

ASSOCIATESHIP: PART I

Section 1. Descriptive and Analytical Statistics.

Richardson, C. H.: An Introduction to Statistical Analysis.

Section 2. Compound Interest and Annuities Certain.

Rietz, H. L., Crathorne, A. R. and Rietz, J. C.: Mathematics of Finance. Chapters 1-7.

Skinner, E. B.: Mathematical Theory of Investment. (Included as a source of additional examples.)

ASSOCIATESHIP: PART II

Section 3. Differential and Integral Calculus.

Granville, W. A., Smith, P. F. and Longley, W. R.: Elements of Calculus. Except Chapters 14, 18, 21 and 24.

Section 4. Calculus of Finite Differences.

Freeman, Harry: Mathematics for Actuarial Students; Part II—Finite Differences, Probability and Elementary Statistics. Chapter 1-7 and 9.

ASSOCIATESHIP: PART III

Section 5. Probabilities.

Hall, H. S. and Knight, S. R.: Higher Algebra. Chapter 32.

Freeman, Harry: Mathematics for Actuarial Students; Part II—Finite Differences, Probability and Elementary Statistics. Chapter 10.

Whitworth, W. A.: Choice and Chance. (Included as a source of additional examples.)

Section 6. Life Contingencies, Life Annuities and Life Assurances.

Menge, W. O. and Glover, J. W.: An Introduction to the Mathematics of Life Insurance.

Dowling, L. Wayland: Mathematics of Life Insurance. Chapter 9.

Workmen's Compensation Board, State of New York: Special Bulletin No. 222, Workmen's Compensation Tables.

Greene, W. W.: Valuation of the Death Benefits Provided by the New York Workmen's Compensation Law. P.C.A.S. I, 31.

Olifiers, Edward: Valuation of the Death Benefits Provided by the Workmen's Compensation Law of New York. T.A.S.A. XVI, 83.

Fondiller, Richard: Tables for Computing the Present Value of Death Benefits Arising under the New York Workmen's Compensation Law. P.C.A.S. II, 110.

Schloss, H. W.: Valuation of the Death Benefits Provided by the Workmen's Compensation Law of New York. P.C.A.S. XXXV, 40.

Roeber, W. F. and Marshall, R. M.: An American Remarriage Table. P.C.A.S. XIX, 279.

Myers, R. J.: Further Remarriage Experience. P.C.A.S. XXXVI, 73.

The candidate should have a working knowledge of the tables set forth in Special Bulletin No. 222, published by the New York Workmen's Compensation Board. The cited paper by Fondiller will be of particular help in this regard, although his examples are based on an earlier edition of the tables. The cited papers by Greene, Olifiers and Schloss should be read for an understanding of the theory underlying certain of the tables, but the candidate will not be required to reproduce the derivation of the formulas contained therein.

ASSOCIATESHIP: PART IV

SECTION 7. POLICY FORMS AND UNDERWRITING PRACTICE.

SECTION 8. RATE MAKING METHODS. (Manual or Class Rates).

The first three general references cited below should be considered as introductory to the study of the material included under both of these sections. The earlier chapters in the Hobbs text are also largely prerequisite in substance.

The candidate should be familiar with policy provisions, the bases of exposure used in the respective lines and the manual or class ratemaking procedures. Since the manual and policy provisions change from time to time it is essential to supplement the cited texts and papers by study of the contracts and manuals currently in use. The principal current manuals, with the names of the organizations publishing them, are cited herein. Copies of current insurance contracts must be obtained from a carrier.

It should be noted that certain of the references encompass some material beyond the scope of Sections 7 and 8, such as the actuarial principles underlying the respective individual risk rating plans, the determination of deductible and excess coverage rates and the determination of reserves. The examinations for this part will not reflect such extraneous material.

(*a*) *General*

Mowbray, A. H.: Insurance. Chapters 5-9 and 11-15.

Kulp, C. A.: Casualty Insurance. Chapters 2-4, 8, 10-15 and 18.

Michelbacher, G. F. and Associates: Casualty Insurance Principles. Chapters 1, 5-7, and 13.

Kulp, C. A.: The Rate Making Process in Property and Casualty Insurance-Goals, Technics and Limits. (Article in Regulation of Insurance published by Duke University School of Law.)

Dorweiler, Paul: Notes on Exposures and Premium Bases. P.C.A.S. XVI, 319.

Perryman, F. S.: Some Notes on Credibility. P.C.A.S. XIX, 65.

Important material on the determination of manual rates is contained in the reports on the examination of the following rate making organizations by the New York Insurance Department which appear at intervals of three to five years:

Compensation Insurance Rating Board (New York)

Mutual Casualty Insurance Rating Bureau

National Bureau of Casualty Underwriters

Surety Association of America

Inland Marine Insurance Bureau

National Automobile Underwriters Association

New York Fire Insurance Rating Organization

(Copies of above reports are in the library of the Society.)

In addition, reference should be made to the three latest reports of the National Association of Insurance Commissioners.

(*b*) *Fire Insurance.*

Riegel, Robert and Miller, J. S.: Insurance Principles and Practices. Chapters 17-23.

McConnell, M. H.: A Casualty Man looks at Fire Insurance Rate Making. P.C.A.S. XXXVIII, 103.

Insurance Department, State of New York: Fire Insurance Rate Making, a Report by H. C. Atkiss—1950, pages 1-23.

Manual published by the New York Fire Insurance Rating Organization.

