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NOTICE

"Man's yesterday may ne'er be like his morrow.
Nothing endures but mutability."

—*Shelley.*

"The jurisprudence of every nation will show that, when law becomes a science and a system, it ceases to be justice."

—*Walter Savage Landor.*

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PROCEEDINGS

NOVEMBER 18, 1937

AN OUTLINE OF CURRENT PROBLEMS IN WORKMEN'S COMPENSATION

PRESIDENTIAL ADDRESS BY LEON S. SENIOR

Parents and teachers are familiar with the exceptional child possessing unusual powers of mind and soul, the one that asks innumerable questions and won't yield until an intelligent answer has been furnished to each question. Its guardians are often in despair and imagine that there is something wrong with the child. In truth, however, the fault is not with the child but with the people who are unable to cope with the situation because of limited understanding of children's psychology.

Children with extraordinary gifts are described as "infant prodigies" or come under the general classification of "problem children." Now to my mind we have such a "problem child" in the family of Casualty Insurance and its baptismal name is "Workmen's Compensation." Its parents and guardians have been at a loss to answer the many questions that have come up from time to time, permitting the youngster to grow up in an atmosphere of doubt and uncertainty. The education of that child has been an expensive one. Available data covering the period 1923 to 1936 show that a group of carriers reporting to the New York Insurance Department have sustained nation-wide an underwriting loss of $11,781,000 per annum. Fifteen of the insurance carriers who have nursed it through childhood and adolescence have given up the task of supervision and have retired, laying down their responsibilities voluntarily or by force of law. Others who

would be willing to give up its care are obliged to retain supervision, fearful to desert the offspring because of the detrimental influence which such action may have upon the other children in the family.

For the purpose of this address it is my intention to limit discussion to three or four of the outstanding problems, with special emphasis on the social benefits which may be achieved through correct solutions, an achievement that may require the creation of a truly scientific program. For the development of such a program it is essential that we place ourselves in a frame of mind to do disinterested and objective thinking. Devotion to the interests of a particular group may be praiseworthy, but blind devotion does not help to solve difficult questions. Prometheus chained to the rock is to be pitied, but no more than the poor fellow unable to break away from his partisan ties, notwithstanding that his own convictions may run contrary to the ideas favored by his group. In this forum we should feel free to submit our ideas to the acid test of criticism and to expect that no matter how erratic they may seem to the outside world, they will be given a sympathetic reception in an atmosphere free from the controversial spirit usually dominant in places where divergent views are expressed on the basis of special interests.

Our Objectives Not Fully Attained

Prevention of injury, restoration of men to health and work, and security of benefits constitute the prime objectives to be attained under the system of workmen's compensation. All of the problems which have arisen since the inauguration of the system a quarter of a century ago have a direct relation to these objectives. Many of the questions have been solved in a more or less permanent way, while others seem to defy solution and are continued on our agenda from time to time. If Rip Van Winkle had gone to sleep in 1917 to regain consciousness in 1937, he would still find our committees discussing the manner of dividing payroll, or the treatment to be accorded to executive officers, or whether reserve values shall be on an actual or average basis. But I am not going to take up with you these moth-eaten problems. In

dealing with items of current interest, I do not want you to infer that the observations or suggestions which I am about to submit represent the fruit of long study and research. Rather they reflect ideas which I have absorbed in discussions with committees over a period exceeding twenty years. Surrounded by older men in earlier years, and by younger men in later years, I have learned the value of results obtained in committees through the fire of debate and the clash of opposing opinions. Referring to committees, Sir J. Alfred Ewing, a British scientist, makes this comment:

> "It has been said of them that they keep minutes and waste hours. The gibe would be pointless if it did not contain a half truth. But in fact, when sensible men serve on a committee, not much time is wasted. In a committee, an old member, particularly when he happens to be in the chair, can do much to check waste of time. His very age becomes a useful asset. It has developed his historical sense; it gives him a sort of authority. He will focus attention on essentials. He will explore the minds of his colleagues, collect their ideas, induce each to contribute, and finally lead them to discover, perhaps to their surprise, that they are in agreement."

I think I can subscribe to all of this with the possible exception of the last phrase. In crucial matters the chair has seldom succeeded in bringing the opposing parties to an agreement.

As you well know, the most recent example of conflict in committees relates to the treatment of experience on the account current basis. The Retrospective Rating Plan and the Supplementary Rating Plan have been advanced by the Stock and Mutual groups respectively as measures that would appeal to the large employer who is either a self-insurer or is inclined to become one. He is to be told that it is to his interest to come within the protecting arms of insurance under plans that would give full credibility either to all losses incurred within certain limits or to losses below a certain normal line. One of the strongest arguments in favor of these plans is predicated on the idea that the employer will become personally interested in safety work so that he may by his own efforts reduce the insurance cost. Here is a problem directly related to the principal objective in workmen's compensation. Much time and effort have been spent by employers and insurance carriers to prevent injury to workers and considerable progress has been accomplished, but it is a matter of regret that the

work of prevention is at times frustrated by unexpected developments, defeating our best intentions. No sooner had the Retrospective Plan been approved and published, than the energetic folks in the excess insurance line produced a contract guaranteeing the employer against excess charges which may result from bad experience, thereby nullifying the "accident prevention" idea which is presumably behind the plan.

An illustration of a different sort is given by Mr. Ambrose Ryder in a discussion on Automobile Insurance.* There it appears that engineering progress has put the safety movement into eclipse. Engineers have put speed into the automobile faster than educators have been able to put safety-mindedness into the drivers, and by building magnificent highways and boulevards they have aroused a mania for speed, thereby increasing the hazard for the occupants of the car. According to Mr. Ryder, "the best risk in the United States to-day is a 15-year-old rattletrap driven over tortuous, winding, mountainous dirt roads, in the hands of an old conservative mossback." The safety movement is thus betrayed in the house of its friends.

The Medical Problem

Restoring man to health and work is the second prime objective in workmen's compensation. Expert medical treatment is essential in order that the injured may be restored to his previous status in industry. For a long time employers and insurance carriers were accorded the privilege and the duty to provide medical care by selecting the physician and hospital where the treatment was to take place. Recently a movement has been started by the medical societies which places the right of selection of the physician in the hands of the injured and takes out the right of selection from the hands of the employer and the insurance carrier. Considerable propaganda has been built up in favor of the so-called "free choice" idea on the theory that the doctor hired by the employer or insurance carrier will so fashion his testimony at hearings on compensation claims as to favor the party who has hired him or paid his bill. An assumption of this sort is, of course, a

* *Proceedings,* Vol. XXII, page 144.

direct reflection on the medical profession which, strange to say, has not been refuted.

The manner under which the employer or carrier has selected physicians may have developed certain abuses for which neither employer nor carrier was responsible, but the system had its good points in that both employer and carrier had a common interest to see that the man got well and returned to work within the shortest possible time. To that end they were bound, as a matter of self-interest, to select the best possible medical skill for the treatment of the injured workman. Under the system which has recently been adopted in New York the injured workman is given a free hand to select his own doctor subject to certain exceptions—such as in case of emergencies, or where the accident happens without the State—while the employer and carrier are privileged to pay the bill.

While the free choice idea may sound good in theory, in practice it is developing unexpected abuses. Workmen who have gone to one physician and become discouraged because of slow healing are apt to make frequent transfers. Attending physicians are disposed to send their patients from one specialist to another in order to get a symposium of opinions on the condition of the patient. Physicians who have not had experience in traumatic surgery will undertake to accept work for which they are not qualified. By the time the medical inspector of the insurance carrier or of the Labor Department comes around to examine the case the harm has been done. It would probably be difficult to persuade the medical profession, the labor organizations and the legislature to go back to the old idea of leaving medical control in the hands of the employer or insurance carrier. But something should be done to regulate the free choice method by means of a system that would keep a close check upon the care and treatment given to the injured man. A plausible suggestion has been made to the effect that a neutral system of medical inspection be organized so that the case could be examined in its early stages and frequent reports rendered upon the efficacy of the treatment by impartial examiners, who would not be specially indebted for their fees to any particular employer or to any particular insurance carrier. The suggestion has possibilities and deserves consideration on its merits.

The medical societies have given sincere evidence of their desire to coöperate with the insurance carriers in bringing about successful results in the administration of workmen's compensation. This coöperation is particularly impressive in connection with the arbitration work now in process under the joint auspices of the State Medical Society and the Compensation Insurance Rating Board. During the ten-month period from January to November, 1937 the Arbitration Division of the Board has disposed of 750 cases under a system of summary procedure, non-technical in form and equitable in spirit. It is one of the bright spots in the administration of the new law, since it serves to bring about quick settlements of disputes on medical bills in a manner that saves time and irritation, which would otherwise result from protracted litigation in the courts. Unfortunately, on the fringe of the medical profession, there are still a number of men admitted to compensation practice whose only qualification for the work is a medical diploma and a diathermy machine. If the medical societies could find a way to curb these gentlemen, restrict their activities and limit their number, the result I am sure would be to raise the profession in popular esteem.

As an incident to the free choice idea, the medical societies have been given the power to recommend physicians on a panel to be specially licensed by the state to do compensation work, each doctor to be given a special symbol to indicate the scope of the work wherein he may practice his profession. It was originally intended that the medical societies would be very careful in the admission of qualified men and approve applications only for those best fitted to do the work. Unfortunately in actual practice the method adopted was to admit all or nearly all applicants to the compensation practice and to rely upon future occurrences to exclude those who were not competent. It appears, however, that disbarment is a difficult proceeding, requiring in each case a set of definite incontestable facts with the possibility of quasi-judicial and judicial review, so that removal from the panel of incompetent doctors, while in theory desirable, in practice would prove to be extremely difficult of realization.

As regards the cost of medical treatment, it will be interesting to know conclusively the difference in cost for states operating under the free choice method as compared with other states where

the medical treatment is directed by the employer or the insurance carrier. Research of that problem has already been undertaken by the National Council on Compensation Insurance as well as by the Compensation Insurance Rating Board, but it will take a year or longer before any conclusive information becomes available. Aside from difference in medical cost, such studies may reveal the facts bearing on the question as to whether the duration of disability is greater or less under the free choice as compared with a directed system.

Under the new method the honor of the profession is still at stake. It will require a high grade of integrity for the doctor to concede that the claimant whom he may have treated for a long period is not a victim of occupational injury. Financial interest in the collection of the bill may still becloud professional judgment. If, under the old system, the circumstances created prejudice on his part against the claimant, under the new circumstances his prejudice will be against the employer. In the final analysis, the success of the new venture in medical practice will depend upon effective coöperation between the medical societies and the insurance carriers and upon a fair and unprejudiced attitude toward the problems created under the new dispensation.

The experiment in New York should be carefully watched for the reason that we are dealing not merely with a piece of local legislation, but with a law that may be accepted as a model for the rest of the country.

Assurance of Benefits

The third objective is achieved by means of "compulsory" insurance in sound institutions operating under strict state supervision. How effective is compulsory insurance? Many people entertain the idea that it is sufficient to pass a compulsory statute and the trick is done. Advocates of compulsory insurance, whether in the field of workmen's compensation or automobile liability, do not realize the extent of administrative work necessary for the strict enforcement of compulsory laws. Too many seem to think that under a compulsory law insurance becomes automatic. As a matter of fact, whether the statute is elective or compulsory, the

insurance institution cannot afford to sit back and wait for the employer to come forth and "sign on the dotted line." It must employ the services of agents and solicitors in order to educate the employer, not only to the advantages of a particular form of insurance, but to the necessity of insurance protection in general.

Notwithstanding extensive education and missionary work on the part of agents and solicitors, there are still many non-insured risks in all states regardless of the particular system that may prevail. Enforcement of the insurance provisions in the State of New York is probably as strict, if not more so, than anywhere else, and yet it is amazing to find a large number of employers in this state who are not insured and the number of employees who are deprived of protection because of the failure to insure. Enforcement in New York requires much effort on the part of the Labor Department, and what may not be generally known is the fact that the money spent by the Department in enforcing compulsory insurance is charged directly to the insurance carriers and indirectly to the insured employers. This is done presumably on the theory, which may be difficult to justify from a strict accounting standpoint, that the just and the unjust shall pay alike and that the non-insured employer of to-day will be the insured employer of to-morrow.

Through the courtesy of the New York State Labor Department, we have made a study of the problem of non-insurance in New York City and vicinity. The period of our investigation covers approximately one year from September 1, 1936 to September 1, 1937. Our findings show that 1,762 firms employing 6,321 men with an estimated payroll of nine and a half million dollars were non-insured and summoned for prosecution. 81% of these firms were found to be employing less than 5 employees, 11% from 5 to 9 employees, 5.6% from 10 to 19 employees and 2.5% more than 20 employees. The operations conducted cover manufacture of clothing, laundries, restaurants, junk dealers, construction work, gas stations, bakeries, printers, retail stores, furriers, foundries, stone cutters and other miscellaneous commercial and manufacturing establishments. 881 cases were sampled for the purpose of determining results of the prosecutions. It appears that 156 were fined, 61 dismissed, 662 were given suspended sentences and in two cases jail sentences were imposed.

Our study shows that the failure to insure is prevalent in industries operated by small employers who find the enforcement of administration to be lax. The number of suspended sentences indicates a sympathy of the magistrates with the small employer who has a hard struggle to meet the weekly payroll, plus a variety of taxes imposed by local, state and federal authorities.

The failure on the part of small risks to secure insurance is due to the real or fancied inability to pay the premium, to the fact that the market is somewhat restricted for the insurance of small risks, and to the lack of interest on the part of solicitors because of the small reward allowed in the expense margin. As a consequence the small employer resorts to a variety of devices in order to escape the insurance tax, taking a chance on the possibility that no loss will happen and that the state authorities will not be sufficiently energetic to enforce compliance with the statute.

One of the devices frequently resorted to consists of forming fictitious partnership agreements with workmen. This device is well known to the authorities and has come to the attention of the courts, who recognize the evasion, but make a distinction on the basis of proof as to whether the arrangement has real facts disclosing common ownership and division of profits and losses. In cases where the facts clearly show that a true partnership does not exist, notwithstanding the existence of written agreements declaring the parties to be copartners, the courts will take cognizance and impose penalties. However, installing an offender in a prison cell is of no special benefit to the victim of the accident. He would rather see his boss out of jail and collect the benefit to which he is entitled.

A great alarm has been raised in recent years because of the fact that beneficiaries for workmen's compensation have suffered loss by reason of failure on the part of insolvent insurance carriers to meet their obligations. As a consequence thereof and because of threats to inaugurate a monopolistic state insurance fund, there was established in New York a guarantee fund to which all private carriers are required to contribute 1% of their premium income. This fund is designed to safeguard claimants in cases where the insurance carrier is forced into liquidation and is unable to meet in full the awards under the compensation law. It is surprising that during the entire discussion on the subject nothing

has been said of the tragic case of the dependents where the head of a family was injured or killed in the course of employment for a boss who had no insurance. A remedy may possibly lie in the establishment of a special fund from which the victims of occupational injuries, in the case of uninsured employers, could be satisfied. It may be feasible to maintain a fund of such character by imposing substantial fines on all offenders instead of suspending sentence. This method may prove more effective than the present system of policing the non-insured risk.

You may say the problem of non-insurance under a compulsory law is not our problem; that the subject matter is for the state to solve in its own way. With this I cannot agree. True, the plight of the injured workman whose boss is not covered, or of the victim of an automobile accident whose owner is not protected by insurance is a matter of public concern, but insurance institutions possessing a franchise to render public service have a duty in the matter. The insurance institution should lend its aid to the state in order that this difficult problem may be properly solved. Insurance carriers must prove their ingenuity by planning and devising means for drawing within the protection of insurance each risk on a fair basis. Unless we are able to do so, we shall fail in our function as scientific guides for insurance management. The spirit of competition which exists insofar as the large risk is concerned must be brought into play with the same keenness in the field of operations occupied by the small risk. I am not prepared to say just how this may be accomplished. Suffice it for the present that the problem be recognized and that thought may be given so that a proper response may be forthcoming in the near future.

Occupational Disease Cover

No single phase of workmen's compensation has attracted so much attention in recent years as the problem of cover for occupational disease. This is not because the subject presents a new phenomenon in the practice of compensation, or that the presence of disease due to occupation has been newly discovered. Great Britain amended its law in 1906 by providing a schedule for certain defined occupational diseases. Other European countries followed suit with provisions for varying schedules, which recog-

nized the fundamental principle that certain disablements of a slowly developing character should form a part of the compensation system.

In this country the first legislative cover for occupational disease was adopted in the territory of Hawaii in 1917. This was followed by California in 1918 and by Connecticut and Wisconsin in 1919. Massachusetts construed its law as covering injuries due to disease. New York in 1920 extended its compensation law to cover certain defined occupational diseases under a "Schedule Plan." Other states soon followed the New York example. Minnesota and Ohio adopted the schedule form in 1921, Illinois in 1923 and New Jersey in 1924. In 1925 Puerto Rico also adopted the schedule method. During the period 1924 to 1928 the all-inclusive provision was adopted for the Federal Compensation Law (applying to civil employees of the government), for North Dakota, for the United States Longshoremen's and Harbor Workers' Act, for the District of Columbia and for the Philippine Islands. From 1928 to 1935, with the exception of the all-inclusive elective provision adopted by Missouri in 1931, legislation on the subject took a temporary recess due perhaps to a decline in business activity. Agitation, however, continued without loss of time. Literature from all sections of the country continued to flow in an endless stream. Legal reviews on court cases, essays on the insurance aspects, pamphlets on dust control, and reports by boards and committees appeared on the market at a rate which is hard to conceive.

Within the last three years important legislation followed in rapid succession. New York, while retaining the schedule system, amended the law to include "any and all occupational diseases," and on top of that adopted a special article relating exclusively to injuries caused by harmful dust. West Virginia provided cover for silicosis, Nebraska included smelting and metal refining industries, North Carolina extended cover to twenty-five scheduled diseases, Illinois and Indiana made all-inclusive provisions, while Washington, Michigan and Pennsylvania adopted the schedule form.

The discussion as to which form of act is preferable is still going on with much energy. This for the reason that the opponents of the all-inclusive act are fearful that a blanket provision for occu-

pational disease is a means for opening the door to general health insurance, thus placing upon industry an impossible burden.

The second point about "occupational disease" that is causing much concern is the question of "definition." There seems to be no general agreement on the meaning of the term. In New York an effort to provide a legislative definition to the effect that the disease was "peculiar to or characteristic of the employment" was not successful because of opposition from various organizations who took the position that the interpretation should be left to the courts. The Industrial Board accepted this definition as a temporary expedient for the guidance of its referees in procedure on claims. The Appellate Division of the Supreme Court has recently in two cases raised the question as to the propriety of this definition and the matter will come up shortly before the Court of Appeals.

The dissenting opinion in Bishop vs. Comer & Pollock (297 N. Y. S. 946) contains an illuminative discussion which should be read by every student of the subject. A variety of definitions are cited in the opinion. In Connecticut an occupational disease is one "peculiar to the occupation in which the employee was engaged and due to causes in excess of the ordinary hazards of employment as such." Rhode Island declares an occupational disease to be one "which is due to causes and conditions which are characteristic of and peculiar to a particular trade, occupation, process or employment." Ohio limits the meaning to one "contracted in the usual and ordinary course of events, which from the common experience of humanity is known to be incident to a particular employment." In the State of Washington it is defined as "one which is due wholly to causes and conditions which are normal and constantly present and characteristic of the particular occupation." Missouri declares it to be one "contracted in the usual and ordinary course of events which, from the common experience of humanity, is known to be incidental to a particular employment." The provisions of Illinois and Wisconsin are broad in their scope and involve many inclusions and exclusions. What a pity we cannot have a common definition and save the time and money wasted in litigation on this point.

Aside from the problem of "prevention" to which a great deal of study has been given by employers, insurance organizations

and government agencies, the subject of "ratemaking" is one that has presented formidable difficulties because of lack of dependable experience. This is particularly true with respect to coverage for diseases resulting from the inhalation of harmful dust. Here we are faced with the problem of "accrued liability." The development of diseases referred to under the general term of "pneumoconiosis" extends over a long period of time. The resultant disablement is not traceable to any particular exposure, but reflects a condition which has accrued over a period of years. If the entire liability is to be assessed against the last employer, the risk which has in its midst a number of men who have been exposed over a long term of years becomes for all practical purposes uninsurable. Any rating schedule designed under the circumstances would be regarded as inadequate by the carrier and prohibitive by the employer.

When confronted with this situation in New York in September, 1935, because of the enactment of the all-inclusive occupational disease law, the committees of the New York Board adopted two sets of rates—(1) for full coverage with a proviso of a contribution by the employer, and (2) the employer was given the option to assume six-sevenths of the liability during the first year, five-sevenths the second year, etc., subject to a per capita deposit as a guarantee for his performance of the agreement. The high rates required under the first plan to cover full protection and the large deposits required under the second plan proved so objectionable to industry and to labor as well, because of threatened unemployment, that the legislature was prevailed upon to enact an amendment limiting benefits by a system of graduation, depending on the age of the act. Benefits began with $500 in the first month of the law, stepping up at the rate of $50 each month until the maximum of $3,000 is reached. Under this law it was possible to bring about a material reduction in rates and to adopt a physical rating schedule for "Foundries," enabling an employer to get as much as a credit of 35% for perfect conditions. Michigan followed the New York example by enacting a similar law effective in October, 1937. In Pennsylvania total liability for dust diseases is limited to $3,600. Accrued liability is taken care of by providing that for a period of ten years compensation shall be payable jointly by the state and the employer. The law provides a gradu-

ation, making the employer liable for one-tenth the first year of the act, stepping up one-tenth for each succeeding year. In Illinois a general loading of 2.5 points was put in all rates as a provision for the accrued liability. Furthermore, there is a special form of coinsurance cover which is optional with the assured. In consideration of a reduced rate, the assured may elect to carry 50% of each claim up to a maximum of $1,000 per claim. Provision is made for a pool to be organized by the Stock companies and for one to be organized by the Mutual companies. This is for the purpose of providing coverage for rejected risks.

The treatment of premiums collected to reflect the accrued liability is a matter that deserves most careful consideration. It would seem desirable to establish a method whereby such premiums in excess of the loss ratio shall be earmarked and held in reserve for future contingencies. This is on a par with the principle under which life companies operate. Assuming that the claims for dust disease represent a gradual period of development, the rates which seem redundant now will prove inadequate in later years. The savings effected in the early years should not be dissipated in dividends to stockholders and policyholders under the mistaken belief that they represent current earnings, but should be treated as reserves for application to future claims now in the course of incubation.

The Political Influence in Compensation

In the struggle to reach our objectives we have been defeated in part by circumstances beyond our control, and in part through our own failure to provide harmonious action through a process of reconciling divergent views. If we are to achieve a larger measure of success, motives of self-interest, justifiable as they are, will have to be submerged for the general good. The solution to the problems which I have outlined here lies in concerted action to be agreed upon without sacrifice of principle, and also in methods of coöperation with state authorities to whom we should be willing to offer helpful advice and constructive ideas to the end that insurance institutions operated on a competitive basis shall function smoothly under a system that encourages the spirit of initiative and enterprise.

The influence of politics in workmen's compensation is undeniable. Labor and industry have been organized for a number of years in order to protect their respective economic interests. The medical profession is the latest recruit in the field of politics. It is quite true that political action may have either a beneficent or deterrent effect on the progress of workmen's compensation as a part of the general scheme of social insurance, but the political arena is not for us. From the Olympian heights of scientific work our sphere is limited to that of observers, whose function is to forecast coming events from the shadows of the past. But as individuals we have a deep interest in politics as the road to good government. We have a large stake in this republic and we want a government that is efficient and conducts its affairs with prudence and economy.

Of course, "It Can't Happen Here," but if taxes and the cost of living continue to rise, as they do, and if wages do not follow the rise, as they never can, there is danger that the powers of government will be vested in the hands of a coterie of demagogues motivated by the "cohesive power of public plunder." Under this hypnotic influence the masses will be deluded by fair promises of a magic land —

> *"Where waters gushed and fruit-trees grew*
> *And flowers put forth a fairer hue,*
> *And everything was strange and new;*
> *The sparrows were brighter than peacocks here,*
> *And their dogs outran our fallow deer,*
> *And honey-bees had lost their stings,*
> *And horses were born with eagle's wings."*

In the legend immortalized by Robert Browning, the children of Hamelin vanished into oblivion when the Mayor and the Council welched on their promise. Is there a similar fate in store for the children of other lands who have listened to the voices of false prophets now strutting on the stage of world-politics?

Mankind has been dreaming of Utopia since Plato and long before that. Perhaps it is only a mode of escape from the world of realities. To-day we talk of "social security" in a life where everything else is insecure except the proverbial certainty of death and taxes. Even as to these two inevitable items some try to cheat the tax collector, while most of us hope to avoid the adven-

ture of death through a belief in immortality. May I be permitted to conclude with a word to the junior members of the Society. With your background of education and special training, and with your youth and enthusiasm, the theoretical will appear attractive. You need not reject theories, but continue in the pursuit of knowledge as the source of power, checking your theories by results of practical experience. And by such methods you will find the ultimate answers to present as well as to future problems certain to arise in the interesting work which circumstance and opportunity have chosen as the pathway for your career.

SOCIAL BUDGETING

BY

W. R. WILLIAMSON

Wordsworth said, over a century ago, most plaintively.

"The world is too much with us; late and soon,
Getting and spending, we lay waste our powers:"

To-day, also, much of the strain of life comes from our anxious concern as to how we can get maximum income and as to whether our expenditure of this income will yield us the maximum in satisfaction.

Modern life recently seemed to Charlie Chaplin a thing of high speed, of senseless mechanization. It seems to others like an orderly game of bridge.

In playing bridge we could conceivably leave the cards face down upon the table as dealt to the four players, each blindly in his turn playing a card. Actually, one player has half the cards in the pack under his control, and each of two other players who are partners know where half the cards lie and control one-fourth. The remaining player looks on. All have knowledge as to the make-up of all four hands if they have bid "in a scientific fashion." All know the specific values of all the cards.

In this major task of earning a living and spending the earnings, there is an increasing possibility of playing our cards with some knowledge as to their generally accepted or probable values. There is not quite the symbolic symmetry of the four suits and the simple scale of values now running from deuce to ace (once, I suspect, from ace to king), but we can get a working knowledge as to many of the tricks, and we can create partnerships which greatly increase the effectiveness of our play.

One of the most fundamental partnerships is the family. In most families money is earned outside the home, and supplementary work is done within the home. The latter determines the effectiveness with which the dollar income can be utilized. Modern life can reduce drudgery or substitute new drudgeries for old, but no review of the game can ignore the importance of the apparently

unpaid work which is done within the home by some of the partners, even by the wage earner himself in his spare time. The man whose wife is a poor partner may find life on any income difficult. The efficient partnership will jointly manage on almost any income.

"The gainfully employed," a group which a few years ago seemed to number about 50 million persons in the United States, required, it was felt, enough income to support the 125 million persons in the total population. On the average each wage or salary earner was responsible for the financial needs of 2½ individuals. The national income has recently been said to be 60 billion dollars, or, for this 125 million population we are discussing, approximately $40 per month per capita. Similarly, without very clear definition, our national wealth has been estimated as 300 billion dollars, or about $2,400 per capita. If these amounts were shared by only the 50 million gainfully employed, the per capita income would be $100 monthly, the per capita wealth $6,000 per year gainfully employed. The difference in these per capita sums may well be the difference between a six-spot and an ace. The breadwinner in the average family (earning the average income), earns $100 a month; his share is $40, that of the rest of his family, $60.

Similarly, the wage earner cannot claim that he *supports* his wife or gives her an allowance. He has agreed to a partnership into which each contributes quite different types of essential services. He could say that she is entitled to her share of his income and that he is entitled to his share of her services. When there are children, they have certain responsibilities and certain privileges. Both the wife and the earning partner are responsible for the training of the children to give them suitable apprenticeship so far as may be possible, with the limited knowledge of the future which can be derived from the past. The children make demands upon available funds as well as upon supervision. While there *is* a wide range of family income and property, yet many a family lives upon such sums as have been here determined. The continuity in the receipt of this income is subject to interruption, but for many the income is still commonly regarded as generally dependable. One man supports himself alone; another has a wife and six children. Either, in his lifetime, may have a wide varia-

tion in his successive family responsibilities. It is still somewhat constructive to consider for a while not the most exceptional men of large fortunes or the equally nontypical, exceptional men of practically no income and large family, but to consider instead the average, the ordinary mortals of whom there are so many more and whose problem it is to live upon the limited but moderately sizable family earnings.

It is assumed that the entire family income is all *earned income,* wages, salaries, commissions or bonuses, with no interest or dividend payment included. In considering the population as a whole one may presuppose that payments of interest or dividends are made to one set of individuals at the expense of another set, and that the transactions involved do not add anything to the aggregate buying power of the community. The per capita share of such "earned income" averages about $1.30 per day, or only a little beyond 5 cents an hour of elapsed time. Our 60 billion dollar a year national income has been widely cited. If, instead of spreading the wages over all elapsed time for the entire population, we recognize the convenience of dividing these wages among the gainfully employed per hour of effective work, a 40-hour work week would seem to result in a real return of pay of 50 cents an hour to each of the 40 per cent of the population classified as wage earners. Whether, therefore, the real rate of compensation is 5 cents or 50 cents an hour depends upon how thoroughly we socialize our wage bill.

Such a simple division of our income or of our property is purely fictitious. The rapid development of insurance coöperation to broader and broader fields, by means of which expected losses may be recognized and their devastating effect reduced, is, however, an effort to approach such simple division. The death of the family wage earner might be regarded as the natural termination of his family responsibilities, as well as of his life. The fear of income cessation at death and the sense of responsibility for the family are so strong that men insure themselves for fixed amounts payable as lump sums or as stated incomes to their families during the continuance of certain conditions. The wage earner, in his family relationships and in his community relationships, can provide for the possibility of death and can so order his commitments that when death occurs he may meet loss by the specific,

reasonable payments which have been arranged for in advance through the insurance company. Life insurance contracts can provide for such members of his family as still require support—children until they reach maturity, the widow while she is still caring for her children, and parents past the age of earning their own living. Men contribute yearly premiums out of their incomes to share with their dependents after death.

The basis of insurance is coöperative provision of funds in the face of contingent possible loss. Possibly 1 per cent of our wage earners will die within a year. The contribution of 1 per cent of yearly income to a common fund should presumably, therefore, result in the ability of the insurance carrier to pay one year's income to the estate of each decedent.

A catastrophic termination of wages may also occur through the incidence of invalidity following sickness or an accident so severe that all subsequent gainful employment seems impossible. In the event of such catastrophe, the wage earner must recognize the cost of his medical care as well as his loss of income. If his wife becomes permanently disabled or invalided, the loss of her services to the family, together with the cost of her medical care, must in some way be met. Frequently, the remaining members of the family divide among themselves the duties customarily exercised by the invalid and thus avoid financial expenditure for carrying on her activities. When children are ill, most of the interruption is in unsalaried schooling rather than work interruption. Since their contribution to household work is slight, the mother can customarily accept this additional responsibility without any noticeable financial adjustment.

Wages may terminate as a result of loss of an income-producing job in old age, which is possibly a special case of invalidity. In this case the physical impairment of the workman is not always the dominant factor. The attitude of the employer in estimating his employee's working capacity and the further general point of view of society as to the wisdom of indefinite work in the very advanced years of life may be more important factors.

Pension plans have frequently determined a retirement age at which old age was assumed to begin. This has variously run from as low as 50 years of age to as high as 70, the most common age probably being 65. Once a man regards himself as a pen-

sioner at the age of 65 he probably expects to maintain this condition for the rest of his life. In the case of either invalidity or old age, the necessity for a life income to the ex-wage-earner is apt to run for many years. His income may have to be supplemented by an income for the support of any dependents for whom he is responsible so long as they remain dependent.

The customary effects of sickness or accident are simply wage interruptions for a limited period, commonly no longer than a two weeks' vacation period, with the distinction, however, that the costs of medical care, hospitalization, nursing, and drugs must be borne at the same time that the loss of wages has occurred. These costs will exist not only when sickness strikes the wage earner, but also when the wife employed in the home and any of the children are ill.

Even as with sickness and accident so also with unemployment. It may be either temporary or chronic. The inability to secure work when one assumes himself both able and willing to work is probably to a considerable degree due to personal qualities of the individual. It is also to a large extent due to the rhythm of growing confidence and increasing alarm which seems to mark the pulse of our modern economic system. The man who is a miner depends not only upon the availability of minerals to be mined, but customarily also upon a strong, functioning corporation organized to remove the minerals from the soil. The store clerk, willing as he may be to work, is commonly dependent upon the complementary willingness of a given employer to engage his services. The termination of employment because of slack work is of little consequence in boom times when many other positions are available; it is very serious in times of depression when new positions are difficult to find.