(c) *Ocean Marine.*

Winter, W. D.: Marine Insurance, Its Principles and Practices. Chapters 5-15.

(d) *Inland Marine.*

Rodda, W. H.: Inland Marine and Transportation Insurance. Chapters 1-19.

Manual published by the Inland Marine Insurance Bureau, 161 William Street, New York.

(e) *Accident and Health.*

Faulkner, E. J.: Accident and Health Insurance.

Craig, J. D.: The Actuarial Basis for Premiums and Reserves in Personal Accident and Health Insurance. P.C.A.S. XVII, 51.

LaMont, S. M.: The Contract of Personal Accident and Health Insurance. P.C.A.S. XVIII, 9.

Farley, Jarvis: A 1940 View of Non-Cancellable Disability Insurance. P.C.A.S. XXVII, 18.

Hunter, Arthur and Thompson, Allen B.: Hospital Service Insurance. T.A.S.A. XLIV, 5.

Thaler, A. M.: Group Major-Medical Expense Insurance. T.S.A. III, 429.

LaCroix, H. F., Jr.: A Discussion of Group Accident and Health Insurance. P.C.A.S. XXXVI, 9.

(f) *Automobile.*

Riegel, Robert and Miller, J. S.: Insurance Principles and Practices. Chapter 29.

Manual of Automobile Insurance published by National Bureau of Casualty Underwriters, 60 John Street, New York, and the manual for automobile fire, theft and collision published for New York State by the National Automobile Underwriters Association, 99 John Street, New York.

(g) *Aviation.*

Riegel, Robert and Miller, J. S.: Insurance Principles and Practices. Chapter 30.

(h) *Boiler and Machinery.*

Smith, Seymour E.: Boiler and Machinery Insurance. P.C.A.S. XXIX, 5.

Manual of Boiler and Machinery Insurance published by National Bureau of Casualty Underwriters, 60 John Street, New York.

(i) *Burglary, Theft and Robbery Insurance.*

Manual of Burglary, Theft and Robbery Insurance published by National Bureau of Casualty Underwriters, 60 John Street, New York.

(j) *Fidelity and Surety.*

Crist, G. W. Jr.: Corporate Suretyship. Except Chapter 7.

Lunt, E. C.: Surety Rate Making. P.C.A.S. XXV, 16.

Informal Discussion: Surety Rate Making. P.C.A.S. XXV, 180.

Rate Manual of Fidelity, Forgery and Surety Bonds published by the Surety Association of America, 60 John Street, New York.

(*k*) *General Liability.*

Ainley, J. W.: Problems in Relation to Contractual Liability Insurance. P.C.A.S. XXV, 151.

Sawyer, E. W.: Comprehensive Liability Insurance.

Contractual, Elevator, Manufacturers' and Contractors', Owners', Landlords' and Tenants', Owners' or Contractors' Protective and Product Liability Manuals published by National Bureau of Casualty Underwriters, 60 John Street, New York.

(*l*) *Glass.*

Manual of Glass Insurance published by National Bureau of Casualty Underwriters, 60 John Street, New York.

(*m*) *Workmen's Compensation.*

The candidate should be familiar with the general rate making methods used by the National Council on Compensation Insurance, together with the modifications adopted in New York.

Hobbs, C. W.: Workmen's Compensation Insurance. Chapters 1-4, 6-10, 12, 13, and 16-18.

Johnson, R. A. Jr.: New York Compensation Rate Making. P.C.A.S. XXXV, 6.

The Basic Manual of Rules, Classifications and Rates for Workmen's Compensation and Employers' Liability Insurance published by National Council on Compensation Insurance, 45 East 17th Street, New York.

FELLOWSHIP: PART I

Section 9. Insurance Economics.

Willet, A. H.: Economic Theory of Risk and Insurance.

Kulp, C. A.: Casualty Insurance. Chapter 1.

Boehmler, E. W., Robinson, R. I., Gane, F. H. and Farwell, L. G.: Financial Institutions.

Badger, R. E. and Guthmann, H. G.: Investment Principles and Practices.

Section 10. Insurance Law and Regulation.

(*a*) *Introduction to the Law.*

Conyngton, T. and Bergh, L. O.: Business Law.

(*b*) *Principles of the Law of Insurance.*

Patterson, E. W.: Essentials of Insurance Law. Chapters 2, 3, 5-12.

(c) *Supervision, Regulation and Taxation of Insurance.*

Hobbs, C. W.: Workmen's Compensation Insurance. Chapters 5 and 15.

Kulp, C. A.: Casualty Insurance. Chapter 20.

Mowbray, A. H.: Insurance. Chapters 27 and 28.

Michelbacher, G. F. and Associates: Casualty Insurance Principles. Chapter 4.

Patterson, E. W.: Essentials of Insurance Law. Chapter 1.

New York Insurance Law. Articles I-V, VII, VIII, IX a, b, c, X, XI a, b, c, XII, XV, XVI and XVII.

New York Tax Law. Section 187.

Hobbs, C. W.: State Regulation of Insurance Rates. P.C.A.S. XXVIII, 37 and 344.

Maycrink, E. C.: Procedure in the Examination of Casualty Companies by Insurance Departments. P.C.A.S. XVIII, 81.

Tax Commission, State of New York: Taxation of Insurance Companies, A Special Report by Philip L. Gamble, 1937.

Sawyer, E. W.: Insurance as Interstate Commerce.