Death, invalidity, old age, accident, sickness, and unemployment, may all leave the wage earner without an earned income and may add costs of medical care into the bargain. The responsible man must consider not only himself but those commonly called dependents, for whom he desires the availability of small sums of money in times of income loss. It seems reasonable that a workman should be expected to assign values to these contingencies comparable to the indices in the pack of playing cards, and that he should anticipate meeting these contingencies either

alone or coöperatively. Insurance assumes wide coöperative effort. It estimates that past incidence of contingencies should furnish guidance for current provision. Could we assume a national survey of some very simple benefits to the whole population, a crude illustrative tabulation of some of the costs, stated as percentages of the national income, might run as follows:

(1) Death.—Drawing somewhat freely from British experience we might deduce the existence of 3 million widows and 1,500,000 children under the age of 16 whose husbands and fathers had been among the 40 per cent employed but are now dead. Should the 3 million widows each receive $25 a month, or approximately 60 per cent of the $40 per capita income of the entire population, these 3 million widows would secure $900,000,000 of income yearly. The 1,500,000 children, granted, let us say, $10 a month each, would add $180,000,000 of income, bringing the total annual requirements up to $1,080,000,000, or less than 2 per cent of the national income of $60,000,000,000. Deferring consideration of the adequacy of these sums or even their social necessity, we can recognize that against earned income there might be an annual charge for this category of recipients amounting to 1.8%

(2) Invalidity.—The duration of disabilities following sickness and accident varies widely. When the duration is short the disability is considered to be "temporary." When the duration is long it is frequently called "permanent" disability or "invalidity." Since at its inception the ultimate duration seems indeterminate, it seems reasonable to consider the first three, six or twelve months as "temporary," and the subsequent period as "permanent," or a period of "invalidity." We will here link the provision of the costs of medical care with the grants for temporary disability and will assume invalidity benefits of $25 per month to the wage earner, of $20 a month to his "non-gainfully-employed" wife, and $10 a month in behalf of each child under the age of 16, such benefits to be dependent upon the continued disability of the wage earner alone. Ignoring much of the wealth of experience that should induce caution, these combined outlays we will very crudely estimate at 2.5%

(3) Old Age.—We can possibly assume that each wage earner when he reaches old age is responsible for the support of himself and about ⅔ of a dependent. Should $25 a month go to the wage earner, $20 a month to his wife if she is

not a wage earner, and $10 to each child under the age of 16, we might find some 4 million ex-wage-earners who with their 2⅔ million beneficiaries might require some $1,600,000,000 per annum, or approximately 2.7%

(4) Temporary Disability.—Including cash benefits to the wage earner for himself and his dependents and the cost of medical, dental, and eye care to himself or any member of his family as well as maternity benefits (including such costs during the period of invalidity), we might have, in addition to the costs of cash grants at invalidity, a figure of $2,700,000,000, or 4.5%

(5) Unemployment.—Unemployment, like disability, may be either temporary or chronic. The load of unemployment is subject to too many shaping factors to warrant accurate estimates of its weight. Although it is acknowledged that in recent years a very large number of individuals have been seeking employment but have been unable to find it, the difficulties of valuing this factor follow immediately from the fact that family partnerships affect the situation. Whenever some special circumstance forces large groups from the 60 per cent of those not gainfully employed into temporary employment, they tend to consider themselves thereafter as no longer members of the 60 per cent group of coöperating partners but as members of the 40 per cent group of wage earners. When a financial recognition is accorded to the fact of unemployment, the transfer of 10 per cent of the 60 per cent, or 6 per cent of the whole, to the 40 per cent would add 15 per cent to the available employees without creating any additional employment by this transfer. Let us assume very arbitrarily that 5,000,000 who would like to be gainfully employed are out of work and that the family dependents include 3,000,000 wives and 4,500,000 children, whose monthly benefits will run respectively $25, $20, and $10. The yearly outlay approximates $2,760,000,000, or 4.6%

The total budget adds up to 16%

In dealing with these illustrative budgets against the national income each estimate has been extremely arbitrary. The catastrophe is but carelessly defined. The benefits have been determind as flat amounts. The administration, so closely affecting costs, is not discussed. National income, the denominator, is said to have been cut in two from 1929 to 1933.

The impact of one type of benefit cost upon another is sometimes an impressive factor. Traditions such as the half-pay basis

of grant, the universal availability of relief, the individual retention of rights to money "deposited" instead of "contributed" cannot be ignored. A comprehensive analysis follows rather than precedes such a brief discussion as this. These figures of possible costs totalling 16% of national income must be regarded as inadequate for meeting all the necessary costs which arise from the various catastrophes when relatively unimportant factors add to costs. Their payment, too, would seem to impinge upon accepted living standards when such living standards have been determined so as to use up the entire earned income without recognizing catastrophes. The costs will be recognized as superficially low by certain students of Social Security accounting. The amount of benefits contemplated in most cases will not be sufficient to tempt those who have already risen to self-sufficiency to court the catastrophe which must precede the receipt of the benefit. If the benefits can be held down to these sums they will frequently require supplementation through borrowing, through friendly assistance, or through personal thrift programs.

For the skilled workman faced with the succession of employment at varying rates of pay, of periods of unemployment resulting from four of the five classifications above, and eventually of death which creates new needs for his family, the assurance that 16% of his current income would give him rights to a small money provision for himself and his family partnership upon which he could depend ought to seem more satisfactory than the expenditure of that 16% of income upon consumption goods which are not necessities with subsequent dependence upon relief. The traditional attitude of self-reliant workers has been that they can earn wages sufficient for all these contingencies. They have frequently failed to value these contingencies and to provide for them in their personal budgets.

Among the possible situations the following life history may serve as a typical example: A young man starts work at the age of 20, marries at the age of 25 a woman of 23, has children born at his successive ages 28 and 30, terminates his employment at 65 and lives to 80. His wife dies at 75. He supports each child for twenty years. He works from 20 to 65, with five years out because of depressions, illness, accidents. He is financially responsible for 60 years of his own life, 52 years of his wife's life, and 40 years

of his children's lives. Thus, there is a total of 152 life-years to be provided for by 40 years of work. Per year of work he furnishes 3⅘ life-years of support. The progression of his responsibility runs by the number of individuals 1-2-3-4-3-2-1. Such an individual *may* find an increasing income rising to its maximum when he is responsible for four people and quite possibly shrinking thereafter. It is even conceivable that, with this considerable margin in responsibility, the French method of family allowances might help to smooth out this progression of added costs by a slightly varying income. Ignoring such a possibility, however, and accepting the actual life history as indicated here, the workman will at age 50 be responsible for only two individuals. If he has met his maximum responsibilities from current income, he will then have sufficient funds released by the termination of provision for the two children to enable him, over the 15-year period, to make sufficient savings so as to support himself and, most of that time, his wife on a definitely smaller monthly income.

The working men with whom this discussion is concerned include not merely skilled wage earners and common laborers but those workers who enter the various professions. The problem of individual budgeting remains one of our most compelling studies. The major reason for all forms of thrift is preparation for changes in responsibilities and for future terminations of earned income at various times and in various situations. The individual cannot know with any exactness the timing and extent of his personal liability to these five contingencies outlined above, and he is almost inevitably forced either to a completely random and speculative provision or to a niggardly reduction of his living standards to achieve safety—possibly the choice between a prodigal carelessness or a coöperative recognition of these contingencies. He may share either with a small or with a large group of his fellow men, looking toward a practical working minimum provision under all these contingencies.

Personal thrift programs have not seemed particularly well fitted to the role of providing against such catastrophes as death, automobile accidents, or fire hazard. The coöperation of insurance through the fraternal organization or the commercial life company, through the services of the automobile insurance company, or the fire insurance company, provides a medium for

coöperation of a straightforward sort. Life insurance, with the increasing hazard of death, has added in its development of level premium a banking element under which personal equities bulk high. This method of operation is very important in the sale of individual policies and with the use of individual selection methods, with the deferred benefits so important in ordinary life insurance. When such a cross-section of the community can be insured under a group life policy, a simpler method of purer insurance without individual cash equities is used by the same companies which sell level premium ordinary life insurance. Individual deferred annuity policies are very largely banking as they are developed to-day. It seems conceivable that a coöperative group could view an insurance so broadly that the entire population might be simultaneously covered with social budgeting as part of the general tax program adequate to such fundamental needs in such reasonable amounts as have been here set down.

It is impossible to map out the progress of civilization into the next century. It would require full understanding to give adequate but not redundant advance provision. When he does not make advance provision, the workman to-day frequently expects and receives the succor of relief measures. Since he may be subject to such relief assistance, he must, as a responsible citizen of the community, contribute his share to relief, whether actual or prospective, when he himself is earning income. An extension of the insurance technique which has done so much in life insurance, accident and sickness, and workmen's compensation, could enable the citizen, who must in any event contribute to relief costs, to share both in liability to benefits when one of these contingencies occurs and in liability to taxes when his income permits him to contribute instead of to receive. The reason for insurance is a recognition of need and a crude collective provision in recognition of such need.

The advance in understanding of aggregate possibilities has been very marked in the last few decades. The coöperation of the many is gradually replacing chance-taking, which too often resulted in loss for most of the participants.

The Social Security program now beginning to function has started the insurance type of provision for these contingencies, including some of its banking elements. Its success depends upon

an extension of the insurance method to a continuously wider field. The employee or the individual workman, after having shared in meeting these contingencies, will be better able to deal with his residual income, thoughtfully and with greater satisfaction to himself, than when he is constantly troubled by the absence of provision for catastrophe.

This insurance concept is presumably not the personal hoarding or banking point of view. The Government's responsibilities are social and must aim at a generally satisfactory nondiscriminatory benefit for the mass of normal wage-receiving citizens.

Private insurance, with its responsibilities for selection, seems unable to achieve sufficient spread to make unnecessary the broad social provision of some minimum benefits. The man whose need is greatest is the one to whom this service is greatest. The higher-salaried man should coöperate to help the other man rather than himself.

These considerations point to a joint coöperative provision aimed to help all to budget—not for an individual provision just right for each, but for some reasonable minimum provision. The better-placed citizen will supplement his basic social provision along the traditional lines of self-reliant additional benefits. Social provision will never really infringe upon the personal prerogative to go beyond the minimum in the way which seems best to the man himself. But he must, the social budgeteer believes, exchange his right to starve or his right to ignore basic need for a shared provision. He must save himself from some of that getting-and-spending agony by adopting a budget.

Insurance has flourished in many fields where it has been possible to expect losses with some degree of regularity. Hence, the insurance carrier could legitimately take the responsibility of exchanging for quite definite premium payments a definite promise of benefit should the contingency occur. In its simplest form, insurance merely spreads the cost of the benefits among those who may be considered as liable to receive them. When it becomes a business rather than a mere coöperative enterprise, benefits and premiums are customarily very carefully expressed in terms of dollars and cents. Into the insurance machinery there frequently enters a large element of investment or banking in the development of level premium life reserves. The limitations of private

insurance seem also to require the accumulation of a claim reserve to the extent of the present value of claims pending or in process of payment, and a contingency reserve in recognition of the unevenness of incidence of claims. These reserves are a detail of the limited coverage which constantly contemplates the possibility of closing down the business as to additional insured lives and of being responsible only to the extent of contract terms for those already insured. In level premium life insurance the banking element has become so prominent that there has developed an enormous investment trust under the supervision of state insurance departments. The limitation that the whole machinery must be geared to function in the event of business termination greatly curtails the efficiency of the business organization from the standpoint of social effectiveness. It may indirectly result in too small insurance protection during the youth of the insured lives. It may have resulted in too frequent termination of insurance when premium payment is difficult. It has raised one of the major catastrophes of life to an importance a little out of proportion when the entire series of possible catastrophes is considered. It has, however, a sound accounting base so developed that, when premiums cease, insurance protection is modified equitably.

The value of the life insurance program lies in its crude basing of coverage upon need. The amount of insurance is determined insofar as possible upon a rational basis. In the event of his death, the insured wishes his family to have a certain minimum standard of existence and he aims at that provision. Save for the rather unimportant detail of translating dividends into paid-up insurance additions, he has as much insurance under most contracts after one premium payment as after forty. The banking accumulation method is very largely removed from the determination of death benefits.

Social insurance is the direct recognition by the people as a whole of minimum needs for which funds are to be available when needed. The essence of insurance is to have the cash to pay the bills when the bills are presented. It is not the accumulation of funds against some long-deferred necessity. The bills may be presented, as we have outlined, at persistent intervals to the survivors of the wage earner. They will be presented for the costs of medical care and for a bare living for the whole family whenever

the normal wage or salary income has been terminated by invalidity. They will be presented for the bare costs of living for the aged when the wage earner no longer secures for current services a cash return. In the relatively less important case of temporary accident and sickness they will be presented for costs of medical care and for living expenses during the period of interrupted income. They will in short be presented for the costs of living expenses whenever for any reason an earned income is not being secured.

The lesson of insurance is that when we understand catastrophic losses we determine joint methods of securing funds to meet the losses. We provide them through insurance because the banking technique is inadequate for the purpose. Old age might seem to be an exception, but it probably is not. In many, many cases bills for living costs are being presented to the aged. They lack the funds with which to pay the bills. We do not know how great this lack of funds for meeting living costs is, but some reports have indicated that as many as two-thirds of the aged have been unable to meet their entire expenses. The reason for part of this failure to meet expenses is probably the very strong desire to retain accumulated capital to pass on intact to the succeeding generations. A moderately reasonable guess may be that half of the two-thirds, were they willing to gather together their entire resources, turn these resources into cash, and translate this cash into a life income or even into an income adequate for current needs for a term of years, would then be able to meet their bills. If, however, two-thirds do commonly *seem* to be in need of additional funds, it is clear that the banking method of accumulating resources over long periods of time has not satisfactorily provided for old age. It is in accord with reality, therefore, to admit that a large proportion of the aged incur the catastrophe of inadequate resources in old age, and that the hazard of reaching old age without funds might well be brought into the field of insurance provision.

Insurance has certain other qualities which can be briefly stated as follows:

(1) It does not deal with the individual as such but only with a sort of typical individual. It gives a sum of money considered reasonable for general needs but not exactly meet-

ing a specific need. Relief meets specific need as nearly as possible.

(2) In evaluating average need, insurance customarily understates the amount which the insured life would wish to have, since it seems rational to provide a little less for a contingent outlay than is called for by the actual requirement facing the insured life at the moment. This principal is commonly called "co-insurance," the reduction of the cost of the contingent benefit to a point where it will undoubtedly have to be supplemented in some fashion at the time of the catastrophe. It also contains a certain moral implication that there should still be some financial loss in event of a definite catatstrophe so as to make us careful.

(3) The selection of the people to be covered is determined so far as possible by the effort to secure a normal cross-section of those exposed to the risk. In private insurance this selection is largely negative under the action of underwriting, which eliminates those most apt to suffer the risk. It is positive in the campaign waged to transfer men from the uninsured to the insured catagories. For society as a whole the selection is by formula, even as it has been in group insurance. For society as a whole with the authority of the state and the taxing power of the state, great economy is possible if the coverage is comprehensive and simply determined.

(4) The gambling element also exists in insurance. As against the hoarding for future contingencies—the hope that by going without things one wishes to-day he can secure rights to future benefits—an *insurance* plan by emphasizing the negative quality of present abstinence to provide for an eventual satisfaction, suggests a sort of betting proposition which stakes our money on the chance of winning. When the catastrophe does not strike us, we receive no money in return. If the catastrophe arises, benefits out of all proportion to the specific amount of contribution paid are anticipated. One insurance advertisement used to say, "Forty thousand dollars for forty dollars," the odds of one thousand to one. On the other hand, there is the recognition that we all ought to be good enough sports to take the odds and put up the money against the contingency which might on the one hand give us a return of a thousand to one but which in all probability will give us a return of zero for a while. The gambler knows that in most bets he loses his money. In insurance, the betting does not create sweepstakes in excess of the probable need at the time the prize

is won. When the winning horse brings in the purse to a lucky winner, he may have a complete change in living with a brief moment of prodigal expenditure. When the insurance prize is won, it is usually necessary to reduce the customary standard of living to fit the reduced income. The lack of balance, however, between specific amounts paid and specific amounts received as claims will practically always tip the scales either to the contributions or to the benefits side, whereas in ordinary savings one believes that he will have exactly what he has contributed towards his thrift improved only by definite interest accruals.

(3) The belief in a sufficiently wide statistical base to make the insurance program reasonably subject to quantitative analysis is another important characteristic. Commercial insurance is successful in the life insurance field because mortality rates, save for an occasional epidemic, are reasonably uniform year after year. Similarly, when accident and sickness insurance is successfully written, it has limited coverage to those risks which seem fairly predictable. Fire insurance, dealing with millions of separate exposures to fire and in spite of an occasional conflagration, has built up a sufficient predictability so that it can furnish great protection to housedwellers. They can exchange small premiums for very definite reimbursement in case of loss. Old-age protection can be fitted into this picture with respect to current old age, the extent of which can be reasonably though not exactly measured through the medium of the census. Disability, with its factors of mental and economic import, is much more difficult but after considerable additional study it may turn out to be something like life insurance on a term basis. Inability to secure work, once one has been accustomed to the position of independent income earning, has intricate and, so far, baffling frequency distributions. Since, however, society has assumed the responsibility of relief whenever individual income is lacking, society seems responsible for making the best estimate possible as to the extent of each of the influences leading toward ultimate relief outlay, and a statistical approach to unemployment must be attempted even though there may be no immediate evidence that an adequately competent budgeting can be accomplished.

In all these qualities which we have set down as accompanying insurance, social provision must qualify. When the bills are presented they must be paid, and even as the individual must attempt to budget for his various outlays so far as in him lies or he ceases

to be an honest man, so society must attempt a similar social budgeting, using so far as possible the tool of insurance. Insurance has worked so well for those with the wisdom, the courage, and the ability to use it that inevitably the extension of the basic concept of replacing the contrast between complete freedom from loss and the impact of terrific loss which one cannot meet, by a definite provision for the probable loss, is being applied in a nation-wide fashion to some portions of the above outlined social insurance program. It does not, in its early development, try to replace very much of the existing private use of insurance, since the customary use of insurance is mainly limited to those people with exceptional earning power, exceptional understanding of contingencies, and ability for straight thinking.

Social insurance administration feels that the debator's attitude, or the missionary zeal which desires unsolved problems for a forum or unconverted heathen as a field of activity, are inadequate as a permanent program. Social insurance aims only at a minimum realization of the problems we are facing, but it requires the coöperation of all; the elimination of the completely unsolved problem and of the completely broken individual are goals. The rights that it builds up are rights jointly agreed upon and not rights which can safely vary for individual cases. The limitations of private insurance when applied to deferred annuities commonly meant that those who at advanced ages knew that they needed the benefit of annuities couldn't get them, and that those who had time enough to buy them were unimpressed with the need because it was so far in the future. Social insurance intends to foot the bills on the minimum economical bases of living, and it is not affected to the same extent by those limitations which deny protection to those who need it most.

The emphasis of this discussion is upon the very tangible extent of the bills for need which are going to be presented, the relative simplicity of universal contribution towards the meeting of those bills, and the straightforward intent to deal with the minimum average need as a suitable approach, instead of reintroducing the limitations of the banking philosophy which at their worst are highly negative and at their best require a generation to make them effective. One point of Wordsworth's sonnet may be that undue preoccupation with the minutiae of earning and disproportionate

spending is a nervewracking strain and that any program of getting and spending which loses sight of order, beauty, sincerity is inadequate. We would be enormously aided by the substitution of a simple method of budgeting which helped us to realize that a sizable portion of our gettings must go for these current losses and that they are losses to all of us. We would thus be anxious to earn more for things of definite value; we would be anxious to coöperate for the reduction of these hazards themselves. We would recognize the necessity and even the economy of public-health administration, of constant research leading to the discovery of causes of disease and their elimination, of improved mental sanitation which will substitute an orderly approach to the problem of life for disordered recklessness.

Strangely enough, the preliminary solution seems so simple that seeing these needs we should start to deal with them. The reserve problem may not exist. The reserve is a concept of the limitations of private business. Social insurance is based upon the intent to foot the bill when the bill is rendered. The next step is a fuller realization of the magnitude of the bill. For that step we need definitions of contingencies, simple formulae, and a great deal of unhurried, competent study by those whose knowledge and vision fits them for the task.

The goal of a social budgeting program is probably the coverage of the entire nation. In many older countries social insurance has been class legislation. In the little democracy of Sweden it seems to be a function of citizenship. The size of their benefits seems very small to us, but their analysis of the problem of a nation-wide program presents a comprehensive philosophy. Great Britain is equally cautious in her development of social services and very hesitant to reach final conclusions after nearly three decades of practice. In no other country has the use of life insurance developed so far as in the United States. This popularity of life insurance, with its banking devices, has been most pronounced in shaping the preliminary social insurance measures in the United States. It is one of the major theses of this paper that more help would arise from the more strictly term insurance coverages of group life, automobile insurance, and workmen's compensation than from the banking elements of life insurance. Without a fairly reasonable functioning program promptly in operation, relief costs

grow too rapidly. With an adequate term program in operation, the problems of its administration would seem to preclude adding very much to the burden in behalf of posterity. The goal of social budgeting is to pay completely as one goes rather than to leave behind unsettled bills.

When the federal government gives benefits, Congressional appropriations from general revenues meet the bills. So we must understand taxation and the ultimate incidence thereof. Social insurance must be cognizant of the effective work done by relief and public assistance, but it must also guard against the element of demoralization which is apt to accompany the too ready availability of cash relief benefits. It must recognize the merits lying in that courageous caution which is private investment. It must comprehend the scope of the national resources and the individual claims thereto; it must comprehend the national temper and strengthen those elements of assured self-reliance which tend to a higher standard of living. Social insurance must be built upon mature knowledge of the common hazards of modern life. It is social budgeting on the part of an informed citizenship.

PURE PREMIUMS FOR COMPENSATION INSURANCE

BY

ARTHUR G. SMITH

INTRODUCTION

During the last few years there has been no little agitation for the development of means of adjusting the premium more closely to the hazard of the individual risk. This has resulted in rather extensive study of the structure of the Experience Rating Plan, the adoption of the Retrospective Rating Plan in a number of states and the proposal of the Supplementary Rating Plan. The two latter plans have so far been restricted to risks developing $5,000 annual premium, although there have been suggestions that the Supplementary Rating Plan might be extended to apply to $500 risks. The qualifications for experience rating vary by state but in New York an average of $500 premium per annum is required. Thus a great deal of energy has been and is being spent in finding ways to make the premium small enough on a good risk and high enough to carry a bad one, but this work has been limited to the fair sized risks and concentrated on the large ones.

It may be that the Retrospective and Supplementary Rating Plans will solve the problem on the larger risks. It is doubtful, however, whether any amendment in the structure of the Experience Rating Plan will go much farther than the present plan in producing a premium which is satisfactory both to the assured and to the carrier. Then there is the large class of risks which do not produce $500 annual premium. In New York, excluding per capita risks entirely from consideration, this group comprises over 90% of the risks and includes more than a third of the total premium. These are not affected at all by any of the schemes recently adopted or proposed to produce more satisfactory premium results. Nevertheless in total they are important and the premium paid by each one is important to the assured even though it may not look very large to the carrier.

It is my opinion that a fair share of the difficulty in arriving at adequate and reasonable premiums for individual risks lies in

the manual rates themselves. This is especially true with respect to the non-rated risks and the smaller experience rated risks whose rates seldom depart very much from manual and which cannot possibly receive a substantial reduction. On many occasions I have found it exceedingly difficult to justify to a disgruntled policyholder the rates he is required to pay, when it appears from an analysis that not only the experience of his risk but also the experience of the entire industry in the State has been consistently favorable year after year as compared with the adopted rates. It does not help much to tell an intelligent man that the manual rate and his experience rate are both based on mathematical formulae, when at the same time you have to admit that the good experience developed in the State has been practically ignored in making the manual rate, and that unless the experience in other states improves there is no hope for a relative reduction in rate, no matter how long the state experience remains favorable. Situations of this kind have led to this proposal to amend the generally accepted system of pure premium calculation.

History

When I first became acquainted with rate-making methods in compensation insurance they were rather crude, due partly to lack of sufficient statistical data and partly to the fact that the business was too new to have perfected a scientific approach to the problem, although much work along these lines had already been done. Confining the discussion to pure premium selection, I recall that in those days the total pure premium was divided into three sections, as it is to-day, but that the Indemnity portion was split into Death and Permanent Total and All Other rather than into Serious and Non-Serious. Few classifications had enough exposure to give a reliable indication for the Death and Permanent Total section and it was a frequent practice to combine the experience of two or several classes, sometimes an entire industrial "group," to determine the pure premium for the classes involved. Often there would be little or no real analogy of hazard among these classes but it gave a convenient method of surmounting a difficulty. The same thing was done to a lesser degree with the All Other and Medical sections. In addition, a large element of underwriting judgment

was always applied. Sometimes national indications were chosen and sometimes state, with no very clear basis for the choice. Each of the underwriters on the committee making the selections was probably especially familiar with certain industries. When these classifications came along one of the committee members would discuss at some length the hazards of the particular industry, and if he was able to persuade the other members to his opinion the pure premium would be raised or lowered accordingly. Naturally there was a good deal of horse-trading under these conditions, and a session devoted to pure premium selection might last for days. Thereafter, why a particular pure premium was chosen for a given classification was likely to be something of a mystery in spite of the effort to set down a brief record in the minutes of the meeting.

Improvement came in the shape of the adoption of state formulae. The Death and Permanent Total portion of the pure premium was expanded to include Major Permanent Partial cases, thus increasing the reliability of the experience based on the relatively infrequent, serious accidents. Criteria were established for giving full or partial weight to the state experience for a classification, and the remaining weight was given to the national pure premiums. For a time the national pure premiums were still selected on a somewhat hit or miss basis, but finally a national formula was also adopted. Underwriting judgment still plays a part, but a very minor one. Thus the selection of pure premiums has been reduced to what is very largely a mechanical process and there is comparatively little argument in committees as to what the pure premium for any classification should be.

Present Methods

I do not intend to go into detail concerning the existing system, which is well-known, but will describe briefly how it operates in New York. When the experience on those classifications which receive any state credibility has been prepared by the National Council a representative of the Compensation Insurance Rating Board sits down with a representative of the Council and in a session lasting about a day or a day and a half selects the pure premiums which will be recommended for adoption. In a large majority of cases the pure premiums produced by the formula are

selected but in a few cases some special treatment is recommended. Subsequently, the experience exhibit with these recommendations is placed before the Classification and Rating Committee of the Board which makes the official selections, usually adopting the recommendations but making exceptions in a few instances. An exhibit showing the pure premiums for the remaining classifications which receive no state credibility is also placed before the Committee and generally adopted without discussion. The latter exhibit does not show the experience on any of these classes.

The following table shows the number of classifications which received various average degrees of state credibility as well as the payrolls and premiums included in each group based on latest available payrolls:

Average Credibility %	Classifications		Payroll		Premium	
	No.	%	Amount	%	Amount	%
100	83	13.5	2,354,448,000	73.6	33,072,640	68.4
75-99	114	18.6	518,440,000	16.2	8,976,557	18.6
50-74	46	7.5	76,267,000	2.4	1,793,848	3.7
25-49	89	14.5	120,077,000	3.8	2,199,416	4.5
1-24	83	13.5	72,432,000	2.3	1,322,557	2.7
0	199	32.4	55,941,000	1.7	1,001,190	2.1
Total	614	100.0%	3,197,605,000	100.0%	48,366,208	100.0%

Included in the group with 100% credibility are the four Standard Exception classifications with payroll amounting to $1,169,694,000 and premium of $4,147,220 representing 36.6% and 8.6% respectively of the totals.

From the above it will be seen that the rates for more than 60% of the classifications are based either wholly or chiefly on national experience. While the payroll and premium involved is a relatively small proportion of the total it is substantial and we must not overlook the fact that the individual risks in these classifications are entitled to as much consideration in the establishment of their manual rates as are the risks in those industries which happen to be more largely represented in the state. If the national pure premium is a proper measure of hazard in a particular state, these smaller industries have no cause for complaint. It is my contention, however, that frequently it is not.

Objections to Use of National Experience

The national experience is usually one or two years older than the state experience. Thus in the latest revision the New York experience covered policy years 1930 to 1934 inclusive, while the national pure premiums were based on policy years 1928 to 1932 inclusive. When it comes to experience rating individual risks many people are disturbed because it does not appear to be practical to consider experience later than one year prior to the rating anniversary, and suggestions for using more recent experience have recently been advanced and seriously considered. The Retrospective and Supplementary Rating Plans go still further and use the experience of the policy period itself in determining the premium applicable to that period. Have we not lost sight of the fact that, in the calculation of the premium, manual rates are the controlling element on small risks; play a very large part on many experience rated risks; and have a considerable influence in the case of very large risks even though they may be subject to Retrospective or Supplementary rating? Where the national pure premium is used in whole or in part we are on the one hand quite complacent about using classification experience of 1932 and prior years, while on the other hand we want to use individual risk experience of 1936 or 1937. It is obvious that there must be a lag in the use of classification experience but it should be no greater than is absolutely necessary.

In a country as large as ours conditions of all kinds vary from one section to the next. Industries which may be of importance in the South or on the Pacific Coast may be negligible or nonexistent in the Northeast. Or the type of industry covered by a given classification may be totally different in Missouri from what it is in New York. The probability of this has increased in recent years because of the reduction in number of manual classifications which has had the effect of broadening others to include more varieties of risks than before. Where differences of this nature exist from state to state there is no reason to believe that a conglomerate of experience from all states will represent the hazard of the class in any one of the states. It is difficult, if not impossible, for authorities in one state to know how its industries differ from the similarly named industries in other states. Hence, when national experience is used one must shut his eyes and hope that

the industry involved is homogeneous throughout the country. The fact that this is not always true has been recognized in selecting national pure premiums themselves where in a few obvious cases, like 0006 "Farm Labor," different pure premiums have been adopted for various sections of the country. Similar situations undoubtedly exist in other instances but since no one has definite information on the subject they are neglected.

The degree to which the application of compensation rules and rates is supervised varies greatly. Comparatively strict regulation exists in some; others are entirely unregulated and there are numerous intermediate conditions. In some, all of the larger risks and many of the smaller ones are inspected, classified and rated by a central bureau, while in others there is comparatively little centralized inspection. It seems unsound to permit experience from unsupervised states to influence or perhaps largely determine the rates for certain industries in closely supervised states.

Since the administration of compensation rules and rates in the several states is in the hands of different organizations, it is natural that classifications will not all be interpreted or applied in precisely the same manner throughout the country. A good deal of such varying interpretation is due to industrial differences of the type already referred to. For example, in connection with certain types of wood-working one rating organization may find that saw mill operation is normal and incidental and include it within the class; another may find that it is exceedingly rare and therefore separate it in the few cases where found. When experience from these two jurisdictions is combined the resulting pure premium is obviously too low for the first and too high for the second. Another cause for variation is the facilities which exist for appeals by policyholders from classifications or rates assigned by the Board or Bureau. In New York, for example, employers have a statutory right to be heard on such questions by a standing committee of the Board, with further right of appeal to the Insurance Department. This right to a statutory hearing is rather freely exercised and as a result there has grown up over the years a body of decisions which have an effect somewhat similar to the common law. When such a procedure exists classifications are bound to be interpreted differently than where the question rests on the opinion of a single individual, and there are few, if any,

appeals from his decision; or where there is little or no check on the various interpretations of dozens of underwriters.

In addition to these basic objections to the combination of experience from different states, the mechanical processes involved in the use of national experience introduce others. The experience of all states must be converted to a common level. Various methods of conversion have been used in the past but in the latest revisions three part experience differentials have been used. That is to say, for each state and each policy year there is a separate conversion factor for each of the three pure premium divisions—serious, non-serious and medical. In the 1934 national revision, for the five-year period, these factors range from less than .65 to more than 5.75, and sometimes vary quite sharply from year to year in the same state, not necessarily as a result of law amendments. It is extremely doubtful whether the conversion of experience as different as these factors indicate to a single theoretical level preserves the true relativity among classifications of which the national pure premiums are supposed to be a function. It is quite true that even within a state some conversion is necessary but the possibility of substantial error is much less in such cases because the experience is more homogeneous and the factors correspondingly closer to unity.

Under the state pure premium formulae the amount of credibility given the state experience is based on expected losses developed from the national pure premiums. The volume of expected losses required for full credibility in the July 1, 1937 New York revision, based on 25 serious cases and 300 non-serious cases, was:

Serious	$130,000
Non-Serious	57,900
Medical	46,320

If it be assumed that the national pure premium is a sound base to start from, this procedure is logical, but it produces some rather startling results. For example, in one instance 18 serious cases costing $67,000 have been given 100% credibility, while 38 cases with $145,000 losses and 31 cases costing $186,000 have been given only 50% credibility. Similarly, on the non-serious pure premium 100% credibility has been allowed for 80 cases with $27,000 losses, while only 75% has been given for 379 cases costing $71,000,

and no weight whatever for 180 cases with $19,000 or for 105 cases with $30,000. Are we supposed to believe that a serious pure premium based on $67,000 is a more accurate indication of the hazard than one based on $145,000 or $186,000? Is it not more likely that for one or more of the reasons mentioned above the hazard of the class in New York is widely different from the average countrywide hazard? Where this situation exists and the industry in the state is too small to receive substantial credibility the continual return to the national pure premium as the base, year after year, serves to prevent giving adequate or perhaps any appreciable recognition to local conditions in the industry. This has come to my attention on several occasions, especially where, although the industry was comparatively small, there were one or two large risks in it and as a result of our rate-making procedure the rates developed for those risks were always out of line with their demonstrated experience. Cases like this have undoubtedly emphasized the need for special rating plans which now seems to be recognized by all types of carriers.

Another flaw in the system is that on account of varying degrees of credibility being given, the formula pure premiums on closely associated classifications are in reverse relativity. For example, the national pure premium for 3824 "Automobile Body Mfg.-N.O.C." is slightly higher than that for 3823 "Automobile Body Mfg.-pressed steel." The New York indicated pure premiums are about the same for both classifications and considerably higher than the national. However, due to the fact that 3824 receives considerable state credibility while 3823 receives none, the formula pure premium for the former is 4.21 while that for the latter, which apparently should be slightly higher, is only 3.22.

Proposed Method

In the foregoing I have sketched the practical objections to the present method of pure premium determination. The remedy proposed to cure or at least abate many of these shortcomings is very simple and by no means radical. Perhaps it might not be suitable for the smaller industrial states but I believe it would work out very well in the more important ones.

First. Only experience from within the individual state being

considered should be used. This experience should be converted to current levels in the same manner as at present but an exhibit should be prepared for every classification instead of only for the restricted number which receive state credibility under the present formula.

Second. The current state pure premiums, placed on the same level as the experience, should be used as a basis of comparison in the application of a formula similar to that now used for the national revisions but substituting the present state criteria for full credibility and making corresponding changes in the volume of expected losses required for each degree of credibility.

Third. The experience of each individual classification should be prepared separately and the indicated and formula pure premiums for that classification calculated accordingly. The experience of two or more classifications should not be combined nor should one be rated by analogy to another except in the case of newly established classifications or instances where there is very evident necessity for such action. No such combination or rating by analogy should be continued in the next following rate revision unless the same reason still exists and is just as compelling as before.

The arguments in favor of the first item in this program are the converse of the objections to the use of national experience and do not need extended discussion. They may, however, be briefly recapitulated. The experience basis will be more up-to-date and will represent the latest available policy years, thus recognizing as far as practicable, without introducing new factors such as giving more weight to the later years of the experience, recent trends in industry in the state. Local conditions including peculiarities of various industries as they exist in the state will be more adequately reflected. The experience will be more trustworthy, being developed under the same type of supervision under which the rates will be applied. The conversion of experience will be reduced to a minimum.