Donovan, James B.: Insurance Business as Engaging in Commerce and as Affected by the Federal Anti-Trust Statutes.

New York Law Journal, Vol. 116, pages 290, 298, 306 and 314. (Included in the Casualty Actuarial Society Library under the title "S.E.U.A. Case and Aftermath".)

Rate Regulatory Laws—Casualty and Surety. (Compilation by Association of Casualty and Surety Cos., 60 John Street, New York.)

Rate Regulatory Laws—Fire and Marine. (Compilation by National Board of Fire Underwriters, 85 John Street, New York.)

Carlson, T. O.: Rate Regulation and the Casualty Actuary. P.C.A.S. XXXVIII, 9.

Donovan, James B.: The New Era of Casualty Rate Regulation. P.C.A.S. XXXIV, 50

The candidate should be familiar with the decision of the United States Supreme Court handed down June 5, 1944 in the case of United States v. South-Eastern Underwriters Association, et al. (322 U.S. 533, 64 Sup.Ct. 1162), with the McCarran Act passed by Congress and effective March 9, 1945 and with the extension of the McCarran Act effective January 1, 1948. All of the foregoing references except the last six antedate this decision, and should be read with that fact in mind. The candidate should be familiar with developments stemming from the Supreme Court decision and the consequent Congressional action, as reported in insurance periodicals. Familiarity is also required with the Casualty and Surety, and Fire and Marine Rate Regulatory Bills developed by the All Industry Committee which was organized to work in co-operation with the National Association of Insurance Commissioners, and the fundamental points of difference in the legislation passed in the respective states for regulation of rates in the casualty and surety, and

fire and marine fields of insurance. The texts of the Supreme Court Decision, Congressional Acts resulting therefrom, the All Industry Bills, together with explanatory memoranda prepared by the All Industry Committee, the rate regulatory legislation in the respective states, and the material cited above from Mr. Sawyer and Mr. Donovan are all available from the Casualty Actuarial Society Library.

The Proceedings of the National Association of Insurance Commissioners from 1944 to date should be reviewed for all discussions and committee reports relating to the Supreme Court decision and subsequent legislative developments.

FELLOWSHIP: PART II

SECTION 11. INDIVIDUAL RISK RATING.

The candidate should study the following rating plans effective in the State of New York and the forms used in the application thereof (published by the National Bureau of Casualty Underwriters, 60 John Street, New York.):

Automobile Liability Experience Rating Plan.

General Liability Experience Rating Plan.

Burglary and Glass—Individual Risk Rating Plan.

Composite Rating Plan (Automobile, General Liability, Burglary and Glass.)

Rating Program for Liability Lines—Tabular Retrospective Rating Plans.

Retrospective Rating Plan D—Rating Supplements For Liability Lines.

The candidate should also study the following rating plans in the workmen's compensation field and the forms used in the application thereof (published by the National Council on Compensation Insurance, 45 East 17th St., New York.):

Workmen's Compensation Experience Rating Plan—1940.

Workmen's Compensation Retrospective Rating Plans—1943. Plans A, B and C.

Workmen's Compensation Retrospective Rating Plan D.

The National Defense Projects Rating Plan, which includes Workmen's Compensation, Automobile and General Liability, may be obtained for study from the Casualty Actuarial Society Library.

In addition, the candidate should study the following property insurance rating plans which may be obtained from the sources indicated:

1. In the field of fire insurance, the Dean and Universal Mercantile Systems of rating, and the Schedule for Grading Cities and Towns of the National Board of Fire Underwriters; and for the rating of

multiple location risks, the Escott Plan and the Multiple Location Service Office Plan. (Casualty Actuarial Society Library)

2. In the automobile physical damage field, the Fleet Rating Formulae for fire and theft, and Fleet Rating for collision. (National Automobile Underwriters Association, 99 John St., New York.)

3. Inland Marine rating plans for individual risks. (Casualty Actuarial Society Library)

The candidate is advised to read the references in the first four books cited below to obtain the general principles underlying individual risk rating, prior to studying the respective plans and the technical articles cited from the Proceedings. It should be noted that the general subject of individual risk rating includes the determination of rates for coverages other than full coverage, such as deductible, excess and aggregate stop loss.

Michelbacher, G. F. and Associates: Casualty Insurance Principles. Chapter 8.

Hobbs, C. W.: Workmen's Compensation Insurance. Chapters 17 and 18.

Kulp, C. A.: Casualty Insurance. Chapter 19.

Riegel, Robert and Miller, J. S.: Insurance Principles and Practices. Chapters 23 and 29.

Whitney, A. W.: The Theory of Experience Rating. P.C.A.S. IV, 274.

Keffer, Ralph: An Experience Rating Formula. T.A.S.A. XXX, 130.

Dorweiler, Paul: Observations on Making Rates for Excess Compensation Insurance. P.C.A.S. XIII, 154.

Richardson, H. F.: The Chemical and Dyestuff Rating Plan. P.C.A.S. XVIII, 385.

Dorweiler, Paul: A Survey of Risk Credibility in Experience Rating. P.C.A.S. XXI, 1.

Kormes, Mark: The Experience Rating Plan as Applied to Workmen's Compensation Risks. P.C.A.S. XXI, 81; XXII, 81.

Cahill, J. M.: Deductible and Excess Coverages, Liability and Property Damage Lines Other Than Automobile. P.C.A.S. XXIII, 18.

Perryman, F. S.: Experience Rating Plan Credibilities. P.C.A.S. XXIV, 60.

Pinney, S. D.: The Retrospective Rating Plan for Workmen's Compensation Risks. P.C.A.S. XXIV, 291.

Smick, J. J.: Merit Rating—The Proposed Multi-Split Experience Rating Plan and the Present Experience Rating Plan. P.C.A.S. XXVI, 84.

Cahill, James M.: Excess Coverage (Per Accident Basis) for Self-Insurers: Workmen's Compensation—New York. P.C.A.S. XXVII, 77.

Peters, Stefan: Ex-Medical Coverage—Workmen's Compensation. P.C.A.S. XXVII, 112.

Johnson, R. A. Jr.: The Multi-Split Experience Rating Plan in New York. P.C.A.S. XXVIII, 15.

Dorweiler, Paul: On Graduating Excess Pure Premium Ratios. P.C.A.S. XXVIII, 132.

Carlson, T. O.: An Actuarial Analysis of Retrospective Rating. P.C.A.S. XXVIII, 283.

Haugh, C. J.: The Comprehensive Insurance Rating Plan. P.C.A.S. XXVIII, 535.

Valerius, N. M.: Risk Distributions Underlying Insurance Charges in the Retrospective Rating Plan. P.C.A.S. XXIX, 96.

Perryman, F. S.: Possible Values for Retrospective Rating Plan. P.C.A.S. XXXI, 5.

Smith, S. E.: Interstate and Overall Rating Plans. P.C.A.S. XXXIV, 6.

Bailey, A. L.: Workmen's Compensation D-Ratio Revision. P.C.A.S. XXXV, 26.

Uhthoff, D. R.: Excess Loss Ratios Via Loss Distributions. P.C.A.S. XXXVII, 82.

Leslie, W. L. Jr.: The National Defense Projects Rating Plan. P.C.A.S. XXXVIII, 174.

Reference should also be made to the reports cited in Section 8 on the examination of rate making organizations by the New York Insurance Department for such information as is contained therein on individual risk rating plans.

Section 12. Social Insurance.

(a) *General.*

International Labour Office: Approaches to Social Security. Studies and Reports Series M, No. 18.

Williamson, W. R.: Social Budgeting. P.C.A.S. XXIV, 17.

Williamson, W. R.: Some Backgrounds to American Social Security. P.C.A.S. XXX, 5.

Meriam, L.: Relief and Social Security. Parts II and III.

Gagliardo, Domenico: American Social Insurance. Chapter 1.

Social Security Administration. Compilation of the Social Security Laws. (latest edition).

Myers, R. J.: The 1950 Amendments to the Social Security Act. T.S.A. III, 1. Also Discussion, T.S.A. III, 483.

Williamson, W. R.: Death 'n' Taxes. Reprint from the Proceedings of the Forty-ninth Annual Meeting of the Health and Accident Underwriters' Conference (Casualty Actuarial Society Library).

(b) *Compulsory Automobile Insurance.*

Committee to Study Compensation for Automobile Accidents: Report to the Columbia University Council for Research in the Social Sciences. Chapter 2.

Kulp, C. A.: Casualty Insurance. Chapter 9.

Insurance Industry Committee on Motor Vehicle Accidents: Report Relating to the State of New York, 1951.

Insurance Department, State of New York: The Problem of the Uninsured Motorist. 1951.

Association of Casualty and Surety Companies: Chart Analysis of the Automobile Liability Security Laws of the United States and Canada. Current edition.

(c) *Cash Disability and Medical Care Insurance.*

Workmen's Compensation Board, State of New York: Disability Benefits Law.

Department of Labor, State of New York: Studies in Disability Insurance. Special Bulletin 224.

Gagliardo, Domenico: American Social Insurance. Chapters 17-22.

Schwartz, M. J.: New York Statutory Disability Benefits Law, Coverage, Rates and Rating Plans. P.C.A.S. XXXVII, 57.

LaCroix, H. F. Jr.: A Discussion of Group Accident and Health Insurance. P.C.A.S. XXXVI, 9.

(d) *Old Age Assistance and Insurance*

Meriam, L.: Relief and Social Security. Chapters 2, 5, 6.

House Ways and Means Committee: Issues in Social Security. Parts I and II.

Federal Security Agency, Social Security Administration: Actuarial Studies, especially Nos. 19 b, 27, 29, 30.

Board of Trustees of Federal Old Age-Survivors Insurance Trust Fund: Current Annual Report.

Féraud, L.: Actuarial Technique and Financial Organization of Social Insurance (Introduction). International Labour Office. Studies and Reports. Series M, No. 17.

(e) *Unemployment Insurance.*

Department of Labor, State of New York: Economic Brief in Support of the New York Unemployment Insurance Law.

Meriam, L.: Relief and Social Security. Chapters 8 and 9.

House Ways and Means Committee: Issues in Social Security. Part III.

Social Security Administration: Comparison of State Unemployment Compensation Laws (latest edition).

Kulp, C. A.: Calculation of the Cost of Unemployment Benefits (With particular reference to Ohio and Pennsylvania). P.C.A.S. XIX, 268.

FELLOWSHIP: PART III

Section 13. Determination of Premium, Loss and Expense Reserves.

Michelbacher, G. F. and Associates: Casualty Insurance Principles. Chapter 9.

Mowbray, A. H.: Insurance. Chapter 24.

Black, N. C.: Method of Setting up Reserve to Cover Incurred But Not Reported Loss Liability. P.C.A.S. XIV, 9.