The need for the second item is obvious if only state experience is to be used and matters are not to be left entirely or largely to judgment. A formula of the type proposed will maintain a reasonable degree of stability even though based on a smaller volume

than the national formula. This smaller volume is justified because the experience to which it will be applied is far more homogeneous and more reliable in every respect except sheer quantity than national experience. For this reason I believe that the pure premium relativity among similar classifications is more likely to be reasonable than under the present method.

The third item is based on the proposition that if there is any reason which justifies maintaining two separate classifications for somewhat related industries, that reason must be the assumption that their hazards are different. If this is true then each one should be allowed to determine its own rate. If, on the other hand, the industries cannot be distinguished from each other, as underwriters sometimes say is the case, or if there is sufficient reason to believe that the hazards are the same even though the experience indicates the reverse, the classifications themselves should be combined. Of course, there are times when it is desirable to observe the trend of experience among a group of such classifications for an experimental period and there is no objection to combination of experience for such a purpose for a limited time.

The proposed method imposes a somewhat greater burden on the staff of the rate-making organizations because the experience of every classification must be prepared, and upon the committee which selects the pure premiums because every classification must be reviewed. However, I am firmly of the belief that this additional work will be more than compensated by the result, which should be a more accurate and defensible set of pure premiums.

THE DISTRIBUTION OF CASUALTY ADMINISTRATION EXPENSE BY LINE OF INSURANCE

BY

THOMAS F. TARBELL AND HARRY V. WAITE

In his commendable paper, "The Theory of The Distribution of Expenses of Casualty Insurance" (P.C.A.S., Vol. XVII, page 22) Mr. F. S. Perryman in referring to general administration expenses stated, "It is of course precisely this group (administration expenses including audit) on which, up to the present, least work has been done with regard to equitable distribution." While considerable may have been accomplished in the matter of distribution of general administration expense since that time (1930), the results are not to our knowledge contained in any generally accessible record. It is the modest hope of the writers of this paper that they may contribute some ideas on the practical aspects of distribution of this general classification of expense. We believe from an analysis of the combined New York Casualty Experience Exhibits that too little importance has been attached to the problem of equitable distribution by line of insurance for this classification, and that there has been a general feeling that administration expense is more or less directly a function of premiums and, consequently, refined methods of distribution are unnecessary or not worth the effort or expense involved. A cursory study of the Annual Statement or the New York Casualty Experience Exhibit will readily show that this classification accounts for the greatest proportion of expense not directly allocatable. It usually exceeds acquisition (other than commissions) and claim expense (other than allocated claim expense).

While it is our purpose to deal primarily with the practical aspects of the distribution of general administration (excluding payroll audit*) expense to line of insurance, any practical system of distribution must be based upon sound theory and it will be necessary to thoroughly consider the theoretical aspects. Mr. Perryman has so well covered the theory of expense distribution that little of importance can be added. Most of what we shall

* The 1937 Convention Annual Statement Blank makes specific provision for payroll audit expense, Item 36, Page 3.

include on this aspect of the subject is taken from his paper and we freely acknowledge our indebtedness to him.

Expenses are classified both by nature (kind) and purpose. Under nature we have such items as: salary, rent, travel, furniture and fixtures, printing and stationery, etc. Under purpose we have such divisions as: acquisition, claim, inspection, payroll audit, and the rather inclusive purpose with which we are specifically dealing—general administration. Since this last item is rather general and inclusive, it is desirable to provide for its subdivision into its functional or departmental elements. Among those departments which may be termed major operating departments are:

Underwriting	Accounting (General and Premium)
Agency (Home Office)	Actuarial and Statistical

There are also such internal service departments as personnel, building supervision and maintenance, purchasing and supply, executive, legal (excluding claim), etc. In addition, we have certain expenses which cannot be classified as functional or departmental, but are more or less general or miscellaneous, but which are a part of general administration. These consist of certain portions of such expense as advertising, printing and stationery, furniture and fixtures, postage, telegraph, telephone and insurance.

Even further subdivisions of departments might be made if desired, but in general all departments can be roughly classified as major operating or internal service and for practical purposes of expense distribution no further subdivisions are necessary.

An effective distribution of expense to line depends primarily upon the recording of basic and essential accounting data in sufficient detail to enable the ready application of methods and formulae to such data. The equitable distribution of such expense depends upon the reasonableness and soundness of the methods and formulae adopted.

It is a fundamental of expense distribution that all items of expense which can be charged to a specific line (or combinations of lines) should be so charged and that only the residue of items should be subject to formula distribution.

The ideal accounting set-up to facilitate the recording of basic data for distribution of expense by line consists of maintaining subsidiary ledger accounts (generally termed sub-ledger accounts)

by department, by kind of expense, divided so far as practicable between allocated (assigned to a specific line) or unallocated. In setting up such a system, reasonableness should govern as between the theoretical and practical. Further, the cost of operating the system is of prime importance.

A large part of the expense for printing policies and other forms can be directly allocated to specific lines and where this is possible it seems worth while to do so. It does not, however, seem advisable to attempt to allocate any part of traveling expense, advertising, postage, telephone and telegraph directly to specific lines, although it is theoretically possible to do so. The individual items are small and, consequently, direct allocation is expensive. Further, the proportion of total expense represented by such items is so small that the additional refinement would have no appreciable effect upon the over-all results.

No more definite rules for the setting up of the basic machinery for distribution of expense by line are offered. The problem is more or less one for the individual company and depends upon the general internal operation of the company, and the extent and scope of departmentalization. In the case of our companies all sub-ledger account work is handled by about six clerks, which, considering the volume of expense involved, appears to be a reasonable cost.

Assuming an accounting set-up similar to that which has been indicated and which may be further assumed to meet the test of economy and efficiency, the problem then becomes one of the application of such methods and formulae as will produce an equitable distribution of the unallocated expense to line.

To avoid possible confusion in the following discussion of methods and formulae for expense distribution, it should be pointed out that unless otherwise qualified the term "expense" as hereafter used means that portion of expense which is not allocated directly to specific lines in the sub-ledger accounts.

As a rule each department will present a more or less distinct problem depending upon the size of the department, the extent of its functions and the kind or type of operations performed. In general some portion of the unallocated expense can be assigned to a single line. The proportion varies by department. In some departments such proportion is small. In others the entire expense

or a substantial amount may be directly assigned. In a large company underwriting may be divided into several departments or divisions, such as Compensation and Liability, Fidelity and Surety, Automobile, Burglary, Plate Glass, etc. The single line, Burglary, Plate Glass, etc. expenses are assignable directly to line. Where more than one line is involved, partial direct assignment is possible and the problem narrows down to one of distribution between two or more lines, such as Compensation and Liability (personal injury and property damage), Accident and Health, Fidelity and Surety and the various Automobile coverages or lines.

Our distribution of a particular department's unallocated expense is accomplished by one or a combination of the following methods:

1. Direct assignment to a single line
2. Direct assignment to two or more lines
3. Time study methods and judgment assignment
4. Formulae
   (a) Number of items (policies, premium items, checks or drafts, punch cards, etc.)
   (b) Amount of premiums (written or paid)
   (c) Amount of paid losses

Since as a general rule salary cost is the predominant element of department expense and most other items such as traveling expense, rents, etc. are closely correlated to salary, we believe that unallocated department expense other than salary should be distributed to line in the same proportions as salary and have consistently followed this theory. In other words, salary is our basic element of department expense and the methods and formulae stated are applied to the distribution of salary. In some instances salaries are distributed on the basis of individuals, in others in groups or in toto.

At this point it may be appropriate to state that it is our belief after considerable experimentation and test that the allocation of rent according to salary produces reasonably accurate charges. We believe, however, that other bases, such as the average cost of space occupied or number of employees, will also produce reasonable and satisfactory results.

In the following portion of this paper we present methods and formulae followed as respects some major operating and internal service departments common to most casualty companies. The

departments used for illustrative purposes are: Casualty Actuarial, Casualty Premium Accounting, Compensation and Liability Underwriting, and Tabulating. These will be considered in order.

The departments have been selected mainly with the purpose in mind of illustrating the application of the direct assignment and time study methods and the use of the number of items formulae heretofore mentioned, although all methods and formulae are involved.

It should be pointed out that our "year" for purposes of expense distribution is a fiscal year ending October 31. This is necessary in our organization, since the distribution of expense in many departments involves from two to five companies. The distribution factors or percentages are determined as of the year ending October 31 and applied to the expenses for the calendar year ending December 31.

Casualty Actuarial Department

This department performs a variety of functions ranging from simple statistical compilations to maintenance of loss reserve records and general actuarial work. A careful analysis of expense is made yearly under the direction of the Statistician. The methods followed are those heretofore mentioned—direct assignment to a single line, direct assignment to two or more lines, assignment to two or more lines based upon judgment, and the application of various formulae to divide to line expense not partially assigned by one of the immediately foregoing processes, or to divide expense assigned to one or more lines to the various individual lines.

The department is a comparatively large one, consisting of approximately 240 employees. The department is divided roughly into five divisions and two of the larger divisions are divided into several units. This division and unit set-up obviously assists in the handling of distribution of expenses by line. For example, one division consisting of approximately 50 clerks deals almost exclusively with Compensation classification experience and consequently nearly 100% of the salary cost of the unit is assigned to the Compensation line.

In the process of distribution of expenses to line each individual salary is considered separately and either assigned directly to a line or group of lines, individually split to line on a judgment basis

or, where subject to formula, grouped with the salaries of other clerks whose work is similar and subject to the application of a particular formula.

Each division and unit presents its peculiar problems and for this reason the functions or work of each division will be described briefly and the basis of distribution given, with such explanations and comments as appear necessary. There are also included percentages of total cost distributed according to the various methods and formulae to indicate the relative importance of each.

Division A—Actuarial—general actuarial and secretarial. Actuarial work devoted mostly to the Compensation, Automobile Liability and Other Liability lines.

Bases of distribution:

(1) Direct assignment to specific lines, 14.6% of total salary cost

(2) Assignment to two or three lines on basis of judgment, 67.5% of total salary cost

(3) Written Premiums, 17.9% of total salary cost
(This last group represents mainly secretarial and stenographic services and special annual statement statistics)

Division B—Compensation experience exposure old Plan Schedule "Z"; Liability and Property Damage other than Auto experience, exposure and losses.

Bases of distribution:

(1) Direct assignment to specific lines, 7.9% of total salary cost

(2) Direct assignment to two specific lines (Other Liability and Property Damage), 71.7% of total salary cost

(3) Assignment to three lines on basis of judgment, 20.4% of total salary cost

(4) (a) Written premiums (That part of (2) and (3) assigned to Liability and Property Damage exposure)
(b) Paid losses (The salaries of 3 clerks included in (2) above engaged exclusively on the loss feature of Liability and Property Damage experience)

Division C—Compensation experience; new form Schedule "Z", exposure and losses; old form Schedule "Z", losses and reports.

Bases of distribution:

(1) Direct assignment to the Compensation line, 89.5% of total salary cost

(2) Assignment to three lines of business on basis of judgment, 10.5% of total salary cost. (Consists mostly of salary of two clerks who assign classification codes to losses. On basis of estimate 90% of salary is assigned to Compensation and 10% to Other Liability and Property Damage)

(3) Paid Losses (The Liability and Property Damage included in (2) above)

Division D—Statistical. Annual statement, branch, state and various calendar and policy year premium and loss statistics; suit record; loss reserve records; punching of paid loss and incurred loss cards, including compilation of annual and monthly statement loss reserves.

The division is divided into a number of separate units, ranging in size from 5 to 19 clerks.

Basis of distribution:

There is no direct assignment to a specific line, and except for assignment of an inconsequential amount to two or three lines on a modified judgment basis, the entire salary cost is assigned to line on a formula basis. The formulae are many and varied, depending upon the nature of the work performed. Examples of the formulae used for the more important operations are:

Statistics. Formula based upon the proportions of time spent on particular records. The records maintained are mostly single line records and the clerks generally work upon certain records. Consequently, it is comparatively simple to obtain a record of the approximate number of days worked each month on a particular record by the individual clerk and to distribute the salary accordingly.

In case of one extensive record involving all lines and requiring full time services of two clerks, the allocation is made on the basis of the actual number of entries by line.

Suit Record—number of suits by line.

Loss Reserves—number of items handled by line (in some instances this will be claim files, in others number of claim drafts and in still others a combination of the two, according to the kind of operation performed by the particular individual clerk).

Punching paid and incurred losses—number of cards punched by line (The formula for each individual clerk takes into consideration the number of lines worked on).

Compilation of loss reserves, Supervision and Miscellaneous—Salaries are distributed to line on the basis of the distribution of the salaries of all specific units combined.

It will be noted that no part of the expense of this division is distributed on a premium basis.

Division E—Miscellaneous experience. Exposure and loss experience, Automobile (all coverages, including Fire, Theft and Comprehensive), Burglary, Plate Glass, Boiler and Machinery. This division is also divided into units representing the various lines of business involved. In addition the Automobile unit is further divided to sub-units, such as coding, punching, changes and compiling final experience.

Bases of Distribution:

(1) Direct assignment to specific lines (Burglary and Plate Glass), 10.3% of total salary cost

(2) Direct assignment to two or more lines (Automobile Liability, Property Damage and Collision and Glass), 6.0% of total salary cost

(3) Direct assignment to all Automobile lines (including Fire, Theft and Comprehensive), 48.7% of total salary cost

(4) Assignment to two lines on basis of judgment, 13.9% of total salary cost

(5) Assignment to three lines on basis of judgment, 8.0% of total salary cost

(6) Number of risks. All of (2) above and a part of (4) above

(7) Special formula. All of (3) above
A special formula is considered desirable for dividing the automobile expense to line, since the problem involves two separate but more or less related elements; first, allocation of expense by company, because of the fire company coverages and secondly, the division to line within each company. The allocation between companies is based upon the number of risks involving the major policy coverages, bodily injury liability for casualty and fire (including comprehensive) for the fire company. The division by line within each company is based upon the number of risks (coverages) written in each company. Supervision and certain general salaries amount to 13.1% of total salary cost and this portion is distributed to line on the basis of the distribution of the salaries of all specific units combined.

The following exhibit shows the percentage distributions of salaries by division and for all divisions combined, on the basis

of direct assignment, judgment assignment and other methods and formulae:

Division	Direct Assignment to			Judgment Assignment to		Otherwise Assigned	Total
	A Single Line	Two Lines	More than Two Lines	Two Lines	More than Two Lines		
A	14.6	..	..	20.7	46.8	17.9	100.0
B	7.9	71.7	..	..	20.4	..	100.0
C	89.5	..	..	..	10.5	..	100.0
D	..	..	..	..	..	100.0	100.0
E	10.3	6.0	48.7*	13.9	8.0	13.1	100.0
All	24.0	10.7	15.2	6.6	12.3	31.2	100.0

* Automobile (All Lines)

It will be noted that 24.0% of total salary cost is assigned directly to a single line of business and that 76.0% is subject to some kind of formula. Of the 31.2% not subject to direct assignment or judgment assignment, 8.6% represents supervisory and general salaries distributed in proportion to salaries of each individual unit excluding such salaries.

Casualty Accounting Department

The main function of this department is the recording and collection of premium items for all casualty lines, including all automobile coverages but excluding Accident and Health. The department also punches the cards from which are compiled all annual statement, state and agency, unearned premium reserve and all other written premium records other than classified experience records. The department also maintains a record of written, paid and outstanding premiums by branch office and direct reporting agency. This record is kept on bookkeeping machines.

The department is a large one, consisting of approximately 200 employees, and is divided into a number of divisions and units, each performing more or less distinct functions. There is no direct assignment of salaries to specific individual lines of business and various formulae are employed. The following are the more important divisions and units and the formulae used for distribution of salary to line:

Sorting and filing of new and renewal collection cards—
Number of risks written by line

Punch operators—
Number of cards punched by line

Recording and collection detail (entering endorsements, not takens, cancelations, payroll audits on collection cards subsequent to issue and posting paid premiums)—
A composite table of percentages based upon the number of gross risks written, the number of net risks (less not takens) written and the number of paid premium items by line

Collections (general collection matters, handling correspondence, etc., with branch offices and general agencies on collection problems and procedure)—
Amount of outstanding premiums by line

Audit of commissions—
Number of paid premium items by line

Premium in course of collection control—
A composite table of percentages, the averages of number of written and paid premium items by line

Supervision and general—
Follows distribution of salaries of all specific units combined.

Casualty Underwriting Department

This department is divided into two major divisions, (1) Underwriting, and (2) Policy Writing, and separate methods of expense distribution are followed for each division.

The underwriting division performs the usual underwriting functions including the maintenance of individual risk experience for the Compensation and Other Liability (including Property Damage) lines. Expense distribution is based upon the results of a time study. In this time study each clerk, regardless of type of work, kept a daily record of the amount of time spent on the respective lines involved for a considerable period of time. The aggregate number of hours thus assigned to each line provides the basis for a percentage distribution of salary to the respective lines. The percentages for the respective lines are adjustable to reflect the change in distribution between lines on the basis of the number of policies issued and the amount of premiums written

for each line during the year in which the time study was made and the particular year for which the distribution is being applied. The distribution to Liability and Property Damage is made on the basis of written premiums.

The policy writing division prepares all renewal policies, certificates, endorsements and such new policies (including endorsements) as are written at the Home Office for all casualty (excluding Accident and Health), and Automobile Fire, Theft and Comprehensive lines. In all cases a master application is typed, from which the policy or certificate is prepared by the "ditto" process. For some lines, mainly Automobile, this master application is used for the preparation by the same process of all departmental service cards. For Compensation, Other Liability and certain other lines, an additional master card is prepared from which the various departmental service cards are drawn off by the "ditto" process. The work of the division consists of typing, checking, pasting of endorsements, numbering, filing, etc.; also, the operation of a policy index file. The distribution of salary expense of this division is also based upon a time study. A time record for all operations involved was made involving from 150 to 300 policies, certificates and master cards in each of the following general classifications: Compensation, Other Liability, Automobile and All Other (Burglary, Plate Glass, Boiler and Machinery) casualty lines. From this time study, the average time required per item in connection with policies, certificates and endorsements and master cards was computed for each of the general classifications. A yearly record is maintained of the number of such items by kind for each classification. The number of items of each kind multiplied by the time required per item produces the total time costs for each classification and from these the percentage distributions for application to total salary cost are computed. This method, of course, gives weight not only to the number of items, but to the variation in time required to handle a particular kind of item under a particular classification.

The distributions to line within the general classifications involving more than one line are made on the following bases:

Other Liability and Property Damage—Gross written premiums
Automobile Casualty—Gross written premiums
Other Casualty Lines—Number of gross written policies

Tabulating Department

This is a central department where all sorting and tabulating work is handled for all companies and departments. In addition, the department punches a considerable volume of cards.

The work of the department is divided into the following groups or divisions:

Sorting
Tabulating
Punching
Comptometer
Supervision and Service

Basis of Distribution:

A productive time record is kept of all sorting, tabulating and punching "jobs." This record is kept upon punch cards. The record carries the amount of time required for the job, the number of cards included and the line or lines of business involved. These productive time cards are filed away and tabulated at the end of the year by type of job. Job time involving a single line is assigned directly to that line, that involving more than one line is divided to lines on the basis of the number of cards involved in the job. From the total productive time distributed to line percentages are determined to be applied to the department expense to obtain the division by line. This method in effect gives weight not only to the number of cards punched, sorted and tabulated, but to the relative time required to punch the cards and the number of times the cards go through the sorting and tabulating machines.

While the illustrations used in this paper do not cover the entire expense which comes under the heading of casualty general administration, we believe that sufficient examples of methods and formulae have been included to give an idea of the practical application of the theory of distribution of such expense as followed in the companies with which we are associated and that further illustrations would involve little more than repetitions or variations on a general theme.

The paper has been submitted with the thought in mind that it may be of some advantage to place before this Society the results of our companies' efforts along the line of practical methods of equitably distributing administration expense to line of insurance. We made no claim that our methods and formulae have attained

perfection and scarcely expect that they will meet the unqualified approval of those in the Society involved or interested in this general subject. We appreciate that some of our formulae may be further refined and anticipating criticisms on this score we wish to say in advance that as respects most of the formulae in this category we have set up two criteria before adopting a simple rather than a complex formula; (1) Are the differences in the results produced by the two formulae material? (2) Is the additional expense incidental to the use of the more complex formula justified? If in our judgment the answers are in the negative, the simpler formula has been adopted.

A word concerning the results of our methods. Our policy has been to endeavor to find for each material group of salary expense a practical method or formula based upon sound theory, which will produce an equitable distribution by line of business. We have avoided so far as possible the use of premium ratio unless in our judgment such a basis provides an equitable distribution. We believe it is obvious from such examples as we have given that a large part of the expense of many of the larger departments should not be distributed on a premium basis. Accordingly, if our methods and formulae are reasonable, the test of the value and advantages of more refined methods is furnished by the results produced. A comparison of the percentage distributions of our total casualty administration expenses by the methods followed and those which would have been obtained by dividing expenses on the basis of written premiums is as follows:

Line of Business	Actual Distribution	Written Premium Distribution	Difference (2) — (3)	Per cent Variation (4) ÷ (2)
(1)	(2)	(3)	(4)	(5)
Compensation	30.27	36.04	— 5.77	19.06
Auto Liability	25.41	31.60	— 6.19	24.36
Other Liability	16.33	14.51	+ 1.82	11.15
Auto Property Damage	11.55	8.58	+ 2.97	25.71
Auto Collision	1.29	.96	+ .33	25.58
Other Property Damage	1.05	.78	+ .27	25.71
Boiler	3.22	1.59	+ 1.63	50.62
Machinery	.48	.38	+ .10	20.83
Burglary	7.77	4.28	+ 3.49	44.92
Glass	2.63	1.28	+ 1.35	51.33
	100.00	100.00		

It will be noted that there are rather wide variations percentage-wise between the proportions of expenses assigned to the various lines by the two methods of distribution. The closest agreement occurs for the Other Liability line. The variations are so substantial that there would appear to be very little question regarding the desirability of adopting methods of expense distribution along the lines indicated in this paper.

We do not wish to give the impression that we hold distribution of expense to line by premium formula in low esteem in all cases. Where no other logical method or formula appears to adequately and equitably solve the problem, we resort to a premium formula, since such a formula is at least consistent with the construction of the premium rate. We use at present a premium formula for distributing Automobile Underwriting Department salaries to coverage. We have tried various other methods and formulae in the past, but none have given what we consider consistent and reasonable results. We recognize the arguments against the use of the premium formula for distributing automobile underwriting expense, particularly as respects division of expense between personal injury and property damage. The main argument is that the cost of the various elements involved in the underwriting of a combined policy is only very slightly greater than would be the cost for issuing a policy for personal injury liability. The argument is good so far as it goes. However, there may be certain operations in an underwriting department, such as the computation of endorsement and cancelation premiums, where the relative costs by coverage may be rather close together. In some operations the cost of handling the property damage element may be greater than that for the personal injury element. If individual risk experience is maintained in the Underwriting Department, it will cost more in the aggregate to post the property damage losses because of the higher accident frequency for the property damage coverage. Measured in terms of premium the property damage frequency is several times that for personal injury. Considering the composite picture and appreciating the fact that the personal injury premium is on the average about four times the property damage premium, it is our opinion that the distribution of Automobile Underwriting Department expense to line on a premium basis gives defensible and probably reasonably accurate results.

We appreciate, of course, that expense allocation to line is not and never will become an exact science. We believe, however, that it can be developed to a point which will insure substantial equity as between lines of insurance. It is our hope that the paper will promote interesting and valuable discussion and encourage further efforts, particularly along the lines of such more advanced features of expense distribution as expense by size of risk and by state.

EXPERIENCE RATING PLAN CREDIBILITIES

BY

FRANCIS S. PERRYMAN

For some time past certain criticisms have been made of the Compensation Experience Rating Plan. These have touched on various aspects of the Plan; some of them have been directed to the way in which the Plan works in particular instances. Other criticisms of the Plan have been in respect of some of the more debatable questions such as the period of experience to be used and the swing of the plan. This is the old question of Stability *vs.* Responsiveness and some of the critics have shown a surprising tendency to ignore the essential conflict between these two qualities. With these criticisms, those responsible for setting up and administering the Plan can doubtless deal. It is not in any way my intention to do more than mention them here as leading up to the subject of this paper. The Experience Rating Plan has recently been the subject of intensive studies by the responsible committees with the objects of seeing what there is of merit in the criticisms and of endeavoring to revise the Plan to make it better adapted to present-day conditions. The lessons gained from the, on the whole, successful working of the Plan over a large number of years are, of course, the principal guides in such studies.

One of the ideas being thus investigated is to see whether the Plan could not be simplified, particularly in the actual day-to-day process of rating, which is largely done by clerical help not particularly well trained in actuarial science, and scrutinized by agents, brokers, field men and assureds who, again, are not generally experts in casualty rate-making. One specific suggestion is that considerable simplicity would be obtained if, in respect of the small and medium-sized risks which are a great majority of the total number of rated risks, the large or excess loss experience were not rated. This idea has a lot of merit and the main purpose of this paper is to help it along by working out, systematically, the way in which the credibilities should be handled under such a plan. In effect under it the excess credibility will be zero unless the size of the risk is large, and considerable research and testing

has to be done to be sure that such a plan will give consistent results and that the excess experience can be worked in satisfactorily for large risks.

In order to present a logical account of this investigation it is necessary first to give a fairly full account of the treatment of credibility under the present form of the Plan and this is done in the first two parts of the paper. The remaining parts are devoted, first, (since it seemed desirable to discuss some definite plan) to a brief description of a concrete plan, the multi-split plan,* which gives no excess credibility except for large risks. The balance of the paper is given up to a full discussion, with examples, of the determination of credibilities under this Plan.

While the paper discusses a particular Compensation Experience Rating Plan, I have tried to treat the question in such a way as to bring out the principles that should be used with the thought that these principles will be applicable to any similar experience rating plan, whether for Compensation or for any other kind of insurance, for which experience rating is suitable.

PART I

CREDIBILITIES IN NO SPLIT PLANS

1. *Analysis of Modification for Simplest Case—No Split Plan.*

First of all we will deal with the case of an experience rating plan with no splits, that is, where all losses (loss costs) are used with equal weight. In this case the ordinary formula for the modification (that is, the multiplier to be applied to manual rates) is

$$\frac{Z\,A + (1 - Z)\,E}{E} \qquad (1)$$

where A denotes the actual losses
E denotes the expected losses
and Z is the credibility assigned to the risk.

In this paper I will not deal with questions of loss or payroll modification factors, or the number of years experience used, and

*I want to make it clear that no implication is intended that I was the originator of the multi-split plan. I wish I had been.

will assume that these are all incorporated in the "actual" and "expected" losses.

This modification can be put in the form (which I shall often have occasion to use later)

$$1 - Z + Z\frac{A}{E} \tag{2}$$

Note that this expression is in three parts:—

(i) unity, corresponding to no change from manual rates, as, for instance, if $Z = 0$

(ii) $-Z$, being the credit for clear experience, that is, if $A = 0$

and (iii) $+Z\frac{A}{E}$ being the charge for the actual losses of A.

2. *K Formula for the Credibility.*

The values to be given to Z in this modification are usually determined from the formula

$$Z = \frac{E}{E + K} \tag{3}$$

where K is a constant, i.e., does not vary with E.

Substituting this in (1) we get

$$\frac{A + K}{E + K} \tag{4}$$

In practice we can obtain the modifications either from (1) or from (4). If we use (1) we must have a reference table of Z from which to get the value to be substituted in (1). If we use (4) we need only to know the value of K. It is therefore somewhat easier to use (4) in this simple case but, as we shall see, when we come to use a split plan with provision for self rating for large risks, it is then easier to use a formula analogous to (1).

The value of K is determined from consideration of the "swing" it is desired to give the plan. K is usually fixed so as to give for a certain sized risk a definite credit (e.g., 10%) for clear experience or a definite charge (say 25%) for a single maximum loss.

The expression (3) gives for Z a value between 0 and 1, continually increasing as E increases but never quite reaching unity. In

fact if Z is plotted as a function of E, Z moves along a branch of a hyperbola which has $Z = 1$ as an asymptote. (See Fig. I).

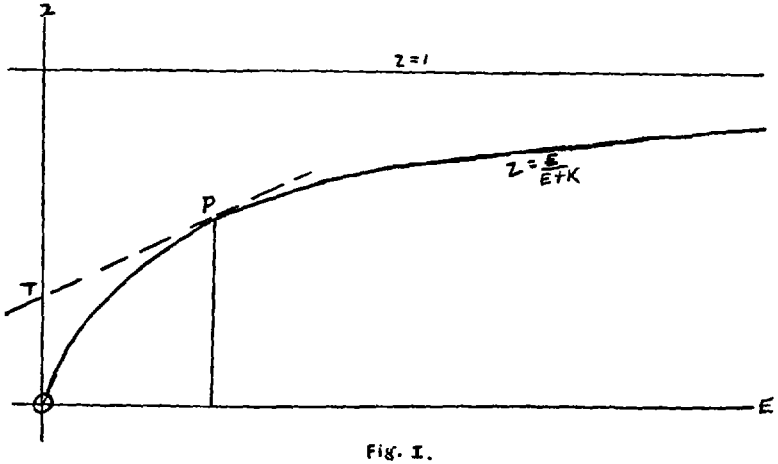

Fig. I.

3. *Conditions to which Z must be Subject.*

At this point it is advantageous to set down some conditions that the credibility Z should satisfy. These are general conditions derived from *a priori* considerations, and are applicable to the more complicated rating formulas we shall consider later.

(i) The credibility should be not less than zero and not greater than unity.

(ii) The credibility should increase (or more strictly speaking not decrease) as the size of the risk increases.

(iii) As the size of the risk increases the percentage charge for any loss of given size should decrease.

(i) and (ii) are obvious requirements; (iii) is perhaps not quite as evident at first, but a little thought will show it is desirable that, given two risks with differing expected losses, then if both have a single actual loss of the same amount the addition to the modification on account of the single loss should be less for the larger risk.

For instance, if we have two risks, the first with expected losses

of 1,000 and the second with expected losses of 10,000: if each have a loss of 5,000, then on account of this loss

(a) by (i) above the addition to the premium in each case is positive and not greater than the equivalent of the 5,000 loss (that is if the expected loss ratio is 60%, the addition is not more than 8,333);

(b) by (ii) the addition is greater for the second risk than for the first; and

(c) by (iii) the addition is a *smaller* percentage of the (manual) premium for the second risk than for the first.

If we consider large self rated risks the reasons for (iii) becomes perhaps clearer: For these risks the addition to the premium is the same for a given loss of say 5,000, whatever the size of risk (for example the addition is 8,333 if the expected loss ratio is 60%) but the percentage addition gets smaller as the risk gets bigger.

The conditions mentioned can be expressed mathematically as

$$\left.\begin{array}{l}\text{(i)}\ \ 0 \leq Z \leq 1 \\ \text{(ii)}\ \ Z' \text{ is not negative} \\ \text{(iii)}\ \ (Z/E)' \text{ is negative}\end{array}\right\} \qquad (5)$$

where to economize space and to facilitate printing we have employed the common notation of Z' for $\frac{dZ}{dE}$: similarly we write W' for $\frac{dW}{dE}$, M' for $\frac{dM}{dE}$ and so on where W, M, etc. are functions of E. All differentiations are to be understood to be with respect to E. We have also written above Z/E for the constantly occurring expression $\frac{Z}{E}$ and we shall often employ this notation. $(Z/E)'$ means of course $\frac{d}{dE}\frac{Z}{E}$. We shall also often say "Z increases" or "Z/E decreases" meaning "Z increases as E increases" or "Z/E decreases as E increases" as will be clear from the context.

It is easily seen that Z as determined by (3) fulfills these conditions: for as E is positive (and K also) Z is > 0 and < 1: also $Z' = K/(E+K)^2$ and is positive, while $(Z/E)' = -1/(E+K)^2$ which is negative.

A useful geometrical interpretation of the conditions is as follows:

Plotting Z as a function of E (as in Fig. I which shows the curve $Z = E/(E+K)$)

(i) means the curve must be bounded by the E axis $Z = 0$ and by the straight line $Z = 1$ parallel to it;

(ii) means that as E increases the curve must always rise from $Z = 0$ towards $Z = 1$ or at most be parallel to the E axis or in other words the tangent at P must slope upwards from left to right or at most be parallel to the E axis;

(iii) means that the tangent must pass above the origin O and cut the Z axis above O; for the tangent at P cuts the Z axis at T where $OT = Z - EZ'$, (where E, Z are the co-ordinates of P), and the condition $(Z/E)' = (EZ' - Z)/E^2$ is negative means that $Z - EZ'$ is positive.

4. *Self Rating.*

In paragraph 2 we have seen that formula (3) for Z gives values that continually approach unity as E increases but never reach that value.

For practical reasons it is often desirable that for risks over a certain size the credibility Z be exactly unity. This certain size is called the self rating point and risks with credibilities equal to unity are called self-rated risks. We will denote the value of E at the self rating point by S. So for $E \geq S$, Z must be unity.

The question now arises as to the proper way to modify formula (3) so as to reach unity at S. Originally all that was done was to draw a straight line from some arbitrary point $(Q_1, Q_1/(Q_1+K))$ to the self rating point $(S, 1)$ (see Fig. II) and use for Z between Q_1 and S the values given by this line. This however gives discontinuity to the values of Z at Q_1 and at S. So instead of using an arbitrary point Q_1, a tangent was drawn from the point $(S, 1)$ touching the curve $Z = E/(E+K)$ at $E = Q_2$. This is the present practice and does away with the discontinuity at Q_2 but leaves that at S. It would have been better, while making the change to have drawn a curve (e.g., a second degree parabola) touching the line $Z = 1$ at $E = S$ and also touching the curve $Z = E/(E+K)$ at $E = Q$. (See Fig. II).

(*Note*: We shall use Q generally to denote the value of E at the point of departure from the original credibility curve.)

Let us work out the equations of the tangent $s\,q_2$ and the touching parabola $s\,q$.