Matthews, A. N.: A System of Preparing Reserves on Workmen's Compensation Claims. P.C.A.S. XIV, 244.

Craig, J. D.: The Actuarial Basis for Premiums and Reserves in Personal Accident and Health Insurance. P.C.A.S. XVII, 51.

Roeber, W. F. and Marshall, R. M.: An American Remarriage Table. P.C.A.S. XIX, 279

Valerius, N. M.: On Indeterminate Reserve Tables for Compensation. P.C.A.S. XX, 82.

Tarbell, T. F.: Incurred But Not Reported Claim Reserves. P.C.A.S. XX, 275.

Informal Discussion: Reserves Against the Recurrence of an Unfavorable Loss Ratio in the Bonding Lines. P.C.A.S. XXIII, 269.

Informal Discussion: Premiums and Loss Reserves for Casualty and Bonding Insurance. P.C.A.S. XXV, 366.

Workmen's Compensation Board, State of New York: Special Bulletin No. 222, Workmen's Compensation Tables.

Conrod, S. F.: Valuation of Non-Cancellable Accident and Health Insurance Policies. P.C.A.S. XXXII, 27.

Report of Committee on Mortality for Disabled Lives. P.C.A.S. XXXII, 123.

Report of Committee on Compensation and Liability Loss and Loss Expense Reserves. P.C.A.S. XXXV, 56, 64.

Insurance Accounting and Statistical Association: Insurance Accounting—Casualty and Fire. Chapters dealing with unearned premium reserves and loss and loss expense reserves. (Casualty Actuarial Society Library.)

The candidate should have knowledge of the provisions of Sections 72, 74, 219, 326 and 352 of the New York Insurance Law (recodification of 1939 and subsequent amendments) which pertain to unearned premium, loss and loss expense reserves of casualty and surety, and fire companies. The current convention form of annual statement blank for fire and casualty companies sets forth in Schedule "P" the statutory loss reserve requirements for the liability and workmen's compensation lines. This schedule should be studied carefully.

SECTION 14. ADVANCED PROBLEMS IN INSURANCE STATISTICS.

This section includes reading which covers: (a) the planning and use of internal statistical material, and the compilation and presentation of insurance statistics for administrative and rate-making purposes; (b) sources and uses of external statistics, particularly as they may be required in insurance administration and rate-making, and (c) advanced statistical analysis.

(a) *Internal Statistics.*

In addition to the references cited, the candidate should study the various statistical plans used in casualty and property insurance. The plans most widely used, and the organizations publishing them, are listed below:

Personal Accident and Health Statistical Plan: Bureau of Personal Accident and Health Underwriters, 60 John Street, New York.

The Unit Statistical Plan and Schedule "Z" for Workmen's Compensation: National Council on Compensation Insurance, 45 East 17th Street, New York.

Standard Fidelity, Surety and Forgery Classification Code: Surety Association of America, 60 John Street, New York.

Statistical plans for Automobile Bodily Injury and Automobile Property Damage Liability, Boiler and Machinery, Burglary, Glass, and the respective General Liability lines: National Bureau of Casualty Underwriters, 60 John Street, New York.

Automobile Statistical Plan for Fire, Theft, Comprehensive, Collision and Allied coverages: National Automobile Underwriters Association, 90 John Street, New York.

Automobile Statistical Plans (all coverages): National Association of Independent Insurers, 111 West Washington Street, Chicago, Ill.

Statistical Plans—Casualty Lines other than Automobile: National Association of Independent Insurers, 111 West Washington Street, Chicago, Ill.

Fire and Allied Lines—Statistical Plan for Earned Premiums and Incurred Losses and Standard Classification of Occupancy Hazards: National Board of Fire Underwriters, 85 John Street, New York.

Inland Marine statistical procedure: Inland Marine Insurance Bureau, 161 William Street, New York.

Michelbacher, G. F. and Associates: Casualty Insurance Principles. Chapters 10 and 11.

Crist, C. W. Jr.: Corporate Suretyship. Chapter 7.

Hobbs, C. W.: Workmen's Compensation Insurance. Chapter 16.

Linder, Joseph: The Function and Place of the Statistical Department in a Multiple Line Casualty Company. P.C.A.S. XIV, 27.

Masterson, N. E.: Statistical Methods for Casualty Companies by use of the Eighty-Column Hollerith System. P.C.A.S. XVI, 288.

Graham, C. M.: The New York Unit Statistical Plan; A Method of Preparing and Reporting Data and Analyzing the Carriers' Business. P.C.A.S. XVII, 190.

Kormes, Mark: A Method of Assembling and Analyzing the Data Reported under the Unit Statistical Plan. P.C.A.S. XVIII, 99.

Barber, H. T.: Mechanized Unit Reporting. P.C.A.S. XXXIII, 5.

The candidate should be familiar with the sources of published insurance statistics, so as to know where to obtain such information when the

need arises. The following annual publications constitute a representative list of such sources:

Alfred M. Best Co. (New York): Best's Insurance Reports (Fire and Casualty); Best's Reproductions of Principal Schedules from Casualty and Surety statements; Best's Fire and Casualty Aggregates and Averages.

The National Underwriter (New York): Argus Casualty and Surety Chart and Fire Chart.

The Spectator (Philadelphia): The Spectator Insurance Year Book: I. Fire and Casualty Volume; II. Insurance by States of Fire, Marine, Casualty, Surety and Miscellaneous Lines. The Spectator Handy Chart, Casualty and Surety, and Fire

The Weekly Underwriter (New York): The Insurance Almanac.