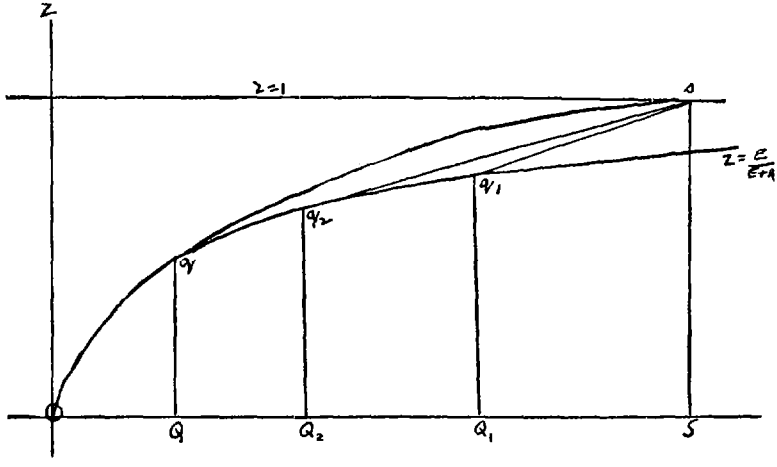

Fig. 11.

The tangent to the (hyperbola) $Z = E/(E+K)$ at the point $E = Q_2$, $Z = Q_2\,(Q_2+K)$ is

$$Z = \frac{E\,K + Q_2^2}{(Q_2+K)^2}$$

and this passes through $E = S$, $Z = 1$ if

$$\left.\begin{aligned} Q_2 &= \frac{S-K}{2} \\ \text{The tangent is then } Z &= 1 - \frac{4\,K}{(S+K)^2}\,(S-E) \end{aligned}\right\} \qquad (6)$$

A simple parabola of the m-th degree, $Z = 1 - H\,(S-E)^m$, where H is a constant and m is $\not< 1$ will touch $Z = 1$ at $E = S$. It will also touch $Z = E/(E+K)$ at $E = Q$ if

$$\frac{K}{Q+K} = H\,(S-Q)^m \text{ for each must equal } 1 - Z$$

$$\frac{K}{(Q+K)^2} = H\,m\,(S-Q)^{m-1} \text{ for each must equal } Z'$$

from which

$$\left.\begin{aligned} m &= \frac{S-Q}{Q+K} \\ H &= \frac{K\,m}{(S-Q)^{m-1}} \end{aligned}\right\} \qquad (7a)$$

Thus we can either (i) choose m (greater than one) and

$$\left.\begin{aligned} \text{then } Q &= \frac{S - mK}{m+1} \\ \text{and } H &= \frac{K(m+1)^{m+1}}{m^m (S+K)^{m+1}} \end{aligned}\right\} \tag{7b}$$

or (ii) choose Q (which must be less than $Q_2 = (S-K)/2$) then m and H can be calculated from equations (7a). If Q is taken as zero $m = S/K$, $H = S^{-\frac{S}{K}}$.

Thus by taking $m > 1$ and $\leq S/K$, or $Q \geq 0$ and $< (S-K)/2$ we can obtain the equation of a simple parabola (not usually a second degree parabola) which touches the credibility curve $Z = E/(E+K)$ at Q and touches the line $Z = 1$ at S. The credibility to be used will be that given by $Z = E/(E+K)$ from 0 to Q, that given by $Z = 1 - H(S-E)^m$ from Q to S, and $Z = 1$ for $E > S$.

To determine which parabola (or which value of Q to use, which is the same thing) other considerations (such as the credibilities to be given for various values of E) have to be invoked. Probably for most purposes the second degree parabola obtained by putting $m = 2$ will be satisfactory. For this

$$\left.\begin{aligned} m = 2 \qquad Q &= \frac{S - 2K}{3} \\ Z &= 1 - \frac{27K(S-E)^2}{4(S+K)^3} \end{aligned}\right\} \tag{8}$$

This is (in an unfamiliar guise or disguise) the familiar "square root" formula used elsewhere in casualty actuarial science as a credibility formula.

Note that the case of the tangent can be deduced by putting $m = 1$.

Note also that if Q is made equal to zero we use the parabola all the way from 0 to S and the original credibility curve has apparently been dropped entirely. Its influence, however, is still present in determining the slope of the parabola at $E = 0$. This case can of course be treated separately as the use of a family of curves:—

$$Z = 1 - \left(\frac{S-E}{S}\right)^m \tag{9}$$

where the parameter m has to be settled from other considerations

such as the swing to be given to the plan. It will probably be found in many cases that a credibility curve of this type will rise too fast, or in other words if it gives satisfactory values for small values of E it will give too large values for intermediate values. For example this would usually be so if we took $m = 2$ to get the "square root" formula.

It is important to note that as all the parabolas suggested are concave to the E axis the conditions (5) of paragraph 3 are complied with. Z is between 0 and 1, Z' is positive and so is $Z - EZ'$. This is also true of the straight line tangent.

In applying credibilities as thus adjusted to rise to unity at the self rating point it would be very complicated to use the formula in each case, as suggested for the second alternative method in paragraph 2. It is apparently better to use the first alternative there mentioned and have a table of Z values to which reference may be made to get the proper value for a given E; in other words to use as a working formula (1) as opposed to a modified (4).

5. *Another Method of Reaching Self Rating.*

The last sentence represents the general view in the past. However, we can retain most of the advantages of using a formula like (4) by proceeding as follows:—For values of E greater than Q calculate K_E from

$$Z = \frac{E}{E + K_E}$$

where Z is the credibility value from the parabola: thus $K_E = E(1 - Z)/Z$. Construct a table for K_E for all values of E, putting $K_E = K$ for $E < Q$. Then apply formula (4) thus

$$\text{modification} = \frac{A + K_E}{E + K_E}. \tag{10}$$

By this method the great majority of risks will be rated by the simple formula (4) with a constant K and for large risks all that is necessary is to ascertain the value of K_E and use the same simple formula. In practice, however, the complications introduced by the present method of splitting into normal and excess would preclude the adoption of this scheme.

This suggests, nevertheless, another method of attaining self rating, namely, by using (4) and gradually reducing the constant

K as E goes from Q to S. Thus if we were to construct values of K_E so that, at Q, $K_E = K$ and $K'_E = 0$ and, at S, $K_E = 0$ and $K'_E = 0$ we would get credibility values which would join smoothly with those given by $Z = E/(E + K)$ at Q and with $Z = 1$ at S.

We will not at present pursue this further, but as will be seen later this idea is used in the more complicated questions of split plans and multi-split plans.

6. *Justification for Departing from Usual Credibility Formula.*

At this point it would seem desirable to see what theoretical objections there may be to departing from the usual or standard credibility formula $Z = E/(E + K)$ or, to put it the other way, whether we can justify departures such as dealt with above. The first thing to be remembered here is that the standard credibility formula itself does not give an exact measure of the proper credibility that shall be given to the risk experience. It is an approximation to an approximation of an expression for the credibility that was based on some necessarily rather arbitrary assumptions as will be seen from the classic papers of Messrs. Whitney and Michelbacher, (P.C.A.S., Vol. IV), describing the genesis of the present form of experience rating. I do not mean to be understood to be attacking the general validity of the usual formula or to be advocating its abandonment. The formula is a very satisfactory, practical instrument that gives credibility values conforming in a reasonable manner to what we would expect and it is because of this that it has stood the test of time. I do mean to state, however, that any not too violent departures from the formula arising out of the self-rating adjustments given in the preceding paragraph cannot be condemned merely for the reason that they are departures. If—as they do—these departures give values that also are reasonable in the light of our a priori judgment and that conform to the criteria of paragraph 3, then our system of credibility values is just as defensible as those given by the unadulterated standard credibility formula.

To anticipate a little so as to collect together all the remarks on departure from the standard formula, similar considerations apply to the usual form of split plan dealt with in Part II. As for the multi-split plan dealt with in the remainder of the paper,

the question there arises as to the validity of the method used of handling the excess credibility. This is kept at zero for small and medium-sized risks and for large risks is brought up to unity at the self-rating point. If the excess portion is considered by itself there is little theoretical justification for this procedure but excess experience *is* excess and always arises in connection with the corresponding normal experience and never by itself, so we must consider the normal and excess parts together. Then whether we look at the risk's average or over-all credibility or whether we look at the effect of any reasonable combination of normal and excess experience we will find that the credibilities by the multi-split plan are not unreasonable.

Part II

Credibilities in Split Plans

7. *Application to "Split" Plans.*

So far we have dealt with a no-split plan as explained in paragraph 1. We now shall consider the necessary modifications of the preceding theory so as to apply it to a split plan. It is not my intention to deal with the history of experience rating (for which see Mr. Kormes' recent papers, P.C.A.S., Vols. XXI and XXII) and so I will merely state here that almost invariably losses (both Actual and Expected) are divided into "normal" and "excess," that is to say the risk is considered in two parts; first, the experience on losses limited to a certain amount per case (say $1,000 indemnity and $100 medical), this being the "normal" part; and second, the experience on the loss cost in excess of this certain amount, this being the "excess" part. The expected losses are divided in the same way (from the available statistics) and the final rate for the risk is the sum of the adjusted rates for each of the two parts.

Less credibility is given to the excess losses since they are more unusual. The reason for making the split is fairly obvious. Without a split a single loss of, say, 3,000 gets as much weight as six losses of 500 each and it is both theoretically and practically desirable to give the six losses much more weight.

The rating formula is as follows where E_n, A_n, Z_n denote the

normal expected losses, actual losses and credibility respectively and E_e, A_e, Z_e are the same for the excess part, (note that $E_n + E_e = E$ and $A_n + A_e = A$).

$$\text{Modification} = \frac{E_n}{E}\frac{Z_n A_n + (1 - Z_n) E_n}{E_n} + \frac{E_e}{E}\frac{Z_e A_e + (1 - Z_e) E_e}{E_e}$$

$$= \frac{Z_n A_n + (1 - Z_n) E_n + Z_e A_e + (1 - Z_e) E_e}{E} \quad (11)$$

If as usual we use

$$\frac{E_n}{E_n + K_n} \text{ for } Z_n \text{ and } \frac{E_e}{E_e + K_e} \text{ for } Z_e$$

(where by making K_e much larger than K_n we give much less credibility to the excess losses) we get for the modification

$$\frac{E_n}{E}\frac{A_n + K_n}{E_n + K_n} + \frac{E_e}{E}\frac{A_e + K_e}{E_e + K_e}$$

which is not subject to much simplification for working purposes. In fact, it is easier to read Z_n and Z_e out of a prepared table and apply (11) particularly as (i) the normal and excess ratios E_n/E and E_e/E vary for risks according to the classifications involved and (ii) by using (11) it is easy to modify Z_n and Z_e (in accordance with the principles set out in Part I) to attain self-rating at S_n and S_e respectively (these self-rating points usually differ). Z_n and Z_e are usually brought to self-rating by means of tangents as shown in paragraph 4, equations (6), although I think it would be better to use a second degree parabola as per equations (8).

It is to be noted that since both Z_n and Z_e comply with the conditions (5) of paragraph 3, so does also the combination of the two in (11) whatever be the proportions of the normal and the excess portions.

8. *Analysis of Split Plan Modification.*

It is useful to note (for it will be needed later) the following analysis of (11).

$$\left.\begin{aligned} & 1 - Z_n \frac{E_n}{E} + Z_n \frac{A_n}{E} - Z_e \frac{E_e}{E} + Z_n \frac{A_e}{E} \\ \text{or } & 1 + \frac{E_n}{E}\left\{-Z_n + Z_n \frac{A_n}{E_n}\right\} + \frac{E_e}{E}\left\{-Z_e + Z_e \frac{A_e}{E_e}\right\} \end{aligned}\right\} \quad (12)$$

This is analogous to the analysis in paragraph 1 of expression (1) into (2): here the parts are:

(i) unity $\left(\text{equal to } \frac{E_n + E_e}{E}\right)$.

(ii) (a) $-Z_n E_n/E$ the credit for clear normal experience.

(b) $-Z_e E_e/E$ the credit for clear excess experience.

(iii) (a) $+Z_n \frac{A_n}{E}$ or $Z_n \frac{A_n}{E_n} \cdot \frac{E_n}{E}$ the charge for the actual normal losses of A_n.

(b) $+Z_e \frac{A_e}{E}$ or $Z_e \frac{A_e}{E_e} \cdot \frac{E_e}{E}$ the charge for the actual excess losses of A_e.

Part III

The Multi-Split Plan—Derivation of Formulas

9. *The Multi-Split Plan.*

The present state of the experience rating plan (as far as the scope of this paper is concerned) is practically as described in Part II. Recently, however, studies have been made with a view to improve the plan and the remainder of this paper arose out of considering some aspects of suggestions which took the form of (i) advocating the so-called multi-split plan and (ii) endeavoring to reduce the working formula to as simple a form as possible, the aim being something like (4).

The so-called multi-split plan consists of a different way of dividing the total losses into "normal" and "excess", or rather as originally proposed, it reduced all losses to normal losses leaving out of account the remainder (or excess) losses, which are not so great as under the ordinary plan. The principle invoked is to take the first (say) 500 of each loss at its face value, the next 500 at (say) two-thirds of its actual value or at a reduction of one-third, the next 500 at another one-third reduction, namely, four-ninths of its actual value, and so on. Thus a very large loss could not be taken at more than 1,500 (using the above values which are illustrative only). The reduction is achieved by means of a table of discounted values showing the discounted value to be used for each size of loss exceeding 500. For losses not greater than 500

the full value is to be used. Thus a loss of 1,000 would have a discounted value of 833 (equal to 500 plus two-thirds of 500), a loss of 1,500 a discounted value of 1,055 (equal to 833 plus two-thirds of two-thirds of 500) and so on. Intermediate values (e.g. for a loss of 800) would be shown in the tables, calculated from the formula:—

$$\text{Discounted value for loss of } x \ (x > 500) = 1{,}500\left\{1 - (\tfrac{2}{3})^{\frac{x}{500}}\right\}$$

or if a is the starting point (corresponding to the 500 above) and ρ (< 1) is the discounting ratio (corresponding to the $\frac{2}{3}$ above)

$$\text{Discounted value for loss of } x \ (x > a) = a\,\frac{1 - \rho^{\frac{x}{a}}}{1 - \rho} \qquad (13)$$

The maximum discounted value is obviously $a/(1 - \rho)$.

From the risk's experience the discounted losses A_n would be determined (it being necessary to enter the table of discounted values only for losses $> a$) and from collective statistics the corresponding expected discounted losses E_n would be determined.

From A_n and E_n by a simple credibility formula (several suggestions as to this are given below) the risk's modification would be calculated. For the great majority of risks, no attention would be paid to the "remainder" losses $A - A_n$ (or excess losses) the experience on these being brought in only above a certain size of risk (i.e., after a certain Q point) to attain ultimate self-rating (at a certain S point).

It is not my purpose here to go into the details or to discuss the soundness or otherwise, or the merits and demerits of the multi-split plan except to say that I believe the idea to be a good one (better than the current split-plan) and that the discounted values given by the exponential curve (13) seem, from tests and from theoretical considerations, to give a good approximation to the relative weight that should be given to losses of various sizes. I hope to give a fuller account of these tests, theoretical and practical, at another time. In this paragraph I have given the above brief account of the plan so as to render intelligible the ideas of the remainder of this paper which is concerned with the credibility formulas to be used in connection with the multi-split plan *or any other plan* where the excess credibility used is zero up to a certain (Q) point and then is gradually brought up to unity

at a self-rating (S) point as is in effect done in the multi-split plan. In any case it is not desirable to pass judgment on the multi-split plan until an exploration has been made of how to manage the credibilities this plan is to grant. It is the main purpose of this paper to do some of this exploring.

10. *First Formula for the Modification.*

The first formula we shall consider for the modification to be used in the multi-split plan is arrived at in this way.

If in (11) we put $Z_e = 0$ we get

$$\frac{Z_n A_n + (1 - Z_n) E_n + E_e}{E}$$

and now if, for simplicity, we put $Z_n = E/(E + K)$ (instead of the usual $E_n/(E_n + K_n)$) we get

$$\frac{A_n + E_e + K}{E + K}$$

and we take this for the modification when $E \leq Q$, when $Z_e = 0$.

Now we can get self-rating by adding $A - (A_n + E_e + K)$ or $A_e - E_e - K$ to the numerator of this expression and subtracting $(E + K) - E$ or K from the denominator: we accordingly use for the modification for $E > Q$

$$\frac{A_n + E_e + K + W(A_e - E_e - K)}{E + K - WK}$$

where W is to be zero for $E \leq Q$ and unity for $E \geq S$, and in between zero and unity for E between Q and S.

Thus:

$$\left.\begin{aligned} \text{Modification} &= \frac{A_n + E_e + K}{E + K} \\ &\qquad \text{for } E \leq Q \\ \text{and} &= \frac{A_n + E_e + K + W(A_e - E_e - K)}{E + K(1 - W)} \\ &\qquad \text{for } E > Q \text{ and } \leq S \end{aligned}\right\} \tag{14}$$

where W is a function of E (to be determined), equal to zero for $E = Q$ and rising from 0 to 1 as E goes from Q to S.

This is perhaps not quite as simple as a formula (see (31)) to be considered later but I deal with it first because of the greater ease of handling the theoretical work.

It will be observed that if $A_n = E_n$ (and $A_e = E_e$ if $E > Q$) the modification equals unity as it should.

Now (14) can be analyzed into:

$$\left.\begin{aligned} & 1 - \frac{E_n}{E+K} + \frac{A_n}{E+K} && \text{for } E < Q \\ \text{and } & 1 - \frac{E_n}{E+K(1-W)} + \frac{A_n}{E+K(1-W)} \\ & \quad - \frac{W E_e}{E+K(1-W)} + \frac{W A_e}{E+K(1-W)} && \text{for } E > Q \end{aligned}\right\} \quad (15)$$

whence by a comparison with (12)

$$\left.\begin{aligned} Z_n &= \frac{E}{E+K}, \; Z_e = 0 && \text{for } E < Q \\ Z_n &= \frac{E}{E+K(1-W)}, \; Z_e = \frac{W E}{E+K(1-W)} && \text{for } E > Q \end{aligned}\right\} \quad (16)$$

We see that $Z_n = 0$ for $E = 0$

and $Z_n = Z_e = 1$ for $E = S$ where $W = 1$

also $Z_n > Z_e$ for $E < S$ (except for $E = 0$)

It will be noted that here, and this is true generally of the multi-split plan as we shall discuss it, that there is only one self-rating point, not one for normal losses and one for excess as in the case of the present plan. This is deliberately done as one means of simplification, and is justifiable if the self-rating point is not too low.

11. *Conditions for W to fulfill.*

Before proceeding to the determination of W, it is necessary to consider how this function must behave. We see at once that as well as $W = 0$ for $E = Q$ and $W = 1$ for $E = S$, we must have $W' = 0$ for $E = Q$ and for $E = S$ in order that we have smooth junctions with $Z_n = E/(E+K)$ and $Z_e = 0$ at $E = Q$ and with $Z_n = Z_e = 1$ at $E = S$.

Furthermore we must also determine W in such a manner that the credibilities comply with the conditions (5), paragraph 3. For $E < Q$, Z_n obviously complies with these (as has been shown above) and so does Z_e and therefore so does any combination of Z_n and Z_e.

For $E > Q$ both Z_n and Z_e comply with (5i) but, on the other hand, Z_e *cannot* comply with (5iii) as will readily be seen from the geometrical interpretations of this condition given in paragraph 3. As Z_e has to rise from zero at $E = Q$ to unity at $E = S$ the tangent to the curve $Z_e =$ function of E must, at any rate for the first part of the range $E = Q$ to $E = S$ cut the Z_e axis below the origin (see Fig. III). This of course applies to all varieties of plan where $Z_e = 0$ up to a point $E = Q$ and then rises to unity at a point $E = S$, in such a manner that there is a smooth junction at Q.

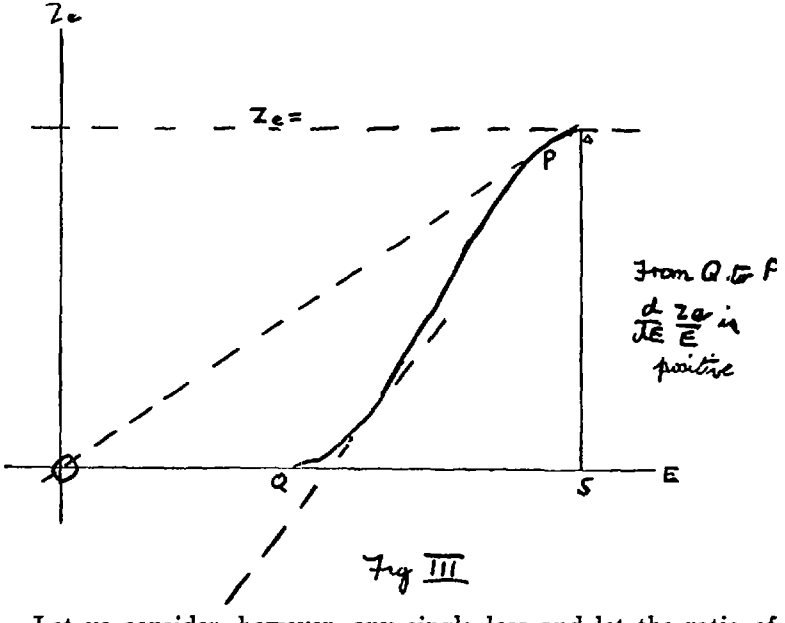

Fig III

Let us consider, however, any single loss and let the ratio of the excess portion of this to the normal be θ.

Since we can have a "normal" loss with no excess portion but cannot have an "excess" loss without a corresponding "normal" portion, it follows that θ can range from 0 to some maximum value which we will call a. To take the illustration given in paragraph 9 where $a = 500$ and $\rho = \frac{2}{3}$, if the maximum possible actual loss is 7,500, it is easily seen that a will be very nearly equal to 4 for the maximum normal loss is 1,500. (The actual value of a in this case is 4.01).

Then it is $Z_n + \theta Z_e$ which must comply with the conditions (ii) and (iii) of (5) and for all possible values of θ. Since θ can be zero, Z_n must certainly comply with these conditions; and then $Z_n + \theta Z_e$ will also comply for all values of θ if it complies for the maximum value of θ regardless of whether Z_e complies or not, for the conditions in question are linear in Z_n and Z_e. Thus we must have Z_n and $Z_n + \alpha Z_e$ (which we will call ζ) both complying with (ii) and (iii). As regards condition (ii) it is desirable (but not necessary) that Z_e also comply (and this can be arranged.)

We observe that at Q $\zeta/E = 1/(Q+K)$ and at S it equals $(1+\alpha)/S$ so that for ζ/E to decrease from Q to S as required by conditions (iii) we must have

$$S > (1+\alpha)(Q+K) \tag{17}$$

This is of course a condition limiting the choice of S when Q has been chosen and vice versa.

12. *Examination of Conditions*

We see from (16) and from

$$\zeta = Z_n + \alpha Z_e = \frac{E(1+\alpha W)}{E+K(1-W)} \tag{18}$$

that we can either determine W directly or first settle on ζ from which we can get W and the other functions. Before deciding which we will do we shall first collect together and "boil down" the requirements that must be fulfilled.

A. Terminal Conditions

(i) W must be 0 at $E = Q$ and 1 at $E = S$
W' must be 0 at Q and at S

(ii) Z_n must be $Q/(Q+K)$ at $E = Q$ and 1 at $E = S$
Z'_n must be $K/(Q+K)^2$ at $E = Q$ and 0 at $E = S$

(iii) ζ must be $= Z_n$ at $E = Q$ and $= 1+\alpha$ at $E = S$
ζ' must be $= Z'_n$ at $E = Q$ and $= 0$ at $E = S$

(iv) Z_e must be 0 at $E = Q$ and $= 1$ at $E = S$
Z'_e must be 0 at $E = Q$ and at $E = S$

It is easily seen that any one of the sets of conditions (i) to (iv)

is equivalent to the other three, e.g., if (iii) holds then (i), (ii) and (iv) must.

B. Conditions for $E > Q$ and $< S$

As E increases

(i) Z_n should increase
(ii) Z_n/E should decrease
(iii) ζ should increase
(iv) ζ/E should decrease

It is also desirable but not mandatory that in addition

(v) Z_e should increase
(vi) W should increase

(The solutions given will comply with (v) and (vi))

Let us see if all the B conditions are independent and if not let us reduce them to the fewest possible.

First expressing Z_n in terms of ζ by eliminating W from (18) and the expression for Z_n in (16) we get

$$Z_n = \frac{a\,E + \zeta\,K}{a\,E + (a+1)\,K} \tag{19}$$

Differentiating* this

$$\{a\,E+(a+1)\,K\}^2\,Z'_n = a\,K\,(a+1-\zeta)+\{a\,E+(a+1)\,K\}\,K\,\zeta'$$

and as $a + 1 - \zeta$ is positive, we find that Z'_n is if ζ' is. So B (iii) includes B (i).

Also

$$\frac{Z_n}{E} = \frac{a + K\,\zeta/E}{a\,E + (a+1)\,K}$$

and it is obvious, without differentiating, that if ζ/E decreases as E increases, so does Z_n/E. Thus B (iv) includes B (ii).

Further, differentiating (18) we get

$$\{E+K\,(1-W)\}^2\,\zeta' = K\,(1-W)\,(1+a\,W)+\{a\,E+(a+1)\,K\}E\,W'$$

* We shall frequently have occasion to differentiate an expression of the form $Z = \frac{X}{Y}$ where X, Y and Z are functions of E. To save space we will usually not write the result in the form $Z' = \frac{Y\,X' - X\,Y'}{Y^2}$ but instead will put it in the form

$$Y^2\,Z' = Y\,X' - X\,Y'$$

which shows that if W' is positive so is ζ'. Thus B (iv) includes B (iii) and therefore also B (i).

Also, as $Z_e = W Z_n$, if W' is positive and therefore Z'_n is, so is Z'_e. Thus B (vi) includes B (v).

The B conditions therefore can be reduced to:

B (iii) ζ should increase
B (iv) ζ/E should decrease

which are mandatory, or to the following which comprises all the mandatory and desirable conditions:

B (iv) ζ/E should decrease
B (v) W should increase

We could now proceed for example to make Z_n go from its value $Q/(Q+K)$ at $E=Q$, to 1 at $E=S$ (using the methods of paragraph 4) and see whether the resulting Z_n values gave W and ζ values which complied with B (iv) and B (iii) or B (v), but this is an indirect way of working. It is better to determine one of the functions so that the conditions are directly complied with. It appears that the most suitable function to operate on is either ζ or W for these are the functions appearing in the conditions B (iv), B (iii) and B (v).

I have found that ζ is somewhat preferable. I construct a formula for it so as to satisfy B (iii) and B (iv) and then find it also satisfies B (v).

The alternative of constructing W itself so as to comply with B (v) and B (iv) is a little more complicated but (as shown in Appendix III) leads to identically the same results as by the method I have used, namely, constructing ζ first.

13. *Construction of* ζ.

We have then to construct ζ so that (i) at $E=Q$, ζ equals $Q/(Q+K)$ and $\zeta' = K/(Q+K)^2$; (ii) at $E=S$, ζ equals $1+\alpha$ and $\zeta'=0$; (iii) ζ' must be always positive, and (iv) $(\zeta/E)'$ must be always negative. It is understood (17) that $S>(1+\alpha)(Q+K)$.

We could try drawing a simple parabola of the m-th degree as in paragraph 4 from $(S, 1+\alpha)$ touching the curve $E/(E+K)$ at $E=Q$, but this is possible only if the tangent at $E=Q$ to the

curve $E/(E+K)$ cuts the line $\zeta = a+1$ at $E = S_1$ where $S_1 < S$. It is easily found that

$$K S_1 = (Q+K)^2 (a+1) - Q^2$$

while S_2 the minimum value of S from (17) is given by

$$K S_2 = K (Q+K) (a+1)$$

and therefore

$$K (S_1 - S_2) = Q \{a Q + (a+1) K\} \text{ and so } S_1 > S_2.$$

So if S lies between S_1 and S_2, no such parabola can be drawn. (What the above proves is that if S is between S_1 and S_2, the curve for ζ must contain a point of inflexion between Q and S which is evident if a diagram is drawn.)

We could use in some cases a non-simple cubic parabola of the form

$$\zeta = a_1 (S-E)^3 + a_2 (S-E)^2 + a_3 (S-E) + (1+a)$$

but this again would not work for all combinations of Q, K and S and in any event if we used such a parabola we would have to investigate to see that the necessary requirements for ζ and W were met, and this would lead to many restrictions. As we are looking for a universal construction we must try something else.

14. *Construction of ζ by Method Finally Used.*

I have accordingly devised a method of constructing an expression for ζ which will give the required values to ζ and its first differential coefficient at both $E = Q$ and $E = S$ and for which ζ continually increases and ζ/E continually decreases as E increases. In order not to burden the body of the paper unduly with mathematics, I have relegated the details of this construction to Appendix I. However, in order to preserve continuity I have numbered the equations in that appendix just as though the appendix were placed here; thus equations (20) to (27i) inclusive are to be found in Appendix I.

The construction is given in detail but it will be seen that all the calculation of the constants is contained in the equations (27b) to (27g). Then from (27h) and (27i) ζ is readily obtainable for all required values of E from Q to S.

15. *This Construction Fulfills Required Conditions.*

From ζ as thus determined W is found from (18) which gives

$$W = \frac{(\zeta - 1) E + \zeta K}{a E + \zeta K} \tag{28}$$

from which W is readily calculated for values of E.

If our object is to calculate W as quickly as possible, we can eliminate the step of calculating ζ from Y—see equation (27i)—and use instead

$$W = \frac{E + K - Y}{a\,Y + K} \tag{28a}$$

We also have for E from Q to S,

$$\left.\begin{aligned} Z_n &= \frac{a\,E + \zeta\,K}{a\,E + (a+1)\,K} \\ Z_e &= \frac{(\zeta - 1)\,E + \zeta\,K}{a\,E + (a+1)\,K} \end{aligned}\right\} \tag{29}$$

These of course give the proper values to Z_n, Z_e, Z'_n and Z'_e at Q and at S. Also of course W, Z_n, Z_e are all between 0 and 1 and $Z_n > Z_e$ (because $\zeta < a + 1$).

We also know from paragraph 12, that as ζ' is positive and $(\zeta/E)'$ is negative Z'_n is also positive and $(Z_n/E)'$ is negative.

We can prove that W (and therefore also Z_e) increases with E for our construction. The proof will be found in Appendix II.

This completes, for the moment, the discussion of formula (14) for the modification. Let us note, however, that the construction for W does not depend upon the value of the excess ratio E_e/E or r.

16. *Second Formula for the Modification.*

We will now consider another formula that has been suggested for the modification for the multi-split plan on the ground that is rather simpler than (14) in practical application.

This formula was derived as follows: For $E < Q$ use the normal modification as the modification for the risk: For $E > Q$ amplify the formula so as to equal A/E at $E = S$ just as was done for the previous formula (14). The result is

$$\left.\begin{aligned} &\frac{A_n + K}{E_n + K} && \text{for } E < Q \\ \text{and} \quad &\frac{A_n + K + W\,(A_e - K)}{E_n + K + W\,(E_e - K)} && \text{for } E > Q \end{aligned}\right\} \tag{30}$$

but if we analyze this as per (12) we get

$$Z_n = \frac{E}{E_n + K + W\,(E_e - K)},\quad Z_e = W\,Z_n.$$

Now if $E_e > K$, Z_n is greater than unity, contravening condition (5) (i) of paragraph 3. This means that if $E_e > K$ (whether E is less or greater than Q and whatever W is—except unity) the charge for a normal loss will be greater than the premium equivalent. However, we can adjust (14) so as to overcome this, as follows:—First of all we must lay down the condition that K must be greater than E_e for $E = Q$; then instead of the constant, K, in (30) we put a function of E, which we will call K_E, such that this is equal to the constant K for $E \leq Q$ but increases as E increases above Q so that K_E is always greater than E_e and also so that $K'_E = 0$ for $E = Q$ (this insures a continuous join of K and K_E at Q.)

We thus have for the modification

$$\left.\begin{array}{ll} \dfrac{A_n + K}{E_n + K} & \text{for } E < Q \\ \dfrac{A_n + K_E + W\,(A_e - K_E)}{E_n + K_E + W\,(E_e - K_E)} & \text{for } E > Q \\ & \text{and } \leq S \end{array}\right\} \quad (31)$$

Leaving the determination of K_E aside for the moment and putting $M = K_E - E_e$ where M is of course a function of E we have

$$\left.\begin{array}{l} \text{for } E < Q \quad Z_n = \dfrac{E}{E_n + K} = \dfrac{E}{E + M} \\ \text{for } E > Q \quad Z_n = \dfrac{E}{E_n + K_E - W\,(K_E - E_e)} = \dfrac{E}{E + M\,(1 - W)} \\ Z_e = W\,Z_n = \dfrac{W\,E}{E + M\,(1 - W)} \end{array}\right\} \quad (32)$$

Now M is positive and so Z_n is > 0 and < 1 until $W = 1$ when $Z_n = 1$: $Z_e = 0$ while $W = 0$ and then as W rises from 0 to 1, Z_e is > 0 and < 1 until $W = 1$ when $Z_e = 1$. Also $Z_n > Z_e$.

17. *Construction of W for Formula (31).*

We now determine $\zeta = Z_n + \alpha\,Z_e$ in a manner similar to that used for formula (14).

Put M_Q for the value of M at Q. We have

$M' = K'_E - E'_e = K'_E - E_e/E$, and $M - E\,M' = K_E - E\,K'_E$ and

$$\frac{d}{dE}\frac{E}{E+M} = \frac{(E+M) - E\,(1+M')}{(E+M)^2} = \frac{M - E\,M'}{(E+M)^2} = \frac{K_E - E\,K'_E}{(E+M)^2}$$

Now at $E = Q$, $K'_E = 0$ and so at that point

$$\frac{d}{dE}\frac{E}{E+M} = \frac{K}{(Q+M_Q)^2}$$

So we must have

$$\text{at } Q \qquad \zeta = \frac{Q}{Q+M_Q} \quad \zeta' = \frac{K}{(Q+M_Q)^2}$$

$$\text{at } S \qquad \zeta = a+1 \qquad \zeta' = 0.$$

Now if we denote E_e/E, the excess ratio, by r and put

$$\zeta = \frac{E}{Y(1-r)} \tag{33}$$

we must have (compare with the method used in Appendix I)

$$\text{at } Q \qquad Y = (Q+M_Q)/(1-r) = Q + K/(1-r), \; Y' = 1$$

$$\text{at } S \qquad Y = \frac{S}{(a+1)(1-r)} \qquad Y' = \frac{1}{(a+1)(1-r)}$$

Now if (i) $(a+1)(1-r)$ is greater than unity, which it will be for r is small, say less than ½, while a is greater than one,

$$\text{and if (ii)} \qquad S > (a+1)\{Q(1-r)+K\} \tag{34}$$

(this corresponds to the condition (17) and means that ζ/E must be less at S than at Q), we can proceed to determine Y just as previously (see after equation (20)—Appendix I)

u will in this case be $1/(1+a)(1-r)$ and w will be

$$\frac{S-(a+1)\{Q(1-r)+K\}}{(S-Q)(1+a)(1-r)}$$

Note that w is positive and $u - w$ is positive, by (34).
Thus $0 < w < u < 1$.
Thus we determine λ, p, k, h, j, t as before and we get:

$$Y = \left\{\frac{h}{k} - \frac{t}{j}\right\}\left(S-Q\right) + \left(Q + \frac{K}{1-r}\right) - \frac{h(S-Q)^2}{E-Q+(S-Q)k} + \frac{t(S-Q)^2}{j(S-Q)+Q-E} \tag{35a}$$

$$\zeta = \frac{E}{Y(1-r)} \tag{35b}$$

Note that because K_E increases with E, $E + M$, which is the same as $E_n + K_E$, increases as E does and faster than $E_n + K$ so that $(1 - r)\ Y$, which is less than $E_n + K$, is *a fortiori* less than $E_n + K_E$: thus ζ is greater than $E/(E_n + K_E)$ or $E/(E + M)$.

18. *This Construction Fulfills Requirements.*

Now as for formula (14) we have

$$W = \frac{(\zeta - 1)\ E + \zeta M}{a\ E + \zeta M} \tag{36}$$

As before we can express W in terms of Y namely

$$W = \frac{E + M - Y\ (1 - r)}{a\ Y\ (1 - r) + M} \tag{36a}$$

Also

$$\left.\begin{aligned} Z_n &= \frac{a\ E + \zeta M}{a\ E + (a + 1)\ M} \\ Z_e &= \frac{(\zeta - 1)\ E + \zeta M}{a\ E + (a + 1)\ M} \end{aligned}\right\} \tag{37}$$

These of course give the proper values to Z_n, Z_e, W and their first derivatives at $E = Q$ and at $E = S$.

Also, since $\zeta > E/(E + M)$, W, Z_n and Z_e are all between 0 and 1, and Z_n is greater than Z_e (except at S).

Examining now Z'_n we find

$$\{a\ E + (a+1)\ M\}^2\ Z'_n = a\ (a+1-\zeta)\ (M - E\ M') + \{a\ E + (a+1)\ M\}\ M\ \zeta'$$

and Z_n will certainly be positive if $M - E\ M'$ is. Now, as shown above, this last expression is the same as $K_E - E\ K'_E$: this means Z'_n will certainly be positive if $(K_E/E)'$ is negative and we will so construct K_E.

Now to examine $(Z_n/E)'$

$$\frac{Z_n}{E} = \frac{a + M\ \zeta/E}{a\ E + (a + 1)\ M}$$

Now the denominator of this equals

$$E\ \{(1 + a)(1 - r) - 1\} + (a + 1)\ K_E$$

which, as $(1+a)(1-r)-1$ is positive, increases with E. As for the numerator, ζ/E decreases as E increases and if M does also then the whole numerator does, and so if M decreases, Z_n/E will also unquestionably decrease. On the other hand if M increases, we find by differentiation that

$$\{a\,E+(a+1)\,M\}^2\,(Z_n/E)' = \{a\,E+(a+1)\,M\}\,M\,(\zeta/E)' - a\,(a+M\,\zeta/E) - a\,(a+1-\zeta)\,M'$$

and the right hand side is certainly negative if M' is positive for $(\zeta/E)'$ is negative. Thus whether M increases or decreases, Z_n/E decreases. (Note, the construction we adopt, in paragraph 19, makes M' negative for the first part of the range Q to S and positive for the latter part).

We can also show that W (and therefore Z_e) increases with E, for our construction. As in the case of the corresponding proof for the formula (14) construction we have put this proof in Appendix II.

19. *Determination of K_E.*

We now come to the determination of K_E. We must have

(a) $K_E = K$ for $E = Q$.
(b) $K'_E = 0$ at Q and positive for $E > Q$.
(c) $(K_E/E)'$ negative.
(d) $K_E > E_e$.

We first note that (d) is the only condition involving E_e (or in other words r) and if $K_E > E_e$ for the maximum value of r it will be so for all values of r: so we will make $K_E > E_e$ for the maximum value of r and then we can use the same series of values of K_E for all values of r. Let this maximum value of r be g; note that as K must be greater than E_e for $E = Q$ we must have $K > Q\,g$.

For $E > Q$ we will let K_E be given by the hyperbola

$$(K_E - g\,E)(E + a_1) = a_2$$

which is asymptotic to $K_E = g\,E$ (see Fig. IV). We will deter-

mine the constants a_1 and a_2 so that the curve touches $K_E = K$ at $E = Q$. We have

$$K_E = \frac{a_2}{E + a_1} + g\,E \qquad \text{so that } K = \frac{a_2}{Q + a_1} + E\,Q$$

$$K'_E = g - \frac{a_2}{(E + a_1)^2} \qquad \text{so that } g = \frac{a_2}{(Q + a_1)^2}$$

$$\text{whence } a_1 = \frac{K - 2\,Q\,g}{g} \qquad a_2 = \frac{(K - Q\,g)^2}{g}$$

and thus:

$$K_E = \frac{(K - Q\,g)^2}{g\,E + (K - 2\,Q\,g)} + g\,E \tag{38}$$

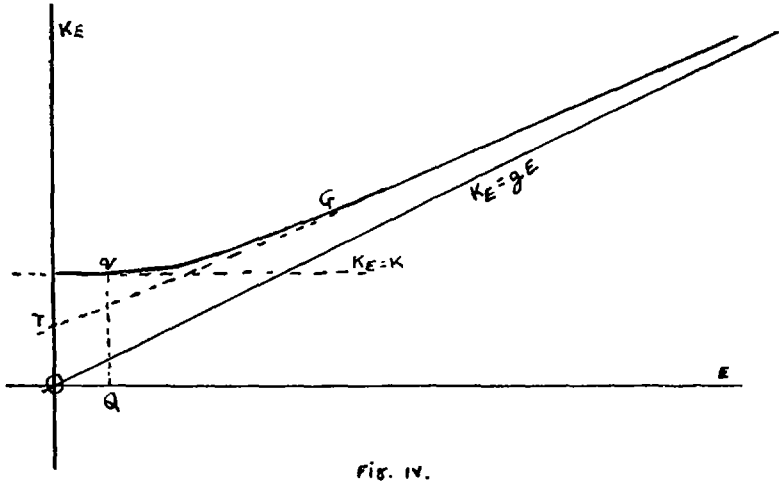

FIG. IV.

The curve is $q\,G$ in Fig. IV. The tangent at any point G cuts the K_E axis at T above 0 showing that $(K_E/E)'$ is negative. Thus all the conditions (a) to (d) are complied with.

For Appendix II it is necessary to note that the maximum value of $O\,T$ occurs for $E = Q$, that is, the maximum value of $K_E - E\,K'_E$, which equals $M - E\,M'$, is K.

We have now completed for the moment the discussion of formula (31). We will return later to consider how to deal with the different values of r that arise. The construction given above for W depends on the value of r used; note, however, that the formula (38) for K_E is useable for all values of r.

20. *Third Formula for the Modification.*

Let us now see what we must do if we apply the ordinary modification formula (11) to the multi-split plan. Making $Z_e = 0$ we have for the modification for $E < Q$

$$\frac{E_n}{E}\,\frac{A_n + K_n}{E_n + K_r} + \frac{E_e}{E}$$

which we can write as

$$\frac{K + \frac{E_n}{E}(A_n + E_e)}{E_n + K} \quad \text{for } E < Q \tag{39a}$$

For $E > Q$ and $\leq S$ we can put $E_n + K(1 - W)$ for the denominator and we must add to the numerator

$$W\{(A - A_n - E_e)\,E_n/E - K\}$$

and we get the rather cumbersome formula

$$\frac{K + (A_n + E_e)\frac{E_n}{E} + W\left\{(A_e - E_e)\frac{E_n}{E} - K\right\}}{E_n + K(1 - W)} \quad \text{for } E > Q \tag{39b}$$

for which $Z_n = \dfrac{E_n}{E_n + K(1 - W)}$, $Z_e = W Z_n$

It will be seen that

$$Z_n = \frac{E}{E + \frac{(1 - W)K}{1 - r}}$$

which is of the same form as Z_n in (16) with $K/(1 - r)$ for the K there; and indeed if we multiply the top and bottom of (39b) by E/E_n and put ${}^rK$ for $K/(1 - r)$ we get

$$\frac{{}^rK + A_n + E_e + W(A_e - E_e - {}^rK)}{E + {}^rK(1 - W)} \tag{40}$$

which is of the same form as (14) with ${}^rK$ for K.

So we can determine W just as for (14) but using ${}^rK$ for K.

We note, however, that as for formula (31) the values of W depend on the value of r.

21. *Value of Excess Ratio to be Used.*

Now let us consider this question of the value of r that enters into the determination of W. We have discussed three formulas

for modifications, namely, (14), (31) and (39). For the first W does *not* depend on r but for the last two it does. It is obviously impractical to calculate a series of values of W for each separate possible value of r and we will therefore see if we cannot use, for all values of r, the values of W calculated for one particular r, say the average value or the maximum or the minimum value. Let us take (39) first, and suppose we have calculated values of W for a certain excess ratio r and use them for risks with a different excess ratio x. Then, since $W = 0$ at Q and $= 1$ at S and $W' = 0$ at both Q and S, Z_n will join smoothly at Q with the values below Q, and will be tangential to $Z_n = 1$ at S; also Z_e will $= 0$ at Q and 1 at S and Z'_e will $= 0$ at both Q and S.

Now since $\zeta = E\,(1 + \alpha W)/\{E + {}^xK\,(1 - W)\}$

$$\{E + {}^xK\,(1 - W)\}^2\,\zeta' = {}^xK\,[(1 - W)(1 + \alpha W) + (1 + \alpha)\,E\,W'] + \alpha E^2 W'$$

which will be positive for all values of x since W' is positive. We also see that Z'_n is positive by putting $\alpha = 0$ in the above, when ζ becomes Z_n. Also Z'_e is positive, for $Z_e = W\,Z_n$.

Now to consider Z_n/E and ζ/E. We easily find by differentiation that

$$\{E + {}^xK\,(1 - W)\}^2\,(\zeta/E)' = {}^xK\,(1 + \alpha)\,W' - \{(1 + \alpha W) - \alpha\,E\,W'\}$$

and by considering that this expression is negative if r is put for x, we see it remains negative if ${}^rK > {}^xK$: we see similarly $(Z_n/E)'$ is certainly negative if ${}^rK > {}^xK$ (put $\alpha = 0$ in the above expression).

So if ${}^rK > {}^xK$ or $r > x$ we can certainly use with safety for the case of an excess ratio x the W's derived for the ratio r. On the other hand there is some margin in the fulfillment of the conditions by the W's derived for ratio r (except perhaps in a borderline case where S is only a little greater than $(1 + \alpha)(Q + {}^rK)$—see (17)) and if x is not much greater than r we probably will still have Z_n/E and ζ/E decreasing.

We note that the condition $r > x$ is what we would expect; for if $r > x$, then ${}^rK > {}^xK$ and Z_n for $E = Q$ will be greater for x than for r. Thus at Q, Z_n/E and ζ/E, which are equal at Q, will be greater for x than for r. On the other hand at S, Z_n/E and ζ/E are equal for all values of excess ratio being equal to $1/S$ and $(1 + \alpha)/S$ respectively. So for x the ratio Z_n/E or ζ/E has further to decrease as E goes from Q to S than it has for r and we

should not be surprised therefore that the W values calculated for r will work satisfactorily for a smaller ratio x.

To come now to formula (31) we first note that we have taken care of K_E by using the maximum excess ratio in fixing it. As far as Z_n and ζ are concerned, we easily find that if the excess ratio is x

$$\{E + M\,(1-W)\}^2\,\zeta' = (M - E\,M')(1-W)(1+a\,W) + \{a\,E + (a+1)\,M\}\,E\,W'$$

Now $M - E\,M' = K_E - E\,K'_E$ which is positive and so the right hand side is positive whatever the value of x. If we put $a = 0$ in the above equation, ζ becomes Z_n and the right hand side is of course still positive. Thus Z'_n and ζ' are positive for all values of x. The question, however, is not so simple when we come to consider Z_n/E and ζ/E.

We have

$$\{E + M\,(1-W)\}^2\,(\zeta/E)' = M\,(1+a)\,W' - \{(1+a\,W) - a\,E\,W'\} - M'\,(1-W)(1+a\,W)$$

Now in this M refers to an excess ratio x and if we write, temporarily, $\overline{M}$ for the M for the ratio r, we have

$$M = \overline{M} - (x-r)\,E \qquad M' = \overline{M}' - (x-r)$$

and the right hand side of the above equation becomes

$$\overline{M}\,(1+a)\,W' - \{(1+a\,W) - a\,E\,W'\} - \overline{M}'\,(1-W)(1+a\,W) + (x-r)\,\{(1-W)(1+a\,W) - (1+a)\,E\,W'\}$$

which we will call $X + (x-r)\,\mu$.

Now X we know is negative for it is what the above right hand side becomes if $x = r$. As for μ, this $= 1$ for $E = Q$ and $= 0$ for $E = S$, but as we shall see as E goes from Q to S μ rapidly becomes negative and remains negative till E reaches S. If we write, for the moment, V for $W - E\,W'$, V is the distance above the origin that the tangent to the curve for W (as a function of E) cuts the W axis $E = 0$. μ becomes $(1-2\,W-a\,W^2) + (1+a)\,V$. The first term in this equals 1 for $W = 0$ $(E = Q)$, equals 0 for $W = \{-1 + \sqrt{1+a}\}/a$, equals $-(1+a)$ for $W = 1$ $(E = S)$ and decreases continually from $W = 0$ to $W = 1$. As for the second term, V equals 0 at $E = Q$ and equals 1 at $E = S$. As will be seen from the examples given below V is negative from $E = Q$ until E is well advanced towards S. Thus we find μ starting from

1 at Q rapidly becomes negative, reaches a minimum and then rises to 0 at S. Now if $x > r$ and μ is negative $(\zeta/E)'$ will be negative, but if μ is positive $(\zeta/E)'$ will be negative only if $(x - r)\ \mu$ is not greater than $-X$. Thus if $x > r$, $(\zeta/E)'$ will be certainly negative over the greater part of the range from Q to S and the only region it can be positive is in the earlier part of the range and then only if there is not much "margin," i.e., only if the relationship of Q and S is such that there is not much drop in ζ/E from Q to S. Further, if in any particular case where there is not much margin and where, therefore, ζ/E does not decrease continuously in the earlier part of the range Q to S, we can improve the situation by using a higher value of η in calculating the W values. It will readily be seen on examination of the construction of Y in Appendix I that a higher value of η will give higher values of Y and lower values of W and ζ/E. Thus increasing η should tend to eliminate the up and down behaviour of ζ/E in the early part of Q to S in borderline cases.

On the other hand, if $r > x$, (ζ/E) will certainly decrease in the first part of Q to S but in the latter part there is danger of an increase and the only thing to prevent this is the "margin" (in the sense used above): but here we must note that in the case of formula (31) if $r > x$, Z_n for Q is *less* for x than for r and therefore ζ/E for Q is less for x than for r and so (as at S ζ/E is the same for x and for r) there is less drop in ζ/E from Q to S for x than for r so it will be easier for ζ/E to increase. The opposite is, of course, the case if $r < x$: there will be a bigger drop in ζ/E from Q to S for x than for r.

The conclusion is that x should be greater than r for formula (31). This is borne out by the examples given below—where it will be seen that $x < r$ gives quite unsatisfactory results, while $x > r$ gives usually quite good ones though not in all borderline cases. An example is given of how increasing the value of η improves a borderline case.

In the above discussion we have dealt with ζ/E. A similar analysis can be made of Z_n/E but it is fairly plain that if we get proper results for ζ/E we will also get them for Z_n/E.

Thus in the case of formula (39), to calculate the W values we should use a value of r at or nearly at the maximum of its range while for formula (31) we should use r near the minimum.

A word about the minimum value for S. In respect of formula (39) we must have

$$S > (1+a)\{Q + K/(1-r)\} \tag{41a}$$

and we should see that S complies with this for the maximum value of r. (Some margin of compliance is desirable.)

In respect of formula (31) we must have

$$S > (1+a)\{Q(1-r) + K\} \tag{41b}$$

and in this case we should see that S complies for the minimum value of r. (The values of K will, of course, probably be quite different for the two cases). We see that the necessity here of using, for r, the maximum value for formula (39) and the minimum for formula (31) agrees with the requirements for the W values.

In respect of formula (14) no question of r arises and we must simply have

$$S > (1+a)(Q+K) \tag{41c}$$

22. *Other Formulas for the Modification.*

I have now given three different formulas, (14), (31) and (39), for the multi-split plan modification and it is clear that many more could be devised, but the three given are sufficient to illustrate the principles involved. It will be observed that the procedure consists of

(a) Choosing a formula for the modification for $E < Q$. This is the most important step since the greater number of risks fall in this range, and in addition the credibilities for risks where $E > Q$ are settled, to a large extent, by the "swing" below Q.

(b) Adjusting the modification formula for $E > Q$ by the addition of terms involving a parameter W so that the credibilities join smoothly at Q to those below Q and reach unity tangentially at S.

(c) Calculating the values of W so as to fulfill these conditions and the conditions set out in paragraph 3. The technique developed above consists in calculating ζ so that it and its first derivative ζ' take the required values at Q and at S and so that ζ increases and ζ/E decreases. Then it is necessary to check that these values when used in conjunction with the modification formula give values of Z_n, Z_e and W that increase and values of Z_n/E that decrease.

It is of interest to note that when the modification formula for $E < Q$ is settled, it is possible to choose more than one formula for $E > Q$ and that the calculation of the ζ values is independent of the choice of the modification formula for E greater than Q. For instance, instead of formula (14) for E greater than Q we could have

$$\frac{A_n + E_e + K(1-W)}{E + K(1-W)} + W\frac{A_e - E_e}{E} \tag{14A}$$

which gives $Z_n = \dfrac{E}{E + K(1-W)}$, $Z_e = W$.

The same ζ's as determined for (14) are applicable here and it will be found that the resulting values for W, Z_n, and Z_e are satisfactory. However, to calculate W from ζ requires the solution of a quadratic equation and all-in-all (14A) is not as simple to work with as is (14).

Another, and easily worked, variation of 14 is

$$\frac{A_n + E_e + K}{E + K}(1-W) + \frac{A}{E}W \tag{14B}$$

which gives

$$Z_n = \frac{E + WK}{E + K}, \quad Z_e = W.$$

Here again the ζ's are the same as for (14) and it will be found that

$$Z_n = \frac{aE + \zeta K}{aE + (a+1)K} \qquad Z_e = \frac{(\zeta - 1)E + \zeta K}{aE + (a+1)K}$$

These are the same as for (14) showing that (14B) gives the *same* values of Z_n and Z_e as does (14). (The W values are different, of course.) Thus (14B) could be used in place of (14) if it gives a better "working formula" and if it is felt that it is easier of explanation, to the layman, than is (14).

However, I will not pursue further this discussion of alternative formulas but will proceed to consider some practical aspects of the three original formulas.

PART IV

MULTI-SPLIT PLAN—PRACTICAL CONSIDERATIONS

23. *Comparison of the Three Formulas.*

We will now examine some of the characteristics of the three formulas (14), (31) and (39), we are discussing. We will pay particular attention to the credibilities given for low values of E, that is those below Q.

For $E \not> Q$ Z_e is zero and Z_n is equal to:—

$$\frac{E}{E+K} \text{ by formula (14)}$$

$$\frac{E}{E_n+K} \text{ by formula (31)}$$

$$\frac{E_n}{E_n+K} \text{ by formula (39)}$$

(The K's will not necessarily be the same).

Therefore (a) for a fixed value of E, i.e. for a fixed total premium the (normal) credibility for varying normal ratios E_n/E, i.e. for varying amounts of normal premiums contained in the fixed total premiums, will

(i) not vary, for formula (14)
(ii) increase as the amount of normal premiums *decreases*, and vice versa, for formula (31)
(iii) increase as the amount of normal premium *increases*, and vice versa, for formula (39)

and (b) for a fixed value of E_n, i.e. for a fixed normal premium, the (normal) credibility for varying normal ratios, i.e. for varying amounts of total premium, will

(i) increase as the amount of total premium *increases*, and vice versa, for formula (14)
(ii) increase as the amount of total premium *increases*, and vice versa, for formula (31)
(iii) not vary for formula (39)

For formula (39) this behavior is, of course, in accordance with our accepted notions (as the formula is, of course, the ordinary

one) but for formula (31) the behavior in particular in respect of (a) (ii) is rather strange.

Formula (14) comes in between the other two and its characteristics are quite defensible. Nevertheless, as the excess ratios are low for the multi-split plan, the disadvantages of (31) are not as serious as they otherwise would be and the working scheme for this formula is very simple.

Now let us look at another aspect of the three credibilities. If as is customary we fix K by its effect for a low or minimum value of E (either by way of the charge for a maximum loss or the credit for clear experience) we find the formulas give different results for larger values of E say in the neighborhood of Q. Since in thus fixing K it is customary to use an average value of the excess ratio, formulas (14) and (39) will give the same credibilities (for the average value of r) at higher values of E if the K's are chosen so as to give the same effect at a low value of E. (The K's will differ—if r is the average excess ratio used, K by formula (39) will be $(1-r)$ times the K by formula (14)). On the other hand the credibilities at higher values of E given by (31) will be considerably greater than those given by formula (14) or (39) with the same effect at a low value of E. This will be an advantage of formula (31) if we desire to give a wider swing to the plan for medium values of E without opening up the swing too much for small sizes of E, and it has been suggested that there would be considerable merit in doing this since no credibility is given to the excess experience as long as E is less than Q.

24. *Working formulas.*

We come now to the question of the form in which the "working formula" should be put.

First we call attention to the point that both for formulas (14) and (31) if in either the numerator or the denominator we take the sum of the coefficient of W and of the remaining terms we get A in the case of the numerator and E in the case of the denominator. For formula (39) we get $A(1-r)$ and E_n respectively but if we put this formula in the alternative form (40) we again get A and E respectively. This, of course, is the same as saying that we get self-rating for $W = 1$.

Thus we can arrange our working formulas as follows:

I. Formula (14)

We give two alternatives

(i) We require a table of W for values of $E > Q$ and $< S$. We arrange our work sheet to give (a) ballasted actual discounted (normal) losses plus unrated expected excess losses, namely, $A_n + E_e + K$ where K is the "ballast" (b) ballasted expected losses, $E + K$. Then if $E \not> Q$ the modification is $\dfrac{(a)}{(b)} = \dfrac{A_n + E_e + K}{E + K}$

but if $E > Q$ we subtract from the top (c) the proportionate surplus of ballasted actual losses being W times the difference between (a) and the total actual losses, namely, $W\{(A_n + E_e + K) - A\}$, and we subtract from the bottom (d) the proportionate surplus of ballasted expected losses, being W times the difference between (b) and the actual expected losses or $W\{(E + K) - E\}$ and the modification is $\dfrac{(a) - (c)}{(b) - (d)}$

or (ii) We require a table of W as before and also a table of ballasts B equal to $K(1 - W)$. For $E < Q$, $B = K$. We arrange our work sheets to give (a) actual discounted (normal) losses plus unrated expected excess losses $A_n + E_e$ (b) the total expected losses. Then if $E < Q$ the modification is $\dfrac{(a) + \text{ballast}}{(b) + \text{ballast}} = \dfrac{A_n + E_e + K}{E + K}$

If $E > Q$ to the top we add (c) the proportionate remainder losses being W times the difference between the total actual losses and (a) or $W\{A - (A_n + E_e)\}$. Then the modification is

$$\frac{(a) + (c) + \text{ballast}}{(b) + \text{ballast}}$$

where the ballast is B from the table.

The second alternative seems to me to be the preferable.

II. Formula (31)

As before we give alternatives

(i) We require a table of W for $E > Q$ and of K_E the ballast $(= K$ for $E < Q)$. Then we get (a) ballasted actual discounted losses, $A_n + K_E$ and (b) ballasted expected discounted (normal) losses. If $E < Q$ the modification is

$$\frac{(a)}{(b)} = \frac{A_n + K}{E_n + K}$$

but if $E > Q$ we subtract from the top (c) the proportionate surplus ballasted discounted losses being W times the difference between (a) and the total actual losses or $W\{(A_n + K_e) - A\}$, and from the bottom we subtract (d) the proportionate surplus expected discounted losses being W times the difference between (b) and the total expected losses; then the modification is

$$\frac{(a) - (c)}{(b) - (d)}$$

or (ii) We require a table of W as before and also a table of ballasts B equal to $K_E(1 - W)$. For $E < Q, B = K$. We get (a) actual discounted (normal) losses (b) expected discounted losses and if $E < Q$ the modification is

$$\frac{(a) + \text{ballast}}{(b) + \text{ballast}} = \frac{A_n + K}{E_n + K}$$

but if $E > Q$ we add to the top (c) the proportionate remainder actual losses being W times the difference between the total actual losses and (a), and to the bottom we add (d) the proportionate remainder expected losses being W times the difference between the total expected losses and (b). Then the modification is

$$\frac{(a) + (c) + \text{ballast}}{(b) + (d) + \text{ballast}}$$

where the ballast is B from the table.

Again the second alternative seems to be the preferable.

III. Formula (39)

In the form (39) this formula is not very suitable for easy working. It would be best to put it in the form (40) and then proceed as for formula (14) but in all cases dividing the ballast—whether K or B—by $(1 - r)$ before using so as to give ${}^rK$ or ${}^rB$ as the case may be. This makes the application of this formula a little more complicated than (14) which again, at any rate for $E < Q$, is neither quite as simple as (31) nor perhaps as attractive when explained to the layman. For (31) the layman is told, we get the modification by dividing the ballasted discounted actual losses by the ballasted (discounted) expected losses, while for (14) he is told we get the modification by dividing the ballasted discounted actual loss plus the (unrated) expected excess losses by the ballasted (undiscounted) expected losses.

25. *The Basic Constants.*

The fundamental quantities entering into all the calculation in connection with the multi-split plan credibilities as set out above are S, Q, and K and the auxiliary quantities are r (except in the case of (14)) and a. A few observations on these are offered.

Taking a first, we see that no particular harm is done by choosing it on the high side and therefore it seems possible and desirable to choose a value for it which can be the same for all states and need not be changed for every rate revision. This will simplify our calculations by eliminating one source of variation. As for the value to be assigned, if we use actual values in respect of death and more particularly permanent total cases, we shall obtain very high values but if as seems desirable we use, as at present, average values for these types of losses a will come out at a moderate value. In the examples given below I have used the value 4. This is possibly on the small side for universal use.

As for the excess ratio r, this does not enter into (14) at all (except incidentally into the determination of K). It enters into the calculations for (39) (apart from its use in fixing K) so that theoretically we should have different sets of W values for each r. If we use a fixed value of r, preferably near the maximum value we should get satisfactory results (see paragraph 21). There is not yet much information available as to the range of r except that it seems probable it will be fairly small (e.g. with a maximum of perhaps 40% and an average of 15% to 20%) for the values of a and ρ likely to be used in practice for discounting (see paragraph 7). In formula (31) the ratio r enters first into the determination of K_E and as shown in paragraph 20, a maximum value g should be used here. In the examples given below, I have used $g = .333$ which is possibly too low. As for the value of r to be used for formula (31) in determining the W values, the investigation in paragraph 21 shows that a low value should be used but it is not certain in respect of this formula (31) that a single value of r will work satisfactorily in all cases—particularly if the inequality (41b) is complied with by only a small margin. As in the case of a it would be a great simplification in practice if a universal value could be adopted for the fixed value of r to be used in determining the W's but until more is known about the actual values r can take, it cannot be decided if this is possible for formula (31).

Coming now to K, we have mentioned above the usual procedure for the fixing of this constant. As for Q and S these also must be settled on in some more or less arbitrary manner. Suggestions have been made to take S as a certain multiple (say twenty) of the average D. and P. T. value and Q as a fixed percentage of S. (Care must be taken, of course, that S and Q together with the K value chosen satisfy the condition (41) (a), (b) or (c) as the case may be). The taking of Q as a fixed proportion of S would greatly simplify the calculation of the W's.

If α (and the value of r if any to be used) are fixed then the determination of y depends solely on one parameter, namely, the value of w, which can vary, in accordance with the choice of K in relation to S and Q, from 0 to u. This assumes we take η equal to a fixed value say $\frac{1}{2}$ in (27a). So it would be easy to compile a standard table of y. Now if in addition Q/S is a fixed ratio q then Y/S (which equals $y\,(1-q)+(q+K/S)$ for (14) for example) will also depend solely on a single parameter fixed by the relationship of K and S and therefore so will ζ/S and there also W expressed in terms of E/S. Thus if q is fixed W depends only on the relationship of K and S (and if this were fixed one table of W would do!)

The task of preparing a table of W for any state can thus be made much easier by deciding on fixed values for α, r, g and q, although as a matter of fact it is not burdensome to calculate W *ab initio*. We first calculate u and w: the expressions for these quantities are in Appendix I for formula (14) and in paragraph 17 for formula (31); for formula (39) use the same expressions as for formula (14) but with ${}^{r}K$ in place of K.

Then by equations (27b) to (27h) we get the expressions for Y (for formula (31) use equation (35a) instead of (27h)). From Y we get W by using equation (28a) for formula (14), (36a) for formula (31) and (28a) with ${}^{r}K$ for K for formula (39). For formula (31) we must in addition calculate K_E and M.

26. *Which Formula should be used?*

As to which of the three formulas should be used, the final determination of this question will rest on practical grounds, regard being had principally to the ease of explanation and facility of operation of the plan. This seems to rule out the rather more

complicated (39) and give a slight preference to (31), or in other words the order of preference is likely to be (31), (14) and (39), the exact reverse of the order of theoretical desirability. However, if theoretical soundness is given enough weight then the "middle of the road" (14) might be chosen—and the mathematics of derivation and calculation will be considerably simplified. Of course (see paragraph 22) many other formulas are possible and it may well be that one far better may be devised.

My personal preference so far is with (14) but I have tried to present the alternatives impartially.

Part V

Illustrations of Multi-Split Plan Credibilities

27. At the end of the paper will be found some tables giving examples of W values and credibilities for the multi-split plan. These have been calculated in accordance with the foregoing and with basic values similar to those that might be expected to be used in practice.

The examples are chosen so as to be applicable to

I. New York State—with high benefits
II. Massachusetts—with medium benefits
III. Georgia with low benefits

In all cases the S values has been taken as approximately twenty times the average D. and P. T. value and the Q value is 10% of the S value (so that the q of paragraph 25 is 0.1). The actual S and Q values used were

New York	$S = 140000$	$Q = 14000$
Massachusetts	90000	9000
Georgia	42000	4200

(Note that as everywhere else in this paper these are in terms of *expected losses* so that the subject premiums would be about two-thirds greater).

In all cases the value of a used is 4, and the value of η is $\frac{1}{2}$.

In all the tables the various values are given for specimen values of E/S so as to facilitate comparisons from one state and one table to another. The at first sight odd percentages between Q and S were chosen as to give round percentages of the interval between Q and S: thus $E/S = 55\%$ represents a point half way

between Q and S. This scheme of specimen values is possible because Q/S is constant.

28. In table I are given values worked out on the assumption that formula (14) is used for the modification.

The value of r is accordingly immaterial, except in fixing K where an average value of one-sixth was used. The values used for K are New York 6900, Massachusetts 5520, Georgia 4140; these were chosen so as to give a charge of 20% for a maximum loss and a credit of 6⅔% for clear experience for expected losses of 600 for New York, 480 for Massachusetts, and 360 for Georgia, the maximum losses used being 1500 for New York, 1200 for Massachusetts, and 900 for Georgia. (These are discounted values of course).

In table II are given values on the assumption that formula (31) is to be used. The excess ratio used in calculating K_E (that is the g of the paragraph 20) is in all cases one-third. For each of the three states three sets of values are given—with $r = 333$, $r = .167$ and $r = 0$ respectively. (Of course the value $r = 0$ cannot arise in practice but the values are given for this to show how the formulas behave when r is very small). The values of K used are New York 7000, Massachusetts 5000, Georgia 4200, which as before, were chosen so as to give the same charge for a maximum loss and the same credit for clear experience for the same expected losses (with the same average value of one-sixth for r) as for Table I.

The values shown in Tables I and II, for each selected value of E/S are E, K_E (Table II only), W, B, Z_n, Z_e, $S\,Z_n/E$ and $S\,\zeta/E$. The last two functions are given to show the way in which they decrease with E, or in other words to illustrate the negativeness of $(Z_n/E)'$ and $(\zeta/E)'$.

The values of u and w involved in the example in Tables I and II are

	u	w		
	All States	New York	Massachusetts	Georgia
Formula (14) Table I	.2	.0563	.0430	.00159
Formula (31) Table II				
$r = .333$	.3	.1388	.1184	.0555
$r = .167$	.24	.0890	.0727	.0223
$r = 0$	.2	.0550	.0420	0

The fact that $w = 0$ for Table II, Georgia, $r = 0$, shows that for this example S is equal to instead of being greater than $(1 + a)\{Q(1 - r) + K\}$. So in this case, $y = 0$ for all values of x and therefore Y is also constant. Thus W is linear and equal to $(E - Q)/(S - Q)$ and there is no smooth junction for any of W, Z_n and Z_e at Q or at S. This is, of course, the limiting case and as observed above $r = 0$ does not arise in practice. If w were equal to (or less than) zero for a possible value of r, then S, or Q or K would have to be changed.

I have given no examples of the application of formula (39) for this is a simple modification of (14). In fact, Table I gives the values for formula (39) for K values equal to the K's of that table multiplied by $(1 - r)$ whatever r may be. There is little to comment on in these Tables I and II. The functions behave of course as they should in the light of the foregoing theory.

29. To illustrate the discussion in paragraph 21, in respect of formula (31), of the effect of using values of W, derived from a fixed value of the excess ratio, for the case of a different, varying, value of the ratio, I show in Table III values of Z_n, Z_e, $S\,Z_n/E$ and $S\,\zeta/E$ that occur with a variable excess ratio x if W values are used calculated for a fixed value r. These are shown for the same values of E/S as before, for each of the three States, for all combinations of r and x equal to .333, .167 and 0. The values for $r = x$ are not given as they are in Table II. (Here again I must mention that the results shown for r or $x = 0$ are merely illustrative of the limit of the effect of a low excess ratio.)