(*b*) *External Statistics.*

The candidate should endeavor to become acquainted with as many sources of external statistics as possible so as to know where to obtain the necessary information in connection with the solution of problems arising in the casualty and property insurance business. The following is a representative but limited list of such sources:

Board of Governors of the Federal Reserve System: Federal Reserve Bulletin (monthly).

Division of Statistical Standards, United States Bureau of the Budget: Statistical Services of the United States Government.

Schmeckebier, L. F.: Statistical Work of the National Government.

United States Department of Commerce: Survey of Current Business (monthly).

United States Department of Commerce, Bureau of the Census: Statistical Abstract of the United States (annually).

United States Department of Labor, Bureau of Labor Statistics: Methods of Procuring and Computing Statistics. Bulletin 326.

United States Department of Commerce, Bureau of Foreign and Domestic Commerce: Distribution Cost Accounting for Wholesaling (Domestic Commerce Series, No. 106).

(*c*) *Advanced Statistical Analysis.*

The references cited below are supplementary to the Richardson text cited under Section 1 and will provide the candidate with sufficient background in mathematical statistics and statistical analysis to deal with applications in casualty and property insurance.

Hoel, Paul G.: Introduction to Mathematical Statistics.

Wolfenden, Hugh H.: The Fundamental Principles of Mathematical Statistics. Chapter I through VI, VIII, IX, XI, XVII excluding pp. 75-77 inclusive. Section B, Mathematics and Interpretations, Paragraphs 22-25. Section C, Applications, Paragraphs 7, 17-18, 20-25.

FELLOWSHIP: PART IV

SECTION 15. ADVANCED PROBLEMS IN INSURANCE ACCOUNTING.

The candidate should acquire an adequate knowledge of the following:

1. General Accounting. As a prerequisite to a study of insurance accounting in detail, the candidate should be familiar with the fundamental accounting principles, terms and forms as set forth in standard college texts on the subject. "Fundamental Accounting" by Tunick and Saxe is suggested for reading.
2. The purposes, details and sources of the accounts set forth in the current convention form of annual statement blank (with accompanying schedules.)
3. The Insurance Expense Exhibit and the instructions for its preparation.
4. The Uniform Accounting Regulations: Regulation No. 30, Uniform Classifications of Expenses of Fire and Marine, and Casualty and Surety Insurers, Insurance Department, State of New York. The candidate should also be familiar with all amendments to the regulations and official interpretations promulgated by the Uniform Accounting Sub-Committee of the National Association of Insurance Commissioners.
5. The adaptation of tabulating machine equipment to purposes of insurance accounting.

Insurance Accounting and Statistical Association: Insurance Accounting-Casualty and Fire (Casualty Actuarial Society Library).

Bailey, W. B.: The Allocation of Adjusting Expense to Line of Insurance. P.C.A.S. XIV, 233.

Van Tuyl, H. O.: The Analysis of Expenses by the Use of Hollerith Cards. P.C.A.S. XVI, 121.

Perryman, F. S.: The Theory of the Distribution of the Expenses of Casualty Insurance. P.C.A.S. XVII, 22.

McGrath, J. J.: Valuation of Investments. P.C.A.S. XX, 281.

Barber, H. T.: Compensation Expenses Per Policy. P.C.A.S. XXI, 65.

Waite, H. V.: Distribution of Inspection Cost by Line of Insurance. P.C.A.S. XXII, 15.

Tarbell, T. F. and Waite, H. V.: The Distribution of Casualty Administration Expense by Line of Insurance. P.C.A.S. XXIV, 45.

Pruitt, D. M.: Premium Collections on Punch Cards. P.C.A.S. XXVIII, 503.

Pruitt, D. M.: Uniform Accounting—A Study of Regulation. P.C.A.S. XXXIV, 22.

Tarbell, T. F.: The Combined Fire and Casualty Annual Statement Blank. P.C.A.S. XXXVII, 74, and XXXVIII, 113.

Section 16. Advanced Problems in Underwriting and Administration.

It is strongly recommended that the candidate seek to acquire technical proficiency in the subjects covered under this section by direct discussion, whenever possible, with executives in the various departments of the insurance business. In addition, the candidate should review scientific and professional journals and the proceedings of supervisory bodies or associations.

Illustrative of these materials are the following:

International Association of Industrial Accident Boards and Commissions: Proceedings (annual). Published currently by the United States Department of Labor, Division of Labor Standards.

National Association of Insurance Commissioners: Proceedings.

State of New York, Superintendent of Insurance: Fire and Marine Report, Volume II (annual), Casualty, Surety and Miscellaneous Report, Volume III (annual).

State of New York, Superintendent of Insurance: Preliminary Report (annual) (Materials on Fire, Marine, Casualty and Social Insurance).

The candidate should keep in touch with current developments by reading regularly the New York Journal of Commerce and also at least two general insurance periodicals. Best's Insurance News (Fire and Casualty Edition) for the most recent years should be reviewed for articles relating to insurance company investments and administration.

The candidate should review all papers in the Proceedings of the Society for recent years which are not cited under the preceding sections and also such material recommended under Section 7 as refers to underwriting practice. The following references are indicated for particular attention:

Michelbacher, G. F. and Associates: Casualty Insurance Principles. Chapters 2, 3, 12, 14-19 and 21.