Chart I (shown at the end of the Tables) has been included to show graphically and a little more fully the behavior of ζ/E if r does not equal x. It shows for each of the nine combinations of the three States and the three x values how ζ/E behaves in going from Q to S when r equals each of the three values we have selected (including the case of $r = x$).

It will be seen that in accordance with the theory given in paragraph 21

(a) if $r = x$ the function ζ/E decreases satisfactorily (for Georgia, $r = x = 0$, ζ/E follows a horizontal straight line which at Q and S is not tangential to the curves for $E < Q$ and $> S$—but this is a limiting case);

(b) if $r > x$ ζ/E does not behave satisfactorily: it decreases, then rises and then falls again.

(c) if $r < x$ ζ/E decreases satisfactorily, except in the case of the Georgia values: there, for $r = .167$, $x = .333$, the behavior is bad for the early part of the interval Q to S (but not bad as, say, for $r = .333$ $x = .167$). In any case this is quite close to a borderline case. For $r = 0$ Georgia, the values of ζ/E are of course even worse.

In paragraph 21 it was suggested that in a borderline case such as Georgia $r = .167$, $x = .333$ where ζ/E, instead of continually decreasing, first decreases then increases and then decreases again, improvement would result if we increased the value of η used to calculate the W's. To show how this works out in this particular case I give on Chart II a graph of ζ/E for Georgia $r = .167$ $x = .333$ both for $\eta = \frac{1}{2}$ (the value used in Chart I and Table III) and for $\eta = 1$, the highest possible value. It will be seen that the up and down behavior of ζ/E is eliminated when $\eta = 1$.

30. Finally, I give Table IV to illustrate the remarks in paragraph 23 regarding the different effects of the three formulas with respect to the credibilities given at higher value of E if the K values are chosen so as to give the same effect at a certain low value of E. In the table IV the K values used for formulas (14) and (31) are the same as in the previous tables and the K values used for formula (39) were chosen so as to give the same effects as the other formulas at minimum values of E. In Table IV are shown for selected E values the Z_n values and also the average credibilities (i.e. the credit for clear experience) taking into account the (zero) excess credibility.

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APPENDIX I

Construction of ζ for formula (14).

The construction referred to in paragraph 14 is as follows:

$$\text{Put } \zeta = \frac{E}{Y} \tag{20}$$

We will construct Y and derive ζ from it.

Y must be such that

(i) at $E = Q$, Y must equal $Q + K$ and be tangent to the line $Y = E + K$ i.e. Y' must equal 1;

(ii) at $E = S$, Y must equal $S/(1 + \alpha)$ and be tangent to the line $Y = E/(1 + \alpha)$ i.e. Y' must equal $1/(1 + \alpha)$;

(iii) $Y' = (E/\zeta)'$ must be always positive;

(iv) $(Y/E)' = (1/\zeta)'$ must be always negative.

Thus (see Fig. V) we must make Y go from q to s and be tangent at q to $L\,q$ and at s to O_s, so that Y continually rises and its tangent cuts 0 Y above 0.

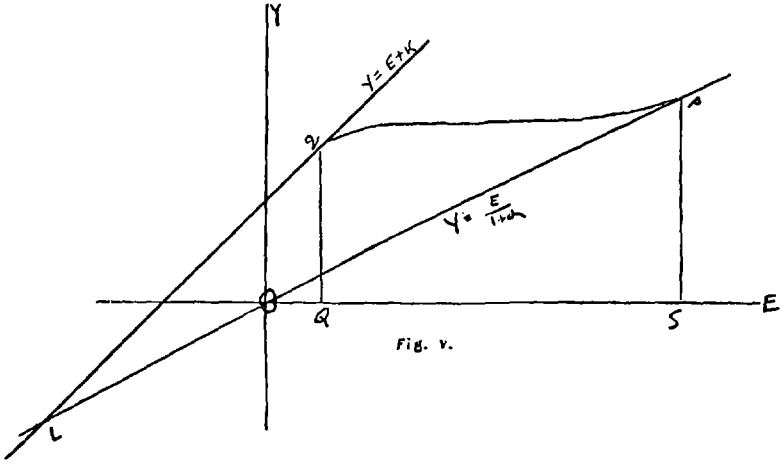


Fig. V.

q must be lower than s which is, of course, the same as the necessary condition (17).

We now put Y equal to the sum of the ordinates of two hyperbolas

$$Y = A_1 - \frac{B_1}{C_1 + E} \quad \text{and } Y = \frac{B_2}{C_2 - E} - A_2$$

where the A's, B's and C's are constants that will be determined so that the sum of these partial curves will meet the necessary conditions, namely that the combined curve touches $L\,q$ at q and O_s at s. B_1 and B_2 are to be positive and $C_1 > -Q, C_2 > S$: then the vertical asymptotes of the two hyperbolas are to the left of Q and the right of S respectively. In both hyperbolas Y' is positive (between Q and S) for in both Y increases from $E = Q$ to $E = S$, therefore, for the combined curve Y' is positive. Again the first partial curve is continually concave to the E axis from Q to S and so Y'' is always negative but it increases continually (that is, gets less negative) from Q to S; also the second curve is continuously convex to the E axis from Q to S, and so Y'' is always positive and it increases continually from E to S: so the sum of the two Y'''s which commences by being negative at q and ends by being positive at S can change sign only once between Q and S: in other words there is one and only one point of inflexion between Q and S and the tangent to the combined curve, starting from $L\,q$ at $E = Q$ and ending at $L\,s$ at $E = S$ can never cut $O\,Y$ below O as an examination of Fig. V will show. In other words, for the combined curve $(Y/E)'$ will always be negative, as required. (The tangent not only always cuts $O\,Y$ above O but also always cuts $L\,q$ above L: this fact will be needed in Appendix II).

To determine the constants we will simplify the calculations by transferring the origin to q and making $S - Q$ the unit i.e. we put

$$y = \frac{Y - Q - K}{S - Q} \qquad x = \frac{E - Q}{S - Q} \tag{21}$$

then the required curve will be

$$y = \frac{h}{k} - \frac{h}{x + k} + \frac{t}{j - x} - \frac{t}{j} \tag{22}$$

where h, k, t must be > 0 and $j > 1$.

In addition we must have

(i) for $x = 0$ $y = 0$ (this is taken care of the form of (22))

(ii) for $x = 0$ $y' = 1$

(iii) for $x = 1$ $y = \{S/(1+a) - (Q+K)\}/(S-Q)$ or w (say)

(iv) for $x = 1$ $y' = 1/(1 + a)$ or u (say)

(ii), (iii) and (iv) give us

$$\left.\begin{aligned} \frac{h}{k^2} + \frac{t}{j^2} &= 1 \\ \frac{h}{k\,(k+1)} + \frac{t}{j\,(j-1)} &= w \\ \frac{h}{(k+1)^2} + \frac{t}{(j-1)^2} &= u \end{aligned}\right\} \quad (23)$$

Note that $w = \dfrac{S-(1+a)(Q+K)}{(S-Q)(1+a)}$ which is positive and that $u - w = \dfrac{a\,Q+(a+1)\,K}{(S-Q)(1+a)}$ which is also positive and so

$$0 < w < u < 1 \quad (24)$$

To solve (23) I put

$$p = \frac{h}{k\,(k+1)} \qquad \lambda = \frac{h}{k^2} \quad (25)$$

Then

$$w - p = \frac{t}{j\,(j-1)} \qquad 1 - \lambda = \frac{t}{j^2}$$

from which we get

$$\frac{p^2}{\lambda} = \frac{h}{(k+1)^2} \qquad \frac{(w-p)^2}{1-\lambda} = \frac{t}{(j-1)^2}$$

so we must have

$$\frac{p^2}{\lambda} + \frac{(w-p)^2}{1-\lambda} = u \quad (26)$$

and if we can find values of p and λ that satisfy this and such that $w - p > 1 - \lambda > 0$ and $\lambda > p > 0$ then these values will give a solution of (23).

Now (26) can be written

$$(p - w\,\lambda)^2 = \lambda\,(1-\lambda)(u - w^2)$$

and as $w < u < 1$ therefore $u > w^2$ so put $u - w^2 = \sigma$ which is positive and we have

$$(p - w\,\lambda)^2 + (\lambda - \tfrac{1}{2})^2\,\sigma = \sigma/4$$

which is an ellipse in p and λ (see Fig. VI) with center $\lambda = \frac{1}{2}$, $p = w/2$, passing through the origin $(0, 0)$ and touching the p axis there, also passing through $(w, 1)$ and touching $\lambda = 1$ there. It cuts the λ axis at $\lambda = 0$ and $\lambda = \sigma/u$ and also cuts $p = w$ at $\lambda = 1$ and $\lambda = w^2/u$.

Also the line $w - p = 1 - \lambda$ passes through $(w, 1)$ and cuts the λ axis at $\lambda = 1 - w$. Also since w is less than unity the line $p = \lambda$ which is parallel to $w - p = 1 - \lambda$ passes through the origin and lies to the left of $w - p = 1 - \lambda$.

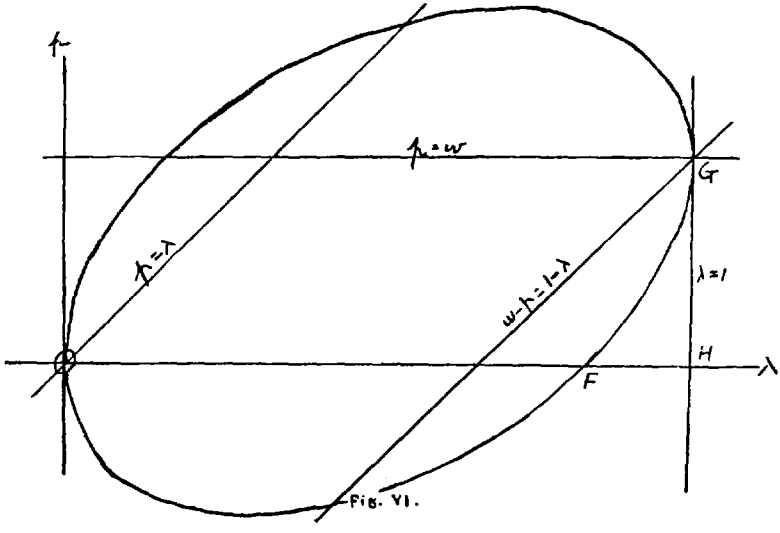


Fig. VI.

Thus all the solutions are given by the arc of the ellipse from $p = 0$, $\lambda = \sigma/u$ to $p = w$, $\lambda = 1$ or (in Fig. VI) from F to G.

There is one "degree of freedom" in this solution as there is one more constant in (22) than there are conditions to be fulfilled.

This is expressed by the possibility of choosing any point on the arc $F\,G$ to give values of p and λ. As $F\,H = w^2/u$ and is usually small compared with $O\,H$ which equals one, a good set of values for p and λ is usually obtained by putting $\eta = \frac{1}{2}$ in $p/\lambda = (1 - \eta)\,w$, the equation which gives all the solutions by varying η from 0 to 1.

The solution is thus:

$$\text{Put } \frac{p}{\lambda} = (1 - \eta)\,w \qquad 0 < \eta < 1 \qquad (27a)$$

Then solving (26) for λ

$$\lambda = \frac{u - w^2}{u - w^2\,(1 - \eta^2)} \qquad (27b)$$

$$p = (1 - \eta)\,w\,\lambda. \qquad (27c)$$

Then from (25)

$$k = \frac{p}{\lambda - p} \tag{27d}$$

$$h = \lambda k^2 \tag{27e}$$

$$j = \frac{w - p}{(w - p) - (1 - \lambda)} \tag{27f}$$

$$t = (1 - \lambda) j^2 \tag{27g}$$

Then from $y = \frac{h}{k} - \frac{t}{j} - \frac{h}{k+x} + \frac{t}{j-x}$

$$Y = \left(\frac{h}{k} - \frac{t}{j}\right)(S-Q) + (Q+K) - \frac{h\,(S-Q)^2}{E-Q+(S-Q)\,k} + \frac{t\,(S-Q)^2}{j\,(S-Q)+Q-E} \tag{27h}$$

$$\zeta = \frac{E}{Y} \tag{27i}$$

If η is taken as 0, $p = 0$ and $\lambda = \sigma/u$, the partial curve $y = \frac{h}{k} - \frac{h}{k+x}$ degenerates to $y = 0$ and the curve for Y is not a proper tangent at q: similarly if $\eta = 1$, $p = w$ and $\lambda = 1$, the partial curve $y = \frac{t}{j-x} - \frac{t}{j}$ degenerates to $y = 0$ and the curve for Y is not a proper tangent at S. η should therefore be taken between 0 and 1 say at ½ as suggested above.

The equation for Y is of the form

$$Y = A_1 - \frac{B_1}{C_1 + E} + \frac{B_2}{C_2 - E} = \frac{C_3 + B_3 E - A_1 E^2}{(C_1 + E)(C_2 - E)}$$

and so the equation for ζ is of the form

$$\zeta = \frac{E\,(C_1 + E)(C_2 - E)}{C_3 + B_3 E - A_1 E^2}$$

a cubic equation. (All the A's, B's and C's are constants).

APPENDIX II

Proof that W (and therefore Z_e) increases with E.

We wish to show that for our construction of W for formula (14)—and for formula (31)—W increases with E. An algebraical proof is given below but first it is constructive to examine the question geometrically and in terms of Y and E as shown in Fig. V.

Taking equation (28a)

$$(a\,Y + K)\,W = E - Y + K$$

we can regard this as the equation of a family of curves in Y and E with W as the parameter. The equation can be written as

$$(a\,W + 1)\,Y = E + K\,(1 - W)$$

showing this represents a family of straight lines. Each one passes through the point L of Figure V, the intersection of $Y = E + K$ and $Y = E/(1 + a)$, the coordinates of which are

$$E_L = -\frac{1+a}{a}\,K,\quad Y_L = -\frac{K}{a}$$

For $W = 0$ the line is $Y = E + K$ or the line $L\,q$, and for $W = 1$ the line is $(a + 1)\,Y = E$ or the line $L\,O\,s$: and as W goes from 0 to 1 the line rotates round L from $L\,q$ to $L\,s$. Now drawing

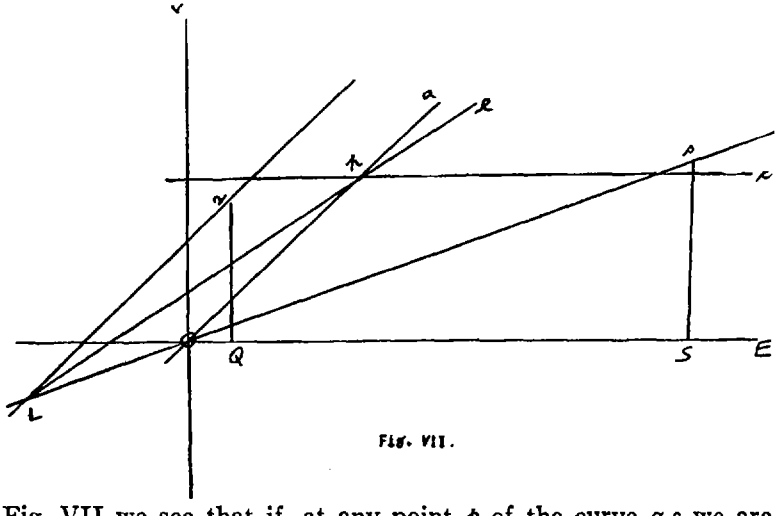


FIG. VII.

Fig. VII we see that if, at any point p of the curve $q\,s$ we are constructing for Y, W is to decrease, the tangent to the curve at p

must fall in the angle $a\,p\,l$ where a is on $O\,p$ extended and l is on $L\,p$ extended.

Now the conditions to which the curve $q\,p\,s$ is subject are that the tangent is in the angle $a\,p\,c$ where $p\,c$ is parallel to the E axis $O\,Q\,S$ and since $a\,p\,l$ falls inside $a\,p\,c$ it is possible to construct the curve so that W decreases: but we observe that our construction does not permit of this: for as noted in Appendix I the tangent always cuts $L\,q$ above L and thus the tangent always falls in the angle $l\,p\,c$. Thus W cannot decrease for our construction.

We can now give an algebraic proof of the increasing of W with E. To do this we obtain the inequality expressing the fact noted above that the tangent to $q\,s$ cuts $L\,q$ above L. If the coordinates of the intersection of $L\,q$ and the tangent are E_T and L_T we have

$$Y_T = Y'(E_T - E) + Y = E_T + K$$

whence $E_T = \dfrac{Y - K - E\,Y'}{1 - Y'}$

therefore $\dfrac{Y - K - E\,Y'}{1 - Y'} > E_L > -\dfrac{a+1}{a}\,K$

$$\text{or } a\,Y + K > Y'\{a\,E + (a+1)\,K\}.$$

Translating this back into terms of ζ we put $Y = E/\zeta$ and $Y' = (\zeta - E\,\zeta')/\zeta^2$ and get

$$E\,\zeta'\{a\,E + (a+1)\,K\} > \zeta\,K\,(a + 1 - \zeta).$$

Now differentiating (28)

$$(a\,E + \zeta\,K)^2\,W' = E\,\zeta'\{a\,E + (a+1)\,K\} - \zeta\,K\,(a + 1 - \zeta)$$

which is positive by the inequality just proved.

Thus W' is positive.

We will now give a proof in the case of the construction given for formula (31): the geometrical proof is considerably complicated by the variability of M and we will not give it. We can, however, readily extend the algebraic proof as follows:

Proceeding as in the proof for formula (14) we have E_L given by

$$\frac{E_L}{(1+a)(1-r)} = E_L + \frac{K}{1-r} \quad \text{or} \quad E_L = -K\,\frac{a+1}{a\,(1-r) - r}$$

and E_T is given by $Y'(E_T - E) + Y = E_T + \dfrac{K}{1-r}$

so $E_T = \dfrac{Y - E\,Y' - K/(1-r)}{1 - Y'}$ which is greater than E_L

Thus

$$\{a\,(1-r)-r\}\,Y+K/(1-r)>Y'\,[\{a\,(1-r)-r\}\,E+(a+1)\,K].$$

Now putting $Y=\dfrac{E}{\zeta\,(1-r)}$ $\qquad$ $Y'=\dfrac{\zeta-E\,\zeta'}{\zeta^2\,(1-r)}$

we get $E\,\zeta'\,[\{a\,(1-r)-r\}\,E+(a+1)\,K]>\zeta\,K\,(a+1-\zeta)$.

Now $K_E \lessdot K$ so we can put K_E for K in the left hand side of this inequality which then becomes $E\,\zeta'\,\{a\,E+(a+1)\,M\}$.

Also the maximum value of $M-E\,M'$ is, as we have seen in paragraph 19, equal to K: so we can put $M-E\,M'$ for K in the right hand side. So we have

$$\zeta'\,E\,\{a\,E+(a+1)\,M\}>\zeta\,(M-E\,M')\,(a+1-\zeta).$$

Differentiating (36) we get

$$(a\,E+\zeta\,M)^2\,w'=\zeta\,E\,\{a\,E+(a+1)\,M\}-\zeta\,(M-E\,M')\,(a+1-\zeta)$$

and by the inequality just proved the right hand side is positive and so W (and therefore Z_e) increases with E.

Appendix III

Direct Construction of W for Formula (14).

At the end of paragraph (12) I had to choose between

(a) constructing ζ so that ζ' is positive and $(\zeta/E)'$ negative and then seeing if W' is positive; or

(b) constructing W so that W' is positive and $(\zeta/E)'$ negative.

I chose (a) but stated that (b) would lead to identical values of W.

In this Appendix we will work out (b).

We must first express in terms of W the condition that $(\zeta/E)'$ must be negative. Dividing (18) through by E and differentiating we get

$$\{E+K\,(1-W)\}^2\,(\zeta/E)'=W'\,\{a\,E+(a+1)\,K\}-(1+a\,W)$$

and the right hand side multiplied by a is equal to

$$\{a\,E+(a+1)\,K\}^2$$

times the derivative with respect to E of

$$\frac{1+a\,W}{a\,E+(a+1)\,K}$$

So the condition that ζ/E must decrease is equivalent to the condition that $(1+a\,W)/\{a\,E+(a+1)\,K\}$ must decrease.

Now if we put

$$a\omega = 1 + aW \qquad a\epsilon = aE + (a+1)K$$

or in other words change the origin from $E = 0$, $W = 0$ to

$$E = -\frac{a+1}{a}K \qquad W = -\frac{1}{a}$$

the conditions W' is to be positive and $(\zeta/E)'$ is to be negative become ω' is to be positive and $(\omega/\epsilon)'$ is to be negative (where the differentiations are here with respect to ϵ). These are very similar to the conditions under which we constructed ζ. We have the terminal conditions that

(i) when $\epsilon = Q + \frac{a+1}{a}K$ $\qquad \omega = \frac{1}{a}$, $\omega' = 0$

(ii) when $\epsilon = S + \frac{a+1}{a}K$ $\qquad \omega = \frac{1+a}{a}$, $\omega' = 0$.

Now if we put $\omega = \frac{\epsilon}{aV}$ we have to go

from $\epsilon = Q + \frac{a+1}{a}K$ $\qquad V = Q + \frac{a+1}{a}K$ with $V' = 1$

to $\epsilon = S + \frac{a+1}{a}K$ $\qquad V = \frac{S}{1+a} + \frac{K}{a}$ with $V' = \frac{1}{1+a}$

so that V' is positive and $(V/\epsilon)'$ is negative.

These conditions are very similar to those for Y in Appendix I. In fact if we refer to Fig. V in Appendix I we see that if we change the origin from O (or $E = 0$, $Y = 0$) to L

$$(E = -K(a+1)/a,\ Y = -K/a)$$

by putting

$$a\epsilon_1 = aE + (a+1)K \qquad aV_1 = aY + K$$

the conditions to which V_1 is subject become exactly those to which V is subject—except that the condition Y/E must decrease does not become the condition V_1/ϵ_1 must decrease. In other words the ϵ_1 and V_1 which we get this way, by transfering E and Y are exactly the ϵ and the V we have just derived from E and W: for it is easily seen that the two ϵ's are the same and as for the two V's the V_1 derived from Y equals

$$\frac{aY + K}{a}$$

which is the same as $\dfrac{a E/\zeta + K}{a}$

or $\dfrac{a E \{E + K (1 - W)\} + K E (a W + 1)}{a E (a W + 1)}$ by (18)

or $\dfrac{a E + (a + 1) K}{a (a W + 1)}$

which equals $\epsilon/a\,\omega$ or V derived from E and W.

Thus the only difference between the conditions for V and for Y are that for the former V/ϵ must decrease and for the latter Y/E. These represent the difference between the conditions with which we started. In constructing Y in Appendix I we required that this should make ζ' positive and in setting up V we required that this should make W' positive.

Now if Y/E is to decrease the tangent to the curve $q\,s$ must cut $O\,Y$ above O: and if V/ϵ is to decrease the tangent must pass above L or, as it can be put must cut $L\,q$ above L. It will be recalled that our construction actually fulfills *both* these conditions (or rather as it fulfills the harder condition that the tangent should pass above L it also fulfills the easier condition that it should pass above O) and it was because of this that W' proved to be positive as well as ζ'.

So if we finish the construction of V by

(i) transferring the origin $\epsilon = 0$ $V = 0$ from L to q at the same time making the unit $S - Q$ (just as we did in Appendix I for Y) and denoting the transformed ϵ by x and the transformed V by y; and

(ii) constructing y in terms of x just as in Appendix I

then we get the same values of y as in Appendix I and these give values of V in terms of ϵ that give the same values of W in terms of E as we get from the values of Y as obtained in Appendix I. Thus we see that if we set out to construct W direct so as to make W' positive and $(\zeta/E)'$ negative we arrive at exactly the same W values as we do by constructing ζ first as in Appendix I.

TABLE I

Examples of Results Produced by Formula (14)

$a = 4 \qquad \eta = \frac{1}{2}$

		E/S										
		.01	.05	.10	.145	.19	.28	.37	.55	.73	.91	1.00
				Q								S
New York	E	1400	7000	14000	20300	26600	39200	51800	77000	102200	127400	140000
	W	..	..	.000	.040	.095	.211	.328	.558	.776	.958	1.000
$S = 140000$	B	6900	6900	6900	6624	6245	5444	4637	3050	1546	290	0
$Q = 14000$	Z_n	.169	.504	.670	.754	.810	.878	.918	.962	.985	.998	1.000
$K = 6900$	Z_e	.000	.000	.000	.030	.077	.185	.301	.536	.763	.956	1.000
	$S\,Z_n/E$	16.90	10.08	6.70	5.20	4.26	3.14	2.48	1.75	1.35	1.10	1.00
	$S\ \zeta/E$	16.90	10.08	6.70	6.03	5.88	5.78	5.74	5.65	5.53	5.30	5.00
Massachusetts	E	900	4500	9000	13050	17100	25200	33300	49500	65700	81900	90000
	W	..	..	.000	.041	.095	.208	.320	.543	.760	.950	1.000
$S = 90000$	B	5520	5520	5520	5294	4996	4372	3754	2523	1325	276	0
$Q = 9000$	Z_n	.140	.449	.620	.711	.774	.852	.899	.952	.980	.997	1.000
$K = 5520$	Z_e	.000	.000	.000	.029	.074	.177	.288	.517	.745	.947	1.000
	$S\,Z_n/E$	14.00	8.98	6.20	4.90	3.07	3.02	2.43	1.73	1.34	1.10	1.00
	$S\ \zeta/E$	14.00	8.98	6.20	5.71	5.62	5.57	5.54	5.49	5.42	5.26	5.00
Georgia	E	420	2100	4200	6090	7980	11760	15540	23100	30660	38220	42000
	W	..	..	.000	.050	.100	.200	.301	.502	.703	.904	1.000
$S = 42000$	B	4140	4140	4140	3933	3726	3312	2894	2062	1230	397	0
$Q = 4200$	Z_n	.092	.337	.504	.607	.682	.780	.843	.918	.961	.990	1.000
$K = 4140$	Z_e	.000	.000	.000	.030	.068	.158	.253	.460	.675	.894	1.000
	$S\,Z_n/E$	9.20	6.74	5.04	4.19	3.59	2.79	2.28	1.67	1.32	1.09	1.00
	$S\ \zeta/E$	9.20	6.74	5.04	5.02	5.02	5.02	5.02	5.02	5.02	5.01	5.00

TABLE II

Examples of Results Produced by Formula (31)—when excess ratio of risk is the same as that for which the W's are calculated

$\alpha = 4$ $\eta = \frac{1}{2}$ $g = .333$ E/S

			.01	.05	.10	.145	.19	.28	.37	.55	.73	.91	1.00
					Q								S
New York		E	1400	7000	14000	20300	26600	39200	51800	77000	102200	127400	140000
		K_E	7000	7000	7000	8000	9700	13580	17630	25900	34240	42610	46790
$S = 140000$	$r = .333$	W	..	..	.000	.034	.092	.218	.346	.594	.813	.971	1.000
$Q = 14000$		B	7000	7000	7000	7728	8808	10620	11530	10515	6403	1236	0
$K = 7000$		Z_n	.176	.600	.857	.946	.972	.990	.995	.999	1.000	1.000	1.000
		Z_e	.000	.000	.000	.032	.089	.216	.344	.593	.813	.971	1.000
		$S\,Z_n/E$	17.60	12.00	8.57	6.52	5.11	3.54	2.69	1.82	1.37	1.09	1.00
		$S\ \zeta/E$	17.60	12.00	8.57	7.41	6.85	6.62	.641	6.13	5.82	5.36	5.00
	$r = .167$	W	..	..	.000	.041	.105	.238	.369	.611	.819	.970	1.000
		B	7000	7000	7000	7672	8682	10348	11125	10075	6197	1278	0
		Z_n	.171	.546	.750	.821	.850	.880	.901	.938	.970	.995	1.000
		Z_e	.000	.000	.000	.034	.089	.210	.333	.573	.794	.965	1.000
		$S\,Z_n/E$	17.10	10.92	7.50	5.66	4.47	3.14	2.44	1.71	1.33	1.09	1.00
		$S\ \zeta/E$	17.10	10.92	7.50	6.60	6.35	6.14	6.04	5.87	5.68	5.34	5.00
	$r = 0$	W	..	..	.000	.049	.118	.258	.389	.623	.820	.968	1.000
		B	7000	7000	7000	7608	8555	10076	10772	9764	6163	1364	0
		Z_n	.167	.500	.667	.727	.757	.795	.828	.888	.943	.989	1.000
		Z_e	.000	.000	.000	.036	.090	.205	.322	.553	.773	.957	1.000
		$S\,Z_n/E$	16.70	10.00	6.66	5.01	3.99	2.84	2.24	1.61	1.29	1.09	1.00
		$S\ \zeta/E$	16.70	10.00	6.67	6.01	5.87	5.77	5.72	5.64	5.53	5.30	5.00

TABLE II — *Continued*

Examples of Results Produced by Formula (31)—when excess ratio of risk is the same as that for which the W's are calculated

$a = 4 \qquad \eta = \frac{1}{2} \qquad g = \frac{.333}{E/S}$

			.01	.05	.10	.145	.19	.28	.37	.55	.73	.91	1.00
					Q								S
Massachusetts		E	900	4500	9000	13050	17100	25200	33300	49500	65700	81900	90000
		K_E	5600	5600	5600	6060	6980	9250	11730	16920	22210	27550	30230
$S = 90000$	$r = .333$	W	..	..	.000	.030	.083	.202	.326	.572	.796	.967	1.000
$Q = 9000$		B	5600	5600	5600	5878	6401	7382	7906	7242	4531	909	0
$K = 5600$		Z_n	.145	5.23	.776	.887	.935	.973	.987	.996	.999	1.000	1.000
		Z_e	.000	.000	.000	.027	.077	.197	.322	.569	.795	.967	1.000
		$S\,Z_n/E$	14.50	10.46	7.76	6.12	4.92	3.48	2.67	1.81	1.37	1.10	1.00
		$S\ \zeta/E$	14.50	10.46	7.76	6.86	6.55	6.29	6.15	5.95	5.72	5.35	5.00
	$r = .167$	W	..	..	.000	.038	.098	.225	.352	.591	.802	.965	1.000
		B	5600	5600	5600	5830	6296	7169	7601	6920	4398	964	0
		Z_n	.142	.481	.687	.778	.821	.866	.890	.933	.967	.994	1.000
		Z_e	.000	.000	.000	.030	.080	.195	.314	.551	.775	.959	1.000
		$S\,Z_n/E$	14.20	9.62	6.87	5.37	4.32	3.09	2.41	1.70	1.32	1.09	1.00
		$S\ \zeta/E$	14.20	9.62	6.87	6.18	6.01	5.88	5.81	5.71	5.57	5.31	5.00
	$r = 0$	W	..	..	.000	.048	.113	.247	.374	.605	.804	.961	1.000
		B	5600	5600	5600	5769	6191	6965	7343	6683	4353	1074	0
		Z_n	.138	.446	.616	.693	.734	.783	.819	.881	.938	.987	1.000
		Z_e	.000	.000	.000	.033	.083	.193	.306	.553	.754	.949	1.000
		$S\,Z_n/E$	13.80	8.92	6.16	4.78	3.86	2.80	2.21	1.60	1.28	1.08	1.00
		$S\ \zeta/E$	13.80	8.92	6.16	5.69	5.61	5.56	5.53	5.48	5.42	4.69	5.00

TABLE II — *Continued*

Examples of Results Produced by Formula (31)—when excess ratio of risk is the same as that for which the W's are calculated

$a = 4$ $\eta = \frac{1}{2}$ $g = .333$

			E/S .01	.05	.10	.145	.19	.28	.37	.55	.73	.91	1.00
					Q								S
Georgia		E	420	2100	4200	6090	7980	11760	15540	23100	30660	38220	42000
		K_E	4200	4200	4200	4320	4590	5390	6370	8560	10890	13290	14510
$S = 42000$	$r = .333$	W	..	..	.000	.028	.072	.174	.283	.510	.737	.942	1.000
$Q = 4200$		B	4200	4200	4200	4199	4260	4452	4567	4194	2973	771	0
$K = 4200$		Z_n	.094	.375	.600	.732	.817	.906	.948	.982	.994	.999	1.000
		Z_e	.000	.000	.000	.021	.059	.158	.168	.500	.733	.941	1.000
		$S\ Z_n/E$	9.40	7.50	6.00	5.05	4.30	3.23	2.56	1.79	1.36	1.10	1.00
		$S\ \zeta/E$	9.40	7.50	6.00	5.63	5.54	5.49	5.46	5.42	5.38	5.23	5.00
	$r = .167$	W	..	..	.000	.040	.091	.201	.314	.535	.745	.936	1.000
		B	4200	4200	4200	4147	4172	4307	4370	3980	2777	850	0
		Z_n	.092	.353	.545	.658	.729	.811	.857	.914	.954	.989	1.000
		Z_e	.000	.000	.000	.026	.067	.163	.269	.489	.711	.925	1.000
		$S\ Z_n/E$	9.20	7.06	5.45	4.54	3.84	2.90	2.31	1.66	1.46	1.13	1.00
		$S\ \zeta/E$	9.20	7.06	5.45	5.25	5.24	5.23	5.22	5.22	5.20	5.15	5.00
	$r = 0$	W	..	..	.000	.053	.109	.224	.338	.552	.745	.919	1.000
		B	4200	4200	4200	4091	4090	4183	4217	3835	2777	1076	0
		Z_n	.091	.333	.500	.598	.661	.738	.787	.858	.917	.973	1.000
		Z_e	.000	.000	.000	.032	.072	.166	.266	.473	.683	.894	1.000
		$S\ Z_n/E$	9.10	6.66	5.00	4.12	3.48	2.64	2.13	1.56	1.26	1.07	1.00
		$S\ \zeta/E$	9.10	6.66	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

TABLE III

Examples of Results Produced by Formula (31)—when excess ratio of risk (x) is different from that (r) for which the W's are calculated