Hobbs, C. W.: Workmen's Compensation Insurance. Chapter 11.

Mowbray, A. H.: Insurance. Chapters 16-19, 21-23, 25, 26.

Flynn, B. D.: Interest Earnings as a Factor in Casualty Insurance Rate Making. P.C.A.S. XIV, 285.

Tarbell, T. F.: The Effect of Changes in Values on Casualty Insurance. P.C.A.S. XIX, 1.

Dorweiler, Paul: Policy Limits in Casualty Insurance. P.C.A.S. XX, 1.

Report of the Committee on Bases of Exposure for Workmen's Compensation Insurance. P.C.A.S. XXI, 200.

Informal Discussion: Investments of Casualty Insurance Companies. P.C.A.S. XXIV, 141.

Vanderfeen, C. G.: Voluntary Plans for Granting Automobile Bodily Injury and Property Damage Liability Insurance to Risks Unable to Secure it for Themselves. P.C.A.S. XXVIII, 471.

Farley, Jarvis and Billings, Roger: An Approach to a Philosophy of Social Insurance. P.C.A.S. XXIX, 29.

Cahill, James M.: Multiple Line Underwriting. P.C.A.S. XXXVI, 1.

Clarke, John W.: Seasonal Fluctuation in Loss Ratios for Automobile Coverage. P.C.A.S. XXXVI, 63.

Scammon, Lawrence W.: Automobile Statistics by "Age of Driver". P.C.A.S. XXXVII, 43.

Carlson, Thomas O.: Rate Regulation and the Casualty Actuary. P.C.A.S. XXXVIII, 9.

Longley-Cook, L. H.: Problems of Fire Insurance Rate-Making. P.C.A.S. XXXVIII, 94.

Blanchard, Ralph N.: Survey of Accident and Health Insurance. U.S. Social Security Board. Bureau Memorandum No. 62.

Blackall, J. C.: Stocks and Bonds as Insurance Company Investments. Proceedings, National Association of Insurance Commissioners, 1936, 91.

National Association of Insurance Commissioners: Second Report of the Special Sub-Committee of the Fire and Marine Committee Re Underwriting Profit or Loss and the Commissioners' 1921 Standard Profit Formula (The McCullough Report)—Oct. 9, 1947.

Statement by Committee on Laws of National Board of Fire Underwriters in Reply to Report Prepared by Mr. Roy C. McCullough—June 3, 1948.

Insurance Department, State of New York: Fire Insurance Terms and Discounts, a Report by Thomas C. Morrill—1950.

Insurance Department, State of New York: The Problem of the Uninsured Motorist, a Report by George H. Kline and Carl O. Pearson—1951.

Insurance Industry Committee on Motor Vehicle Accidents: Report Relating to the State of New York—1951.

Thompson, Kenneth: Reinsurance.

INDEX TO READINGS

(Books Marked "out of print" are in the Society Library)

AUTHOR	TITLE	PUBLISHER
Association of Casualty and Surety Companies	*Chart Analysis of the Automobile Liability Security Laws of the United States and Canada. (current edition)*	Association of Casualty and Surety Companies, New York
Badger, R. E. and Guthmann, H. G.	*Investment Principles and Practices (1951)*	Prentice Hall, Inc., New York
Best's Insurance News	*Fire and Casualty Edition (monthly)*	Alfred M. Best Co., New York

AUTHOR	TITLE	PUBLISHER
Blanchard, Ralph H.	*Survey of Accident and Health Insurance (Bureau Memorandum No. 62)*	Social Security Administration, Washington,D.C.
Board of Trustees of Federal Old-Age Survivors Insurance Trust Fund	*Current Annual Report*	Social Security Administration, Washington,D.C.
Boehmler, E. W., Robinson, R. I. Gane, F. H. and Farwell, L. G.	*Financial Institutions (1951)*	Richard D. Irwin, Inc., Chicago
Committee on Laws, National Board of Fire Underwriters	*Statement in Reply to Report Prepared by Mr. Roy C. McCullough (1948)*	National Board of Fire Underwriters, New York
Committee to Study Compensation for Automobile Accidents	*Report to the Columbia University Council for Research in the Social Sciences*	Press of International Printing Company, Philadelphia
Conyngton, T. and Bergh, L. O.	*Business Law (third revised edition, 1949)*	The Ronald Press Co., New York
Crist, G. W., Jr.	*Corporate Suretyship (2nd edition)*	McGraw Hill Book Co., Inc., New York
Department of Labor State of New York	*Economic Brief in Support of the New York Unemployment Insurance Law.*	Division of Placement and Unemployment Insurance, Albany, New York
Department of Labor, State of New York	*Studies in Disability Insurance. Special Bulletin 224 (1949)*	New York Department of Labor, New York
Dowling, L. Wayland	*Mathematics of Life Insurance (1925)*	McGraw-Hill Book Co., Inc., New York
Faulkner, E. J.	*Accident and Health Insurance (1940)*	McGraw-Hill Book Co., Inc., New York
Federal Security Agency, Social Security Administration	*Actuarial Studies. 19b, 27, 29, 30*	Social Security Administration, Washington,D.C.
Féraud, L.	*Actuarial Technique and Financial Organization of Social Insurance. (Introduction). International Labour Office, Series M, No. 17*	International Labour Office, Washington,D.C.