$\alpha = 4 \qquad \eta = \frac{1}{2} \qquad g = \frac{.333}{E/S}$

r	x		.01	.05	.10	.145	.19	.28	.37	.55	.73	.91	1.00
					Q								S
New York		E	1400	7000	14000	20300	26600	39200	51800	77000	102200	127400	140000
.333	.167	Z_n	.171	.546	.750	.820	.848	.877	.898	.936	.970	.995	1.000
		Z_e	.000	.000	.000	.028	.078	.191	.311	.556	.789	.966	1.000
		$S\ Z_n/E$	17.10	10.92	7.50	5.66	4.47	3.14	2.42	1.71	1.33	1.09	1.00
		$S\ \zeta/E$	17.10	10.92	7.50	6.43	6.10	5.87	5.80	5.74	5.66	5.33	5.00
	0	Z_n	.167	.500	.667	.725	.751	.787	.818	.880	.941	.990	1.000
		Z_e	.000	.000	.000	.025	.069	.172	.283	.523	.765	.961	1.000
		$S\ Z_n/E$	16.70	10.00	6.67	5.00	3.95	2.81	2.21	1.60	1.43	1.09	1.00
		$S\ \zeta/E$	16.70	10.00	6.67	5.68	5.40	5.26	5.26	5.40	5.47	5.31	5.00
.167	.333	Z_n	.177	.600	.857	.945	.973	.990	.996	.999	1.000	1.000	1.000
		Z_e	.000	.000	.000	.039	.102	.236	.368	.610	.819	.970	1.000
		$S\ Z_n/E$	17.70	12.00	8.57	6.52	5.12	3.54	2.70	1.82	1.37	1.09	1.00
		$S\ \zeta/E$	17.70	12.00	8.57	7.59	7.27	6.90	6.66	6.26	5.85	5.36	5.00
	0	Z_n	.167	.500	.667	.726	.754	.792	.823	.884	.943	.990	1.000
		Z_e	.000	.000	.000	.030	.079	.188	.304	.540	.772	.960	1.000
		$S\ Z_n/E$	16.70	10.00	6.67	5.01	3.97	2.83	2.22	1.67	1.29	1.09	1.00
		$S\ \zeta/E$	16.70	10.00	6.67	5.84	5.63	5.52	5.52	5.53	5.52	5.31	5.00

TABLE III — *Continued*

Examples of Results Produced by Formula (31)—when excess ratio of risk (x) is different from that (r) for which the W's are calculated

$a = 4$ $\eta = \frac{1}{2}$ $g = .333$

r	x		E/S .01	.05	.10	.145	.19	.28	.37	.55	.73	.91	1.00
					Q								S
New York (Cont'd)													
0	.333	Z_n	.176	.600	.857	.947	.973	.990	.996	.999	1.000	1.000	1.000
		Z_e	.000	.000	.000	.046	.115	.255	.387	.622	.820	.961	1.000
		$S\ Z_n/E$	17.60	12.00	8.57	6.54	5.12	3.54	2.69	1.82	1.37	1.09	1.00
		$S\ \zeta/E$	17.60	12.00	8.57	7.80	7.54	7.18	6.87	6.34	5.87	5.35	5.00
	.167	Z_n	.171	.546	.750	.823	.851	.882	.904	.940	.971	.995	1.000
		Z_e	.000	.000	.000	.040	.100	.228	.352	.586	.796	.963	1.000
		$S\ Z_n/E$	17.09	10.92	7.50	5.08	4.48	3.15	2.45	1.71	1.33	1.09	1.000
		$S\ \zeta/E$	17.09	10.92	7.50	6.78	6.58	6.41	6.24	5.96	5.70	5.32	5.00
Massachusetts		E	900	4500	9000	13050	17100	25200	33300	49500	65700	81900	90000
.333	.167	Z_n	.142	.481	.687	.776	.819	.862	.889	.930	.966	.994	1.000
		Z_e	.000	.000	.000	.023	.068	.174	.290	.532	.769	.961	1.000
		$S\ Z_n/E$	14.20	9.62	6.87	5.36	4.31	3.08	2.40	1.69	1.32	1.09	1.00
		$S\ \zeta/E$	14.20	9.62	6.87	5.99	5.74	5.56	5.54	5.56	5.54	5.32	5.00
	0	Z_n	.138	.446	.616	.689	.728	.773	.808	.872	.935	.989	1.000
		Z_e	.000	.000	.000	.021	.060	.156	.263	.499	.744	.956	1.000
		$S\ Z_n/E$	13.80	8.92	6.16	4.75	3.84	2.76	2.19	1.58	1.28	1.09	1.00
		$S\ \zeta/E$	13.80	8.92	6.16	5.33	5.09	4.99	5.03	5.21	5.36	5.29	5.00

TABLE III — *Continued*

Examples of Results Produced by Formula (31)—when excess ratio of risk (x) is different from that (r) for which the W's are calculated

$a = 4 \qquad \eta = \frac{1}{2} \qquad g = .333$

Massachusetts (Cont'd)			E/S .01	.05	.10	.145	.19	.28	.37	.55	.73	.91	1.00
r	x				Q								S
.167	.333	Z_n	.145	.523	.776	.888	.936	.974	.988	.996	.999	1.000	1.000
		Z_e	.000	.000	.000	.034	.092	.219	.348	.589	.801	.965	1.000
		$S\,Z_n/E$	14.50	10.46	7.76	6.12	4.92	3.48	2.67	1.81	1.38	1.10	1.00
		$S\ \zeta/E$	14.50	10.46	7.76	7.07	6.87	6.61	6.44	6.09	5.76	5.34	5.00
	0	Z_n	.138	.446	.616	.691	.731	.778	.814	.877	.937	.988	1.000
		Z_e	.000	.000	.000	.026	.072	.175	.287	.518	.751	.953	1.000
		$S\,Z_n/E$	13.80	8.92	6.16	4.77	3.84	2.78	2.20	1.59	1.29	1.08	1.00
		$S\ \zeta/E$	13.80	8.92	6.16	5.48	5.36	5.28	5.30	5.36	5.40	5.27	5.00
0	.333	Z_n	.145	.523	.776	.881	.938	.975	.988	.997	.999	1.000	1.000
		Z_e	.000	.000	.000	.042	.106	.241	.370	.603	.803	.961	1.000
		$S\,Z_n/E$	14.50	10.46	7.76	6.07	4.93	3.48	2.67	1.81	1.37	1.10	1.00
		$S\ \zeta/E$	14.50	10.46	7.76	7.24	7.16	6.92	6.67	6.20	5.77	5.32	5.00
	.167	Z_n	.142	.481	.687	.780	.824	.869	.896	.935	.968	.993	1.000
		Z_e	.000	.000	.000	.037	.093	.215	.335	.566	.778	.954	1.000
		$S\,Z_n/E$	14.20	9.62	6.87	5.38	4.34	3.11	2.42	1.70	1.32	1.09	1.00
		$S\ \zeta/E$	14.20	9.62	6.87	6.40	6.29	6.17	6.04	5.81	5.59	5.28	5.00

TABLE III — *Continued*

Examples of Results Produced by Formula (31)—when excess ratio of risk (x) is different from that (r) for which the W's are calculated

$a = 4 \qquad \eta = \frac{1}{2} \qquad g = .333$

				E/S										
				.01	.05	.10	.145	.19	.28	.37	.55	.73	.91	1.00
	r	x				Q								S
Georgia			E	420	2100	4200	6090	7980	11760	15540	23100	30660	38220	42000
	.333	.167	Z_n	.092	.353	.545	.655	.725	.806	.852	.909	.953	.990	1.000
			Z_e	.000	.000	.000	.018	.052	.140	.241	.464	.702	.933	1.000
			$S\,Z_n/E$	9.20	7.06	5.45	4.52	3.82	2.88	2.30	1.65	1.31	1.09	1.00
			$S\ \zeta/E$	9.20	7.06	5.45	5.01	4.91	4.88	4.91	5.03	5.15	5.19	5.00
		0	Z_n	.091	.333	.500	.592	.652	.725	.773	.846	.915	.980	1.000
			Z_e	.000	.000	.000	.017	.047	.126	.219	.431	.674	.923	1.000
			$S\,Z_n/E$	9.10	6.66	5.00	4.08	3.43	2.59	2.09	1.54	1.25	1.08	1.00
			$S\ \zeta/E$	9.10	6.66	5.00	4.55	4.42	4.39	4.46	4.67	4.95	5.13	5.00
	.167	.333	Z_n	.094	.375	.600	.735	.820	.910	.950	.983	.994	.999	1.000
			Z_e	.000	.000	.000	.029	.075	.183	.298	.526	.741	.935	1.000
			$S\,Z_n/E$	9.40	7.50	6.00	5.07	4.32	3.25	2.57	1.79	1.36	1.10	1.00
			$S\ \zeta/E$	9.40	7.50	6.00	5.87	5.90	5.86	5.79	5.61	5.42	5.21	5.00
		0	Z_n	.091	.333	.500	.595	.657	.732	.781	.853	.917	.978	1.000
			Z_e	.000	.000	.000	.024	.060	.147	.245	.456	.683	.915	1.000
			$S\,Z_n/E$	9.10	6.66	5.00	4.10	3.46	2.61	2.11	1.55	1.26	1.07	1.00
			$S\ \zeta/E$	9.10	6.66	5.00	4.77	4.72	4.71	4.76	4.87	5.00	5.10	5.00

TABLE III — *Continued*

Examples of Results Produced by Formula (31)—when excess ratio of risk (x) is different from that (r) for which the W's are calculated

$\alpha = 4 \qquad \eta = \frac{1}{2} \qquad g = .333$

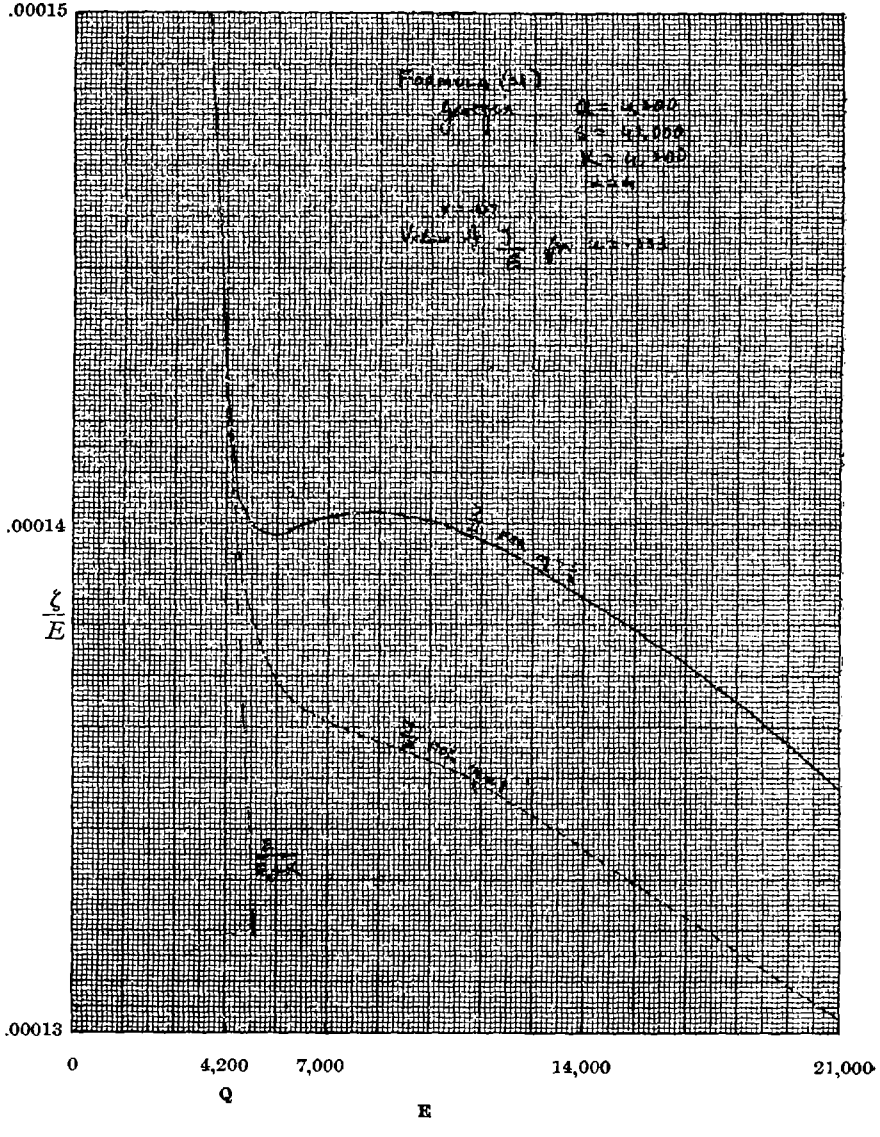
Georgia (Cont'd)			E/S										
			.01	.05	.10	.145	.19	.28	.37	.55	.73	.91	1.00
r	x				Q								S
0	.333	Z_n	.094	.375	.600	.737	.824	.912	.952	.983	.994	.999	1.000
		Z_e	.000	.000	.000	.039	.090	.204	.322	.543	.741	.918	1.000
		$S\ Z_n/E$	9.40	7.50	6.00	5.08	4.34	3.26	2.57	1.79	1.36	1.10	1.00
		$S\ \zeta/E$	9.40	7.50	6.00	6.16	6.23	6.17	6.05	5.74	5.42	5.13	5.00
	.167	Z_n	.092	.353	.545	.660	.733	.816	.861	.916	.954	.985	1.000
		Z_e	.000	.000	.000	.035	.080	.183	.291	.506	.711	.905	1.000
		$S\ Z_n/E$	9.20	7.06	5.45	4.55	3.86	2.91	2.33	1.67	1.31	1.08	1.00
		$S\ \zeta/E$	9.20	7.06	5.45	5.52	5.54	5.53	5.47	5.35	5.20	5.06	5.00

TABLE IV

Credibilities given for selected value of E if K is chosen to give credit of 6⅔% for clear experience at qualification point

				Formula (14)		Formula (31)		Formula (39)	
	r	E	E_n	Z_n	Average Credibility	Z_n	Average Credibility	Z_n	Average Credibility
New York									
	.333	14000	9333	.670	.447	.857	.571	.619	.413
Qualification	.167	14000	11667	.670	.558	.750	.625	.670	.558
point $E = 600$	0	14000	14000	.670	.670	.667	.667	.709	.709
	.333	14000	9333	.670	.447	.857	.571	.619	.413
	.167	11200	9333	.619	.516	.686	.571	.619	.516
	0	9333	9333	.575	.575	.571	.571	.619	.619
Massachusetts									
	.333	9000	6000	.620	.413	.776	.517	.566	.377
Qualification	.167	9000	7500	.620	.517	.687	.573	.620	.517
point $E = 480$	0	9000	9000	.620	.620	.616	.616	.662	.662
	.333	9000	6000	.620	.413	.776	.517	.566	.377
	.167	7200	6000	.566	.472	.621	.517	.566	.472
	0	6000	6000	.521	.521	.517	.517	.566	.566
Georgia									
	.333	4200	2800	.504	.336	.600	.400	.448	.299
Qualification	.167	4200	3500	.504	.420	.546	.456	.504	.420
point $E = 360$	0	4200	4200	.504	.504	.500	.500	.549	.549
	.333	4200	2800	.504	.336	.600	.400	.448	.299
	.167	3360	2800	.448	.373	.480	.400	.448	.373
	0	2800	2800	.404	.404	.400	.400	.448	.448

CHART II



ABSTRACT OF THE DISCUSSION OF PAPERS READ AT THE PREVIOUS MEETING

CAN WE IMPROVE THE COMPENSATION RATE-MAKING METHOD?

HARMON T. BARBER

VOLUME XXIII, PAGE 151

WRITTEN DISCUSSION

MR. W. F. ROEBER:

In a rather brief paper Mr. Barber discusses certain distortions and fluctuations in manual rates attributed chiefly to the use of group rate levels and to the incidence of certain fortuitous types of losses. Suggestions for their elimination or correction are also contained in the article.

It would be pointless to review Mr. Barber's criticism item by item and list reasons for agreement or disagreement with his views, or to discuss the advantages and disadvantages of his proposed solutions. With much there is agreement and with the rest there is either a difference of opinion or a preference as to the best method of procedure. In the discussion of a subject such as this, one must always bear in mind the fundamental differences in viewpoint: the rate maker desires a smoothly functioning system that will be free of complications and will have component parts that will be simple and easily explainable. The man who uses the rates, on the other hand, wishes to eliminate any unusual or extraneous influences which detract from the value of the rate as a guide for current underwriting purposes.

Group rate levels, for the majority of states, have been in effect only a relatively short length of time. When they were adopted, underwriting results were extremely unfavorable and it was felt that group rate levels would tend to ameliorate the situation. Consequently, industry group rate levels for Manufacturing, Contracting and All Other were selected, to be based on three years of experience and to be balanced to the two year combined indications for indemnity, one year for medical. In case any group did not have sufficient experience on a three year basis to produce

$1,000,000 of premium, its indications were to be discounted and averaged by formula with the indications for all groups combined. The assumption, in the main borne out by experience, was that there was definite need to recognize differences by groups and it was further felt that sufficient safeguards were established to prevent violent fluctuations and unreasonable results.

This rate-making procedure has been generally adopted and, for those states where there was definite need for differentials by industry group, has resulted in rates more accurate than under the previous program. However, it has also shown certain weaknesses in the assumption and in the safeguards introduced in the rate-making procedure. Mr. Barber has shown the effect and suggests certain remedies. It would seem more logical to go a step further and try to ascertain and remove the trouble at its source.

In those states in which projection factors fluctuate wildly and where the group relativity shifts from one year to another, one inescapable conclusion is that the facts are not in agreement with the assumption that separate group rate levels are indicated. In these instances, the use of group rate levels adds no value to the resulting rates, and merely introduces an element of instability. Where group rate levels are not needed, their elimination would automatically correct the situation and would, in general, result in more satisfactory rates. This is, of course, the actuarial viewpoint. Whether or not it is practical to suggest to the supervising authorities in one state a set of rates based on group rate levels, and in another a set of rates not so based, is another problem to consider.

The distortion pointed out by Mr. Barber caused by the difference in the distribution of exposure between the latest year of experience (used in determining medical rate level), and the three years used in group rate levels, would be difficult to correct. We do correct for the difference between the two year distribution and the three year distribution in order that the final test, made on two years of exposure will balance out. But so long as two years of exposure for indemnity and one year of medical is used as a basis for the overall change in rate level, there appears to be no practicable method whereby this fundamental difference can be reconciled.

One suggestion appears to be in order at this time; namely,

that the period used for determining the average change in rate level and the group change be made identical. In those states where there is a substantial volume of exposure there is no material difference produced by using three years instead of two years for group rate levels. The attached exhibit shows the total loss ratio, for a number of states, by industry group. Two year, three year, and rate level results are exhibited. The use of identical periods for group and overall rate levels would somewhat simplify the rate-making procedure and remove the need for the correction factor now introduced to force a balance to the two year distribution.

In his article Mr. Barber states that the indemnity projection factors are particularly sensitive to the occurrence of serious losses and furthermore, that it is difficult to minimize the effect of certain severe cost cases, especially if they occur in the medical losses. To this one can add the incongruous situation where, because of the use of the various factors, a single case or group of cases sometimes appears in the experience at a value greater than the maximum allowed by law. When unusual losses show up in the experience, the formula pure premium results are usually tempered by the selections made on the basis of underwriting judgment. However, if it is desired to correct for unusual occurrences by automatic process, a simple remedy would be to treat these cases in a manner analogous to catastrophe losses and limit the amounts which may be included in the experience. This will, of course, require identification of high cost cases in the compilation of experience.

An illustration of the effect of using the weighted system of determining rate levels, suggested by Mr. Barber, is attached. The results produced by the present and proposed program do not differ greatly. We must remember, however, that we cannot obtain rates on the basis of past experience which will be exactly right for any ensuing period. The best we can hope for is an approximation, adjusted periodically, and further safeguarded by the use of contingency loadings. We have placed in the rate-making system such a factor of safety, and with the leeway thus afforded, we should strive toward a simplification of the rate-making structure, and a procedure which will lend a greater measure of stability to final manual rates.

EXHIBIT I

TOTAL LOSS RATIOS

State	Manufacturing			Contracting			All Other			Total		
	2 Years	3 Years	Rate Level	2 Years	3 Years	Rate Level	2 Years	3 Years	Rate Level	2 Years	3 Years	Rate Level
Alabama	51.3	54.6	49.6	44.7	51.1	47.0	48.8	50.8	46.5	48.8	52.4	47.9
California	52.8	52.5	51.6	66.4	66.3	65.5	55.1	55.3	54.4	57.2	57.1	56.3
Colorado	50.4	48.9	48.4	51.4	49.4	48.7	49.8	51.1	50.6	50.1	50.4	49.7
Connecticut	53.7	55.6	56.3	61.1	60.2	61.0	60.4	57.1	57.8	57.7	57.2	57.8
District of Columbia	53.5	52.4	53.1	57.5	58.7	58.7	54.4	52.6	52.2	55.6	55.1	54.9
Georgia	49.0	50.8	48.8	44.8	48.9	48.3	57.2	57.1	54.9	51.0	52.8	50.8
Illinois	53.0	53.3	52.6	54.8	56.0	55.4	55.3	54.8	54.1	54.2	54.4	53.7
Indiana	52.3	55.2	52.4	46.4	50.5	47.8	54.4	56.1	53.2	51.9	54.7	51.8
Iowa	57.0	54.3	53.8	56.4	58.2	57.8	55.1	56.3	55.8	56.0	56.2	55.7
Kansas	42.1	47.3	45.3	51.9	53.5	51.1	57.3	56.6	53.8	51.4	53.1	50.6
Kentucky	50.5	52.2	48.7	51.5	54.3	51.0	50.5	53.1	49.7	50.8	53.2	49.8
Louisiana	58.2	57.2	55.7	54.2	57.8	56.5	59.0	58.2	56.7	56.8	57.9	56.5
Maine	53.2	56.6	56.0	70.4	68.5	64.3	61.0	60.5	59.9	58.9	60.1	58.8
Maryland	59.9	61.4	60.8	57.1	58.9	58.6	64.6	61.8	61.3	60.9	60.9	60.4
Michigan	56.1	57.0	55.1	48.1	53.6	52.0	62.1	61.1	59.1	56.7	57.9	55.9
Missouri	53.8	54.4	53.7	53.9	53.7	53.3	52.9	52.9	52.3	53.4	53.6	53.0
Nebraska	49.6	56.7	52.1	53.1	58.5	53.5	53.6	56.4	51.8	52.6	57.1	52.3
New Hampshire	56.5	57.4	58.0	76.7	72.9	64.7	57.5	57.0	58.5	59.8	59.5	59.2
Oklahoma	55.4	58.7	52.6	54.7	61.0	54.7	52.4	58.3	52.3	53.8	59.3	53.1
Rhode Island	50.6	51.4	49.9	56.8	57.1	54.5	55.3	55.0	53.5	52.8	53.3	51.6
Texas	59.5	60.4	59.2	58.9	60.5	58.1	55.8	56.8	55.8	56.9	57.8	56.6
Tennessee	48.9	50.5	48.4	45.2	47.5	46.1	49.4	50.0	48.0	48.4	49.6	47.8
Virginia	52.4	52.3	51.0	54.7	55.7	54.5	51.7	51.3	50.1	52.7	52.7	51.6
Wisconsin	51.7	56.6	52.4	56.8	57.7	53.4	52.6	55.2	51.1	53.2	56.4	52.1

EXHIBIT II

COMPARISON OF COLLECTIBLE RATE LEVELS BASED ON PRESENT PROGRAM AND 5 YEAR WEIGHTED LOSS RATIO PLAN

State	(1) Present Program Coll. L. R.	(2) Weighted 5 Year Loss Ratio	(3) Allowable Loss Ratio	(4) Collectible Present Program (1) ÷ (3)	(5) Change Weighted Program (2) ÷ (3)
Alabama	47.9	52.3	59.3	.808	.882
California	56.3	56.8	56.4	.998	1.007
Colorado	49.7	49.8	56.0	.888	.889
Connecticut	57.8	56.3	57.5	1.005	.979
District of Columbia.	54.9	53.6	58.0	.947	.924
Georgia	50.8	54.1	55.4	.917	.977
Idaho	51.1	59.0	61.5	.831	.959
Illinois	53.7	53.5	61.0	.880	.877
Indiana	51.8	54.8	62.5	.829	.877
Iowa	55.7	55.8	57.0	.977	.979
Kansas	50.7	52.6	54.5	.930	.965
Kentucky	49.8	52.8	62.5	.797	.845
Louisiana	56.5	59.3	62.0	.911	.956
Maine	58.8	58.7	57.5	1.023	1.021
Maryland	60.4	61.6	63.5	.951	.970
*Massachusetts	56.3	56.6	55.0	1.024	1.029
Michigan	55.9	56.3	55.0	1.016	1.024
Minnesota	51.7	52.6	60.0	.862	.877
Missouri	53.0	52.6	55.0	.964	.956
Montana	51.1	50.5	57.5	.889	.878
Nebraska	52.3	56.2	62.5	.837	.899
New Hampshire	59.2	59.5	59.5	.995	1.000
New Mexico	47.0	48.5	62.5	.752	.776
New York	54.2	53.7	60.0	.903	.895
North Carolina	52.4	55.9	59.5	.881	.939
Oklahoma	53.2	60.7	57.5	.925	1.056
Rhode Island	51.6	53.6	57.5	.897	.932
South Dakota	50.5	51.0	59.5	.849	.857
Tennessee	47.8	50.5	57.0	.839	.886
Texas	56.6	58.2	53.8	1.052	1.082
Vermont	56.6	56.2	62.5	.906	.899
Virginia	51.7	53.5	57.0	.907	.939
Wisconsin	52.1	55.6	54.5	.956	1.020

* Massachusetts—based on policy years 1929-33.

SOME ASPECTS OF RETROSPECTIVE AND SUPPLEMENTARY RATING PLANS

J. J. MAGRATH

VOLUME XXIII, PAGE 167

WRITTEN DISCUSSION

MR. S. BRUCE BLACK:

"Retrospective" and "Supplementary rating plans" are similar in that each has for a primary purpose the shifting of part of the risk assumed by the insurance carrier under its policy contract from the insurer to the assured. They differ in the method employed and the degrees to which the risk is shifted.

While the provision for expense, particularly for acquisition expense, in the "retrospective" plan frequently differs from the provision in the standard "prospective" rating plan, the method and amount of loading for expense is a wholly distinct problem in no way peculiarly associated with any particular rating plan. In Massachusetts, where the "retrospective" plan was first adopted for general use, the expense provision is the same in the "retrospective" rating plan as in the standard "prospective" rating plan. The "retrospective" plan has been used as a convenient vehicle for introducing reduced commissions to the carriers' agents in a way least likely to create strong opposition from those who suffer from the reduction. Whether the expense loading in compensation insurance is too high or low, whether agents' commissions are too high or too low, are questions that must be determined by compromising the conflicting viewpoints of carriers and agents under the pressure of competition between differing methods of insurance company management and these questions have little place in a discussion of the principles of cost-plus insurance underlying "retrospective" and "supplementary" rating plans.

Is there a general demand from insurance buyers for some form of cost-plus insurance? If there is such a demand, does "retrospective" rating adequately meet this demand, or is it better met by "supplementary" rating?

Compensation insurance experience is distinctly cyclical. Losses fluctuate with changing employment conditions. Manual rate changes lag behind changes in pure premium experience and the fluctuations in loss ratios are more violent than the fluctuations in

either losses or pure premiums for it is usual for the trend of manual rates to continue upward or downward after the trend in losses and pure premiums has changed direction. We have been passing through a period during which rates have reflected the adverse experience of the deep depression period, while current pure premiums have been reflecting the more favorable experience of a recovery period. This has created an appreciable demand from insurance buyers for a rating plan which would more promptly reduce the current insurance premiums to a degree fairly comparable to the improved experience. It does not necessarily follow, however, that insurance buyers generally desire to surrender a great part of the protection afforded by a "prospective" rating plan. Experience in Massachusetts has shown that few insurance buyers are willing to assume all the risk of a substantially increased insurance cost possible under the "retrospective" rating plan. A strong majority of those buyers who have accepted "retrospective" rating in Massachusetts, and probably in other states, have done so only after buying some form of supplemental excess insurance which eliminated or greatly reduced the risk of additional cost during the current year. These stop-loss supplementary contracts have usually been sold by Lloyds of London or other carriers at rates substantially less than those indicated by the data underlying the "retrospective" rating plan. In a majority of cases insurance buyers have accepted "retrospective" rating plans not because they wished "cost-plus" insurance but because they could buy supplementary "stop-loss" contracts at a cost which added to the "retrospective" premium gave the assured some assurance that he could not lose as compared with the standard "prospective" rating plan. Close observation of the operation of the "retrospective" rating plan leads to the conclusion that very few insurance buyers whose annual premiums are less than $20,000-$25,000 desire to assume the risk of substantially increased premiums and that if such insurance buyers are required to pay a premium for a supplementary excess loss contract even approximately that indicated by available data, very few would accept "retrospective" rating.

For the very large compensation insurance buyers whose experience is likely to be reasonably stable and for whom the maximum possible additional cost is not large in proportion to the standard

"prospective" rating premium, "retrospective" rating has a somewhat greater appeal during periods of good experience.

What will happen when we enter that phase of the experience cycle in which loss ratios are generally unfavorable? Will assureds, becoming familiar with the operation of the "retrospective" plan accept such a plan during the favorable loss ratio part of the cycle and shift to a "prospective" rating plan when "prospective" rates have been reduced to the point where loss ratios are likely to be higher than average? It would seem probable that this will take place if permitted by the insurance carrier and, of course, such a practice would prove costly to the carriers. There would seem to be no complete protection to the carrier other than to make a "retrospective" plan mandatory on all eligible risks—or prohibiting any shifting except after several years notice.

Partial protection would result from such changes in the "prospective" rating plan as would cause a more prompt response in the rates to changes in experience and thereby making a shift from "retrospective" to "prospective" rating less profitable. In any event, a revision of the standard "prospective" rating plan, to make collected rates more responsive to changing experience, would go some distance in meeting a demand from insurance buyers which is properly urged as a justification for new rating methods. It is quite possible that if the lag in the prospective rating plan were reduced, all but the very largest insurance buyers would prefer "prospective" rating to "retrospective" rating. Certainly it would seem that a rating plan which so generally requires the addition of supplementary excess insurance against the intended working of the plan is not adequately meeting the true demands of insurance buyers.

Will the "Supplementary" rating plan better meet the demands of insurance buyers?

The originators of "Supplementary" rating will frankly admit that they have sought primarily to make available the insurance buyers a rating plan which, within the limits of sound actuarial practice, will as completely as possible meet what they believe to be the desires of insurance buyers. Because it is a cost-plus plan, it is subject to some of the same practical difficulties as "retrospective" rating. It does, however, have certain virtues. It does

give definite insurance protection, within limits that insurance buyers may reasonably accept. It is sufficiently flexible so that it is attractive to buyers whose annual insurance premium is very much smaller than is practically advisable under the "retrospective" plan, and at the same time it is at least as appropriate on the very largest risks. By limiting within reasonable limits the maximum possible penalty for adverse experience there will be little likelihood of insurance buyers purchasing supplementary excess contracts.

For these reasons it is likely to be acceptable to a larger number of buyers than "retrospective" rating and because it reduces the penalty for unusual severe accidents may cause fewer disappointments and fewer recriminations against the carrier which advised acceptance of cost-plus insurance.

The discussion thus far has been limited largely to discussion from the viewpoint of the insurance buyer. If "retrospective" insurance gives greater incentive to loss prevention than "prospective" rating, "supplementary" rating will be at least as effective.

Considering the immediate self-interest of insurance carriers, any form of cost-plus insurance has considerable appeal if, the plan is actuarially sound, and if the carriers are protected against shifting from "retrospective" to "prospective" rating or visa versa. There is no competitive advantage to any kind of insurance organization, in sound cost-plus insurance. The carrier is relieved of much of the worry caused by high loss ratios during the adverse stage of the experience cycle. Perhaps, it should be added, that the insurance buyer may sometimes be called upon to pay large added premiums when he is least able to—but that is cost-plus insurance.

MR. RALPH H. BLANCHARD:

An author may avoid the charge of incompleteness by using the phrase "some aspects." Mr. Magrath's paper shows restraint; but I am sure that its scope was not limited by lack of knowledge or of conviction. I detect the scent of many vivid statements which the author did not make.

If the rigidly classical format of the *Proceedings* might be altered I should like to entitle my contribution "Some Reflections on Some Aspects." The limitations on my discussion will be due

not to reticence but, in Johnson's words, to "pure ignorance." Nor will the aspects which I discuss be the same as those considered in Mr. Magrath's paper. The preparation of a complete discussion would have required investigation far beyond the time at my disposal.

By way of preparation I have read the several plans and a variety of explanations, discussions and arguments. I am told that the Retrospective Rating Plan is, and is not, a "rating plan"; that it involves graduated commissions and that it is in no sense a graduated commission plan; that it is likely to lead to (a) overestimate of outstanding losses and (b) underestimate: that it is sound in theory and that it violates fundamental insurance principles; that it will probably encourage the prevention of accidents, and that it may lead to decreased interest in accident prevention; that its operation will in no way affect risks to which it is not applied, and that it will result in a greater burden on those risks as well as throw the whole rating machinery out of joint; that it is fair and legal because it represents a justifiable classification of risks based on differences in hazard, and that it has neither of these qualities because it violates both the law and sound rating theory.

It is well-nigh impossible for an observer to extract the sound kernel of significance from the thick husk of partisan interest. And this array of opinions is most distressing to an academic theorist accustomed to look to his practical brethren for enlightenment.

Clearly the Plans are only in part rating plans and in part plans for selling service in settling losses. The Retrospective Plan gives the employer the option of paying his own losses between limits. The Supplementary Plan permits the employer to self-insure normal losses while insuring excess losses. In both cases all losses are settled by the insurer and full payment is guaranteed to the injured workman.

The proposal of such plans brings up many questions of general policy for which no generally satisfactory answers have been given.

To what extent should variations in the incidence of expense be recognized in the price charged for insurance? If the rating system is to be treated purely as a measure of probable disbursements, then it is proper to recognize in the premium any measurable

variation in the probability of expenses. We attempt very carefully to measure the loss-producing characteristics of risks; why not be equally diligent in measuring their expense-producing characteristics? And it is here that differences in size of premium may well have some significant bearing on a company's disbursements, as well as on those of middlemen. Certainly the Retrospective Plan provides for graduation of expenses, in spite of the argumentative efforts of the casuists. And why not, if there is a real difference in the experience? Whether the reduction in expense allowance should be shared equally or unequally by carriers and middlemen should be wholly a matter for realistic analysis. Neither should do more or less than the indications warrant. I see nothing to be commended in the theory that either group is making a "contribution" to a high purpose.