AUTHOR	TITLE	PUBLISHER
Freeman, Harry	*Mathematics for Actuarial Students, Part II—Finite Differences, Probability and Elementary Statistics. (1939)*	Cambridge University Press
Gagliardo, Domenico	*American Social Insurance (1949)*	Harper & Bros., New York
Granville, W. A., Smith, P. F. and Longley, W. R.	*Elements of Calculus (1946)*	Ginn & Co., Boston
Hall, H. S. and Knight, S. R.	*Higher Algebra (fourth edition 1891)*	The Macmillan Co., New York
Hobbs, C. W.	*Workmen's Compensation Insurance (1939)*	McGraw-Hill Book Co., Inc., New York
Hoel, Paul G.	*Introduction to Mathematical Statistics*	John Wiley & Sons, Inc., New York
House Ways and Means Committee	*Issues in Social Security (1946)*	Government Printing Office, Washington, D.C.
Insurance Department, State of New York	*Fire Insurance Rate Making, A Report by H. C. Atkiss (1950)*	New York Insurance Dept., New York
Insurance Department, State of New York	*Fire Insurance Terms and Discounts, a Report by Thomas C. Morrill (1950)*	New York Insurance Dept., New York
Insurance Department, State of New York	*The Problem of the Uninsured Motorist, a Report by George H. Kline and Carl O. Pearson (1951)*	New York Insurance Dept., New York
Insurance Industry Committee on Motor Vehicle Accidents	*Report Relating to the State of New York (1951)*	Casualty Actuarial Society Library
International Labour Office	*Approaches to Social Security. Studies and Reports, Series M, No. 18*	International Labour Office, Washington, D.C.
Kulp, C. A.	*Casualty Insurance (second revised edition 1942)*	The Ronald Press Co., New York
Kulp, C. A.	*The Rate-Making Process in Property and Casualty Insurance-Goals, Technics and Limits. (Regulation of Insurance. Autumn 1950 issue of Law and Contemporary Problems)*	Duke University School of Law, North Carolina
Menge, W. O. and Glover, J. W.	*An Introduction to the Mathematics of Life Insurance (1935)*	The Macmillan Co., New York
Meriam, L.	*Relief and Social Security (1946)*	The Brookings Institution, Washington, D.C.

AUTHOR	TITLE	PUBLISHER
Michelbacher, G. F. and Associates	*Casualty Insurance Principles (1942)*	McGraw-Hill Book Co., Inc., New York
Mowbray, A. H.	*Insurance (1946)*	McGraw-Hill Book Co., Inc., New York
National Association of Insurance Commissioners	*Proceedings*	Obtainable from Secretary of Association
New York Insurance Law	*1939, with subsequent amendments*	Edited by Paul R. Taylor. Williams Press, Inc., Albany, N. Y.
New York Tax Law	*McKinney's Consolidated Laws of New York, Annotated-Book 59, (1943)*	Edward Thompson Co., Brooklyn, N. Y.
Patterson, E. W.	*Essentials of Insurance Law (1935)*	McGraw-Hill Book Co., Inc., New York
Richardson, C. H.	*An Introduction to Statistical Analysis (revised edition 1944)*	Harcourt, Brace & Co., New York
Riegel, Robert and Miller, J. S.	*Insurance Principles and Practices (1943)*	Prentice-Hall, Inc., New York
Rietz, H. L., Crathorne, A. R. and Rietz, J. C.	*Mathematics of Finance (revised edition, 1932) (out of print)*	Henry Holt & Co., New York
Rodda, W. H.	*Inland Marine and Transportation Insurance (1949)*	Prentice Hall, Inc., New York
Sawyer, E. W.	*Comprehensive Liability Insurance (1943)*	The Underwriter Printing and Publishing Co., New York
Sawyer, E. W.	*Insurance as Interstate Commerce (1945)*	McGraw-Hill Book Co., Inc., New York
Schmeckbier, L. F.	*Statistical Work of the National Government (1925)*	The Brookings Institution, Washington, D.C.
Skinner, E. B.	*Mathematical Theory of Investment*	Ginn and Co., Boston, Mass.
Social Security Administration	*Comparison of State Unemployment Compensation Laws (latest edition)*	Social Security Administration, Washington,D.C.

AUTHOR	TITLE	PUBLISHER
Social Security Administration	*Compilation of the Social Security Laws (latest edition)*	Social Security Administration, Washington,D.C.
Tax Commission, State of New York	*Taxation of Insurance Companies, A Special Report by Philip L. Gamble —1937*	J. B. Lyon Co., Albany, N. Y.
Thompson, Kenneth	*Reinsurance (1951)*	The Spectator, Philadelphia, Pa.
Tunick and Saxe	*Fundamentals of Accounting*	Prentice-Hall, Inc., New York
Whitworth, W. A.	*Choice and Chance*	G. E. Stechert and Co., New York
Willett, A. H.	*Economic Theory of Risk and Insurance (re-edition, 1951)*	University of Pennsylvania Press, Philadelphia
Winter, W. D.	*Marine Insurance, Its Principles and Practices*	McGraw-Hill Book Co., Inc., New York
Wolfenden, Hugh H.	*The Fundamental Principles of Mathematical Statistics (1942)*	The MacMillan Company of Canada, Limited, Toronto, for the Actuarial Society of America, New York
Workmen's Compensation Board, State of New York	*Disability Benefits Law (1949)*	New York Workmen's Compensation Board, New York
Workmen's Compensation Board, State of New York	*Special Bulletin No. 222, Workmen's Compensation Tables*	New York Workmen's Compensation Board, New York