How far should the pricing system be influenced by considerations of policy? It is argued that these plans will (or will not) tend to prevent accidents. Has a rate-maker any business to consider the effect of his prices on accident prevention, or should he merely attempt to measure results? I incline to the measurement idea, particularly when it is not clear what the effect will be. Another question is that of whether large risks shall be given such advantages as may be theirs because of size and superior organization, if any. Again I believe the rater should confine himself to measurement. But note that these remarks apply to that part of the plans which *is* a rating scheme. It is quite another problem to determine whether insurers should sell individual loss-settling service combined with insurance.

If a plan provides the carrier with sufficient funds to meet its obligations and frankly gives the insured what he pays for, how far should the form of the plan and the choice offered the employer be controlled? I don't know. The deductible idea has long appealed to me as the sound way in which to adjust the relative roles of self-insurer and insurer. But stop-loss cover is also sound. Do these plans, or either of them, adjust insurance more accurately to needs? I hope so.

Given human nature, will such plans work? Will they influence estimates of losses in either direction; will they affect the accident record; will they be used primarily as an unwarranted competitive device? In other words, will they, in spite of the rater's effort to

confine himself to measurement and the supervisory official's attempt to permit a sound combination of insurance and service, lead to unfavorable results which outweigh their value in other directions?

I should like to see them tried, careful records kept, and final decision reserved for the future. But that brings up a still broader question: How far can the trial and error method be used in this field? Having raised all these questions, I leave the answers to others, with the suggestion that there is nothing sacred in present and past methods of rate-making, and that perhaps those doctrines which have been least questioned are most in need of reconsideration.

FEDERAL JURISDICTION AND THE COMPENSATION ACTS — CLARENCE W. HOBBS

VOLUME XXIII, PAGE 170

WRITTEN DISCUSSION

MR. S. B. ACKERMAN:

The article on Federal Jurisdiction and the Compensation Act prepared by Mr. Hobbs is an excellent study of the relation between federal jurisdiction and the various compensation acts.

In this article, Mr. Hobbs indicates that many cases have come before the courts for interpretation, due to the difficulty arising from the powers of the various states and the powers of the Federal government. The material prepared is so exhaustive that I wish that Mr. Hobbs had added at the end of his paper a summary of the principles evolved from the various decisions that have been rendered. I believe that such a summary would materially aid lawyers and representatives of claim departments in handling matters discussed in Mr. Hobbs' article.

Mr. Hobbs states the following in his conclusion:

> "Conflict of laws between the states and federal jurisdiction would be less serious . . . if uniformity could be secured between state compensation acts and federal compensation acts . . ."
>
> "That the difficulty is of no mean proportion can be seen by viewing the number of cases cited in this study and in the previous study on the extra-territorial application of com-

pensation acts. The remedy, if there be one, must probably be worked out through the Federal government . . ."

"Let it be marked down, however, as a point which will one day require settlement, that rights and duties of employer and employee should be reasonably uniform as between state and state, and as between state jurisdiction and Federal jurisdictions, and that the policy of states and of Federal government alike should be directed towards the avoidance of situations where the rights of the employee may be imperiled or confused by the necessity of determining obscure issues of fact or controverted points of law."

I do not consider that the number of compensation cases involving conflict of law is unusual. It must be remembered that the various courts have dealt with a large number of individuals affected by the various compensation laws. Indeed, when this fact is considered, there has been a remarkably small number of cases which have been subject to scrutiny by the Federal courts. Incidentally, uniformity of laws will not reduce the number of cases involving obscure issues of fact.

It is my hope that the day of uniformity of compensation laws will continue to be very remote until experience provides a sound foundation upon which to build uniformity. It is true that there is diversity of legislation. However, this has not materially harmed those subject to the various laws. The fact that these laws have not been uniform has afforded the people excellent experimental legislative laboratories. The good principles evolved by legislation in one state has been, and will be, made available for adoption by legislatures of other states. Uniform legislation will only be worthwhile when the time has arrived, if ever, when the problem of compensable accidents will have been solved. As one who is interested in this provision from the point of view of the employer, the employee and the insurance company, I do not believe that such a stage has been reached. In my opinion, legislatures have paid little attention to the most important problem, that is, the problem of accident prevention. If and when this problem is solved, uniformity through the aid of legislatures may be considered.

The belief held by some people that it will be impossible to provide uniform legislation except through Federal action is unfounded. A study of state statutes will indicate that in many

states various statutes are uniform. For example, through the joint cooperation there is now a uniform sales statute in various states. There is a logical reason for the development of a uniform sales act. The legislatures have had the benefit of past legislation, as well as interpretation by the courts, concerning this subject for many centuries. However, the legislatures have not the benefit of similar experience for the compensation law. The latter remains in the formative stage.

It is true that joint action by all states requires long periods of time. On the other hand, speedy action may not necessarily be effective action. Uniformity does not necessarily make for progress. Therefore, effort for a uniform compensation law seems to me premature. In my opinion, efforts should be made to improve each state law to meet the various conditions presented by the general development of the particular state at any given time. Energy spent in aiming for uniformity at present might prove more harmful than beneficial. The aim should be to induce the various legislatures to seek the ultimate goal, that is a compensation law which makes as its primary function accident prevention.

AUTHOR'S REVIEW OF DISCUSSION

MR. CLARENCE W. HOBBS:

Professor Ackerman's discussion is so very kind and considerate that it is with some difficulty the author brings himself to essay a response. Nevertheless, in self-defense, it might be observed that the statement to which the discussion takes exception was directed, not merely to the federal jurisdiction but to the entire matter of conflict of laws, of which the federal jurisdiction cases are but a part. There has been developed on the subject a fair and increasing body of case law including a goodly number of cases in the Supreme Court, and this within the space of less than twenty-five years. The number of cases going to courts of last resort is by no means a certain index of the number of cases in which such issues occur. These are fairly numerous. The rate maker and the underwriter, too, must view the matter more or less from the standpoint of possibilities. The jurisdictional split makes plenty of trouble in establishing rates for classifications

in which the split occurs, and in rating specific risks or writing policies where a split in jurisdiction is involved. For this reason, the problem has an importance not measurable in its entirety by the mere matter of decided cases.

As to the attaining of uniformity by federal legislation, one may agree that federal legislation in a field now occupied by state legislation is a matter of doubtful policy. The author ventures to state, however, that the problem of divergence in statute is a matter differing in many respects from the problem of divergence between the courts of various jurisdictions in the matter of interpreting the common law. The common law relating to a particular field commonly passes through an evolutionary stage paralleling the evolution of that particular field; and it is only when that field reaches a condition of approximate stability that codification is practicable or uniformity between jurisdictions desirable; nor is uniformity of law at all possible unless there is also a substantial uniformity of practice. The divergence between compensation acts is based in part upon local differences in economic conditions, in part upon differences in social theory, in part upon politics. It may be doubted if a compensation act absolutely uniform for the whole United States is desirable. Certainly the establishment of such an act and a new uniform system of administering it would be a tremendous task and replete with many local heartbreaks. One would very much prefer to see the states move in the direction of bringing their compensation benefits to as near a general standard as possible, also in the direction of a uniform coverage. But as to the matter of uniform extraterritorial application, this is in some degree a federal question, and a federal statute on the subject has somewhat more excuse for being.

INFORMAL DISCUSSION

Investments of Casualty Insurance Companies

MR. HARDWICK STIRES:*

First of all, if you will let me, I will apologize for being here, although I accepted the invitation with a great deal of appreciation. My partner, Mr. Scudder, is convalescing from an operation and we had hoped he could have been here, but it has been found impossible. I also want to apologize for my lack of preparation—I had only one day to prepare myself. I think, however, I will be able to sense if I take too much time and try to adjust accordingly.

From time to time, in the past, we have discussed general investment problems with similar groups—the fire and casualty companies—and before coming here this morning I went over some of this material to see what type of address we had given. To my dismay I found them erudite and filled with charts and various analyses which I was unable to assemble. Accordingly, I will summarize what I plan to discuss.

Largely for my own benefit, and so you can correct me if I am operating under false premises, I'd like to give my conception of the purposes of a casualty company's investment portfolio,—a brief appraisal of our outlook for both bonds and stocks,—consideration of the business picture as it was prior to the collapse of the stock market,—a few comments as to where we are now and may be a few as to where we think we are headed, also a few suggestions for casualty companies in considering their investment portfolios—and I will try to be as brief as possible.

First of all,—the problem of a *casualty company's* investment portfolio—and I bring that up because the first point that we raise with anyone coming to us for investment advice is: What are your objectives? What are you trying to accomplish with your investment funds? And we try to be very sure that we locate that objective and attempt, within reason to fulfill it. Fortunately, as we see a casualty company's objectives, they are

* Mr. Stires is of the firm of Scudder, Stevens and Clark, Investment Counselors. He spoke upon invitation.

identical with those of the policyholder; that is to say, the policyholder must be satisfied by giving him as effective insurance as possible. If that is the case, obviously a greater amount of insurance will be bought and the company will grow. How, then, to accomplish that through the investment portfolio? Its characteristics, of course, must be integrity of principal, stability and income, in order to provide both that safety and yield which will make insurance less expensive to the policyholder.

It is perfectly apparent (running along somewhat more rapidly) that stability is contributed by cash and short-term governments and other high grade securities, and that the income and growth feature of the fund must be contributed by securities containing a greater degree of hazard. Now, in what proportion, theoretically? There we run up against, I believe, a problem that cannot be stated categorically, and I think you will all agree. In the first place, we have found, in our twenty years of attempting this work, that investing is such an inexact science in and of itself that it is impossible, at any given time, to state any theoretically perfect position for any investment fund. When you add to that complication, the fact that you are in this particular type of business,—to become more specific and categorical, and lay down specific rules and outline the perfect proportions for a typical casualty company under a certain set of conditions, would be, in my opinion, madness.

In that connection (not to waste your time in story-telling) one thing does occur to me to illustrate my point in not attempting to be categorical: It came to my attention recently that a large company employed an industrial engineer to make a study of a new product they were considering fabricating and putting on the market. It involved very expensive distribution facilities, so they hired an industrial engineer to make a study of the project. He reported unfavorably and at length. The company, however, decided to go ahead nevertheless, and so did. It was a complete failure and they dismissed the industrial engineer. The engineer asked if they had read his report and asked them why they had proceeded with the undertaking. They replied that it was perfectly true that the venture had been criticized, its abandonment recommended, but that he had not "pounded on the table."

In this business we don't "pound on the table"; we don't insist

that our way is the only way, so I can only indicate some of the things we are thinking.

First of all, to be practical, I will concede that the typical portfolio of a casualty company today includes cash, short-term governments, other high-grade bonds, preferred stocks and common stocks, and that an interplay of those securities seems justified. That is the way your funds are now invested—that is the way the funds of similar companies have been invested for some time and the results seem to justify such a position. Accordingly, we come down to a survey of the outlook for those specific classes of securities.

First of all—bonds. In this connection I will first consider only those bonds which are dependent upon interest rates and not upon business conditions, in so far as that is possible,—money bonds and those preferred stocks which might fall into that class. Here, of course, you run up against the necessity of predicting the course of interest rates, and today it is much more important than ever before. At the turn of the century, if the investor were worried as to the then level of bond prices, and accordingly the possible contraction of long-term bond prices, he could move into short-term bonds, suffering only a slight loss of income and the possible lack of future appreciation if the bond market went higher. At the present time, if the investor is frightened of the long-term bond market, he has to accept a staggering penalty for not being willing to time the contraction of the long-term bond market or the stiffening of interest rates. Nevertheless, the problem is, to my mind, almost insuperable to decide whether or not the long-term bond market, having recovered most of its recent losses, is on a pinnacle or, as we have often heard it, a "permanently high plateau." In this connection, some time ago, we collected a group of letters which were written in 1899 at the request of the Equitable Life Insurance Association. They wrote to a group of prominent financiers in the country at the time—insurance companies, banking houses, etc.—and asked their appraisals of the level of interest rates that would obtain over the next twenty years. Uniformly they were wrong. They all predicted from, say, a minimum of two and one-half per cent to a maximum of three and one-half per cent. When anyone asks my firm to predict the course of interest rates, or the length of time at which the bond market accordingly will

stay at a given point, I simply refer to these. If these men could not predict more accurately, far be it from me to try. If you want a "horse-back" appraisal of the future of interest rates, we see little chance of stiffening in the near future—say six to nine months—but that is such an unimportant consideration that I feel it is unworthy of attention of this gathering.

Next we come to the types of securities—common stocks, second-grade preferred stocks and second-grade corporate bonds—wherein there is superimposed on the interest rate risk, the business risk. In considering these classes of investments we are confronted with the most serious part of our deliberation—where is business going? If you will permit me, I will consider where we were last Spring, where we are now and where we are going, without consideration of the government, of war or of inflation. I know that it is occurring to you that it is futile for me to make these exclusions and predict, and I will agree with you in part. I will illustrate the futility of making any prognostication ex any important imponderable by taking you back for a moment to the Spring of 1931. If you will remember, in March, 1931, the Dow Jones industrial averages were about 180—had dropped 200 points from 380. Machine tool sales, as one index, had risen month by month from November of the previous year—slightly, to be sure—but they were showing a healthy trend. The Federal Reserve index of industrial production was up, employment was showing more than normal season gains and, if I may repeat, the stock market was down 200 points. The business recession we had already had, showed, roughly, a contraction greater than any previous depression since 1875. Only one important element was running counter to a somewhat hopeful outlook in the United States: commodity prices were still headed downward. That was the state of affairs locally in the Spring of 1931. It seems to me that the reasonable investor might have been justified in thinking that most of the excesses of the twenties had been worked out of our system and that we were then prepared to straighten out our local economy and proceed, ex Europe. If you had asked me then for a prediction as to our course, I might very well have predicted that we had experienced the worst of our own troubles. You know, only too well, what happened in the Spring of that year. The New York banks had been making heavy loans to London, both directly and

indirectly, because they could receive a higher rate of interest for short-term money there than they could here. The English banks were doing the same thing in Berlin because they could receive a higher rate of interest there than they could in London. In turn, the German banks were loaning to Austria who, in turn, was loaning to certain individuals and banks in the new succession states. Each one of those moves provided the lender with a slightly higher rate than he could obtain locally. In the Spring of that year the "tip-off" occurred—if you will excuse the colloquialism. When the Kredit Anstalt failed in Austria, and it was recognized that Germany was involved to a great extent, then came the runs on the German banks, ending in the "Standstill" Agreement. After that came the run on the pound, not on English banks, and finally (speeding this thing up) our rapid loss of gold and the runs on our banks causing the price panic phase of our depression, wherein securities were dumped overboard, not because of a fear of further recession of business or earning power, but because of necessity. I simply illustrate that that was the final blow, that that was what caused the panic phase at the end of our depression. At the same time, I believe I shall have to eliminate government, war and inflation for the following reasons:

In consideration business ex-inflation, I do so first of all because inflation is difficult of definition and, to treat it casually, I believe, would be unconvincing and trivial in a short speech. Secondly, if this audience believes that the world-wide "coin clipping" that has been going on for some time is going to bring about widespread and wild, ultimate inflation, bonds aren't going to be very good investments and I don't believe common stocks will be very much better. If you think our fiscal policies have laid the groundwork and must continue so that ultimately we will have wild inflation, frankly, at this stage of the game, I can't advise a storm cellar to get into. Finally, as I see it, deflation must come first, and the thing which would bring about the wild inflation which we fear would be a severe continued depression of the 1932 character; therefore, for me, possibly this is an easy way out. To discuss inflation I believe there is an intermediate hurdle necessary rather than the ultimate inflation which we are forced to consider. Furthermore, the budget is apparently in balance *on a cash basis,* so that for the first time in four or five years we are

considering the threat of inflation at a time wherein we are less justified in so doing.

If you will permit me, I will eliminate the government for the following reasons: What can government do? Its possible actions fall into two parts, the psychological effect of moves of the government such as, say, the wrangle over the Supreme Court last Spring. Its long term implications are serious. Its long-term results might be practically harmful, but from an immediate point of view its chief danger to business is psychological. Conversely, consider the psychological effect on business of a more benign attitude on the part of those making public statements! For me to conjecture as to whether or not the encouragement currently being tendered by the government will be believed by business, and that as a result business will go ahead, is too near the realm of sheer guesswork to weigh carefully in estimating the outlook. Furthermore, what can the government do, actually? We all know what is currently under discussion in the way of tax relief and other actual measures that the government can employ in relieving and assisting business. Again, we believe, at this time, to predicate an investment program on the probability of their happening and of their having an actual benefit, is too hazardous.

To illustrate that point, if you will let me again go back to 1931, you will recall a whole succession of government acts at that time to check the unwinding of the credit spiral which was just begun and you will recall how dismally they failed. At least it gave a record of a sequence of pretty important government moves to check a spiral of deflation, all of which, even the cumulative effect of which, failed—such as the formation of the Reconstruction Finance Corporation, the National Credit Corporation, the Glass-Steagal Bill, and similar acts, all inflationary in character, and which at any other time would have had a very prompt effect —so I simply want to be realistic in considering what the government can do psychologically and practically, what it has attempted to do in the past, and to what extent those moves have or have not succeeded.

Ex-war. Obviously, as I believe Frank Simonds said, the "stage" in Europe is always "set" for war. The "war to end wars" has not yet been fought. You can speculate as to whether one-man governments can be held in check or will want to "show their

wares" once they have assembled them. And again, to predicate an investment portfolio on that basis, I think would be unwise.

What we are doing, and what I would strongly advise you to do, however, is to go over your securities and appraise, to the extent that you can, the dependence of companies that you may own on foreign business and attempt to appraise the war risk involved. Not necessarily eliminate it, but at least be realistic about it; try to decide what companies possibly might be benefited by a world war, with or without our participation, and what companies might seriously be injured by it.

Now, having somewhat glibly eliminated inflation, the government and war, if you will let me, I will appraise (and here I am going to be bromidic and tell you only the most obvious things you already know) where we now find business was last Spring. It is perfectly evident that, for various reasons, inventories of both raw materials and finished goods had been assembled in undue quantities, due to various reasons,—fear of inflation, of labor troubles, and, in my opinion utilizing those two as blankets to throw over the fact of over-optimism. It is evident now that prices were too high, although from a more hopeful point of view, comparatively little, to the best of our knowledge, of those very high-priced commodities actually got into industry. Wages were so high that in many important industries such as railroads, profits were cut to an extent that buying was virtually eliminated and industries such as the railroad equipment companies accordingly suffered. There was no forward buying of the heavy industries. Finally the budget was approaching balance and there might be an inflation prop removed from prices. As you know, the government was making serious moves to check a runaway. Then came the stock market decline and I won't attempt to lay the blame for the decline on "whether she fell or whether she was pushed," or whether the rich, having finally given up any hope of being able to record capital gains on the plus side, were abandoning the stock market; but, in any event, we don't have to speculate about it because it occurred and is a known fact that we can now deal with. That is, roughly and crudely, where we were and what has happened.

Now where are we and what are people thinking? First of all, I shall apologize because at this particular time your speeches

coincided with a period in which we are trying to keep our minds blank. Somewhat facetiously, maybe you have discovered that. From time to time we adopt a similar attitude with an investment portfolio. That is, mentally we will reduce a portfolio to cash and move all our previous conceptions to the background and decide what we would do today if the fund were entirely in cash. To some extent, that is what we are trying to do now; that is, to recognize that we are in a period of readjustment, send out our men into the field, assemble facts and hope that we may be able to exercise our highly fallible human judgment on those facts and reach a reasonable conclusion.

We have, at the moment, a man abroad, visiting London, Amsterdam, Berlin and Paris. He will attempt to reach informed opinion regarding what part of their business cycle those countries feel they are now in. Also he will seek their point of view and their perspective on our local economy. However, now that prices are going down and now that business is headed downhill, many prices must still go down, both of raw materials and finished articles. As you very well know, certain big categories of finished articles, such as autos and refrigerators, have recently received price advances. Undoubtedly these have got to be corrected. Inventory losses are going to loom pretty large; inventories themselves are looming pretty large every day. Various large merchandisers that we talked to told us at the end of September confidently that their inventories were low and they had passed their peak this year earlier than usual, but that they had three months' inventories on hand which had automatically turned into six months' inventories as their sales disappeared. There is a purchasing agents' strike on. These are what we find exist today. Furthermore, excessive demands of labor are cutting profits. The bright spot is retail sales. Consumer purchases seem to be holding up extraordinarily well. Taking the first four weeks of the last eight-week period—my guess would be that consumer purchases, as measured by department store sales all over the country, were running slightly ahead of 1936, as exemplified by the big mail-order houses. Sears, Roebuck, and Montgomery Ward, doing business with the farmers, showed sales increases over last year. In other words, their sales were, say, roughly, eight or nine per cent ahead of last year, whereas prices were roughly six per

cent ahead of last year. Over the last four weeks that rate has been slowing down, but their sales volume still shows increases over last year, although taking into consideration the price factor the tonnage volume is slightly below 1936, but compared to heavy industry it is a bright spot. The healthy effect it has is in moving inventory accumulations. In other words, if the consumer went on strike the situation would be pretty serious indeed.

Now what are we thinking? Again, as you well know, there were, prior to the collapse, no important excesses built up such as in the nineteen-twenties. Of course, prominent among these is the building industry. Again, very prominent, is the railroad equipment industry. At the present time, the railroad equipment business can sink no lower, and yet they have not by any means filled normal replacement demand. Inventory excesses also, barring a few exceptions, were not great compared to say, the 1919 period.

Retail sales, as I have said, are very good, all things considered. Farm income is high, as you know; furthermore, the very severity of this decline is a very hopeful factor. At the beginning of the late depression, as you remember, we tried to "hold ourselves up by our own bootstraps," for various reasons, and postponed the day of reckoning, which made it all the more severe when it hit. At the present time, with the contraction of business, if commodity prices stabilize at or near these levels, the inventory losses will be, by and large, non-recurrent and, loath as I am to predict, it seems to me that at the moment commodity prices are beginning to look as though they were finding a level. Accordingly, if you will first permit me to go back and reiterate that we are not ready to make up our minds, that we are still assembling facts—this thing having come so suddenly that we have not had time to appraise what its ultimate effect may be; whether we are entering a long serious depression of the 1932 variety or whether we are enjoying a healthy reaction—I'll say that at the present time we do feel that there will be improvement, probably in the course of next year.

Now the trouble with that prediction, from our point of view, is that we find it too widely held. That is what the majority of informed economic opinion agrees on today. The general background that I have given,—that inventories are being cleaned out, that the sharpness indicates possible shortness and that for various

other reasons which I have eliminated from this discussion, such as the government—we may very well work out of this and see some improvement next year, the time limit being from sixty days to twelve months.

There is a "lunatic fringe" at the lower end of that prediction that says we are entering a prolonged depression of the 1932 character. There is another "lunatic fringe" on the other side of it which says that the snap-back will be as abrupt as was the decline at any moment, and in between those two we find ourselves; that is why I am most suspicious of the conclusion which I have just given you.

Now for a few suggestions, and I can promise you that I had to look hard for them and I will explain that afterwards. If you don't mind a few very obvious ones, they are as follows: Keep in mind always, in an investment portfolio of a casualty company, that you are in the insurance business. We always have a good deal of difficulty with our clients in persuading them what type of business they're in, and maintaining their portfolio accordingly. Have that thread of realization that you are a public servant administering your fund in a fiduciary capacity color every investment decision that you make. My feeling is that if it is barely permissible for an important rich man to have his safe deposit box disgorge "cats and dogs" at his death, showing his mistakes, it is certainly bad for an insurance company to have investments not suitable for an insurance company.

Secondly, call your equity risk by name. "Equity risk" is a colloquialism of my own firm. In other words, not all bonds are bonds, not all preferred stocks are preferred stocks, and, if you want to belabor the point, not all common stocks are common stocks; many of them are merely warrants or calls upon future earnings, whereas the equity is contained in the bonds. So I would comb over, as we do, your bond portfolio, and attempt even mathematically, to determine what percentage of a given bond will act in a protective capacity and what percentage of the bond should be classified as a common stock, and break down your investment portfolio for equity risk,—that is your common stock risk, plus your business risk in the bond fund. I will invite any questions on that point later on.

Next, go over your investment portfolio carefully from the

point of view of deciding the dependence of the various companies on the business cycle—your so-called "cyclical" companies. Take, for the moment, the four main categories of endeavor,—consumers' goods companies, consumers' capital goods companies, producers' capital goods companies and straight commodity companies—what percentage should you have invested in those four groups? Consumers' companies are stable in character, to a great extent. The next, a heavier group and accordingly more cyclical in character, we characterize as the consumers' capital group, where the consumer makes not a day-to-day purchase out of income but out of principal. The third, heavy industry—industry buying from industry, which, as you have seen, can dry up quickly. Finally, the commodity group—companies representing extractive industries, the taking of something out of the ground.

I would suggest that you should consider carefully whether or not the inclusion of cash and short-term governments is enough stability for your fund, and other bonds of course. Do they represent sufficient stability so that you can disregard the element of stability in even your common stock funds? To what extent have you casualty companies the right to abandon the provision of stability regardless of what security you buy? Should you possibly overweight the consumers' group because of their greater stability? Have you the right to buy highly cyclical companies such as companies in the building field where there is either a building boom or absolutely no building, because of the character of the business you're in.

I raise these points frankly without knowing the answers, but believing that a correct proportion and a small participation in hazardous companies is justified.

I forgot earlier in the speech to say that I am predicating everything that I now say on the assumption that, of course, your company is large enough, your reserves large enough and your surplus large enough, to *consider even* the type of company which is dependent upon business risks.

Next I would examine your portfolios carefully from the point of view of seeing to it that there is quality in addition to stability. That is, that the products that the companies are dependent upon, say, are not frivolous in character; that the management is a

management that you trust; that the capital structure is a powerful one. In other words, not companies simply with halos around them that the stock market has put there, but companies that, although their prices might go down, you wouldn't be ashamed of being caught with.

Now I know you didn't come here to be complimented, but frankly, I can't help it. I don't know much about casualty company investing, but I briefly glanced over yesterday a few figures that we had assembled on them. These were only recently collected together but prior to the issuance of Best's Insurance News, which figures will show, I believe, only a very slight variance from the ones which I have here. These were compiled from making a composite picture of, I believe, sixteen of the leading casualty companies and, in general, my picture as of the end of last year is as follows: Bonds accounted for 65% of their investment funds, preferred stocks 12%, and common stocks 23%. Cash and agents' balances 18% of total assets. Of the bond funds we find that 50% are in United States Government securities, so, from my point of view, I will admit that I am somewhat over impressed having constantly to see the miserable condition of the portfolios of many individuals that come to us. I cannot help but say congratulations in discussing investments with any group which is 65% in bonds—of which 50% is in governments—and 23% in common stocks at a time like this. In general, as to the form of your investment portfolios, I can only take off my hat to you.

MR. C. H. SIMMONS, JR.:*

Your program sets forth very well indeed, I think, the questions uppermost at this time in the minds of those responsible for the investments of a casualty company, and I should like to talk on each question briefly. I am going to change their order, if I may, and deal with the last question first. It is:

> "What is the effect of the changes in the value of money, inflation, or deflation, with respect to the relationship between the assets and liabilities of a casualty company?"

First of all, what is meant by inflation? It seems to me that there are two distinct kinds—the first is credit inflation which

* Mr. Simmons is Treasurer of the Liberty Mutual Insurance Company. He spoke on invitation.

generally takes place during periods of business expansion. We had such an inflation in the boom which culminated in 1929. If the question implies this type of inflation, then it seems reasonable to assume that the margin in rates charged for insurance will be sufficient in the future, as in the past, to absorb any rise in the price of commodities or services which credit inflation would cause. The effect of an inflation of this type would react negligibly on the relationship between assets and liabilities of a casualty company.

If, on the other hand, the question implies the second type, or monetary inflation, such as took place in Germany, France, Italy, etc., then the effect on the relationship between the assets and liabilities of a casualty company would require some analysis. In this connection, let us take the liability side of a casualty company's balance sheet:

(a) First of all, we can eliminate the Unearned Premium, Dividend, and Accrued Expense (including tax) Reserves as being strictly dollar reserves. That is, they are payable in dollars irrespective of the relation of the value of the dollar to the value of commodities at the time of payment. They are not subject, therefore, in any respect to the hazards of monetary inflation.

(b) Next, let us take the Compensation Loss Reserve. The major portion of this, approximately 85%, is for payments to indemnify injured employees, or their survivors. The remainder is for payments to be made to hospitals, surgeons, and doctors for rendering medical aid to injured workers. The indemnity reserve is fixed in amount by the workmen's compensation laws of the respective states which, for the most part, definitely state what amount shall be paid, given the nature of the injury and the average weekly wage of the employee. Thus, the indemnity reserve tends to be fixed. Regardless of fluctuations in the general price level, a fixed amount is paid out in dollars. The dollars may not buy as much merchandise as they would have at the time the reserve was set up, but for the most part, the loss will have to be borne by the injured worker or his dependents. Such beneficiaries will suffer by inflation along with the holders of life insurance policies, savings bank depositors, and all others whose contracts are in fixed dollars. To a large extent, therefore, from a company standpoint, the indemnity reserve is not subject to the hazards of monetary inflation.

(c) The remainder of the Compensation Loss Reserve is made up of funds designed for future payments of medical losses. The amount to be paid for these losses is not governed by law, or by contract. The policy contract merely provides that the losses shall be paid. The dollar cost of these losses is dependent upon the price of the services, or materials needed at the time of payment. Rapidly rising prices, therefore, would undoubtedly make the liquidation of this reserve more costly. Off-setting this, however, is the fact that medical reserves normally are liquidated within a short time. The turn-over in this reserve is rapid, and would require an inflation of extreme intensity, such as the one which took place in Germany, to make a medical reserve appreciably inadequate. Even then, the smallness of the reserve in relation to the total assets of a company, would undoubtedly permit any inadequacy to be absorbed by surplus. I think we may safely say, therefore, that the medical reserve may be classed with the other reserves previously mentioned as far as problems created under inflation are concerned.

(d) We come then to the reserves for personal injury and Property Damage Liability. Inflation would create dangers for the personal injury reserve. With an inflation under way, a well-managed company would make every effort to speed up its settlements wherever possible. The attempt would be made to settle at the price level in effect at the time the accident happened. Probably this would never be altogether successful, and losses would inevitably run higher than anticipated. Intelligent claims administration, under these circumstances, would probably decide to make payments even in some cases of doubtful legal merit, rather than allow them to become suits. Suits would unquestionably present a very serious problem. Often they might not come to trial until two or three years after the date of the original reserve, and might require sums for their settlement which would exceed very substantially the amounts reserved for. This constitutes the principal problem raised by inflation in the entire liability side of casualty company balance sheets.

Property damage reserves, like medical reserves, are generally liquidated within a short period and are small in relation to the total liability reserve. Reserves for other miscellaneous lines are relatively unimportant in size with most companies.

There is one other hazard which would confront casualty companies in the event of a severe monetary inflation; that is—the

ability of the companies to increase salaries of their employees at a rate commensurate with the increase in the cost of living. This might well play an important part in the expense of liquidating the Compensation and Liability Reserve. It was one of the difficulties which the German Life Insurance Companies were obliged to face during inflation of their country. Casualty companies, however, would be in a much more favorable position because so much of their premium is based on payrolls. In the event that inflation takes place slowly, increased costs of doing business would not become a problem, but an intensive inflation might make it serious.

We might sum up by saying that while the most serious inflation hazard lies in the personal injury reserve, the effect on the surplus of most companies would not be serious in a moderate inflation such as has taken place in France. The fact, however, that in five years of depression in this country, our government debt has increased from 20 billion to over 37 billions might well give some concern as to the intensity of an inflation here once it got under way.

There are two conditions which produce monetary inflation:

(1) A continued unbalanced budget,
(2) A continued unfavorable foreign trade balance (visible and invisible).

Either, or both of these, if carried to a sufficient degree, will result in a lower value of money or government credit in relation to the wealth of the country. The result, and the conditions bringing it about, are not different with a country than with an individual. When more goes out than comes in, the obligations of a nation, an individual, a corporation, or an insurance company lessen in value. That is what is taking place in our country today and a continuance of the process must inevitably result in monetary inflation.

Now, what can the investment department of a casualty company do with the assets side of the balance sheet, to off-set any increased cost in the liquidation of its personal injury reserve? Many theories have been advanced with regard to this, the most common one being the purchase of common stocks, and particularly the stocks of those companies which employ a relatively small amount of labor, and those companies which engage in mining,

where the inventory is underground, indeterminable as to value, and not perishable. Other groups advance the theory that real estate is a hedge, and that any property acquired through foreclosure should be held rather than converted into dollar obligations.

We do not have the time here to review the inflations of Germany, Italy, and France at length, but I think one point is important in that it is indicative of what might well happen here. Germany, the first country to inflate in recent years, had the most intensive and disastrous of all inflations by far. Because it was the first to inflate its government over-looked many possibilities for taxation. It was not concerned, apparently, with ruining all classes of investments by the process. Many of the large estates in East Prussia, therefore, escaped the results of inflation almost completely. Taxes and restrictions were not imposed upon them, and when the new currency was established, these estates were in a position to produce the much needed food at high prices. They, truly, were excellent hedges against inflation.

The Italians, however, having had the advantage of Germany's experiences in East Prussia, saw to it that the landed estates in Italy suffered their full share. They not only have been taxed and re-taxed, but have had restrictions imposed upon them as to the price at which their products could be sold, the wages their farmers must receive, and the number of farmers they must employ per acre, etc., etc. In a study which I made on Italian inflation, I was fortunate in being able to obtain first-hand information with respect to a large estate composed entirely of farm land and buildings. This estate paid its owners handsomely before the war through several generations, but for the past ten years it has been operating at a deficit due entirely to the restrictions which the government imposed. Its owners, therefore, would have been better off if they had sold the estate ten years ago and invested the money in Italian government bonds which have, and still are, paying their coupons when due. Such an exchange, if it had been made, might not prove advantageous ultimately, however, when, as, and if the government debt becomes valueless, or nearly so, but the example is brought out to emphasize the difficulty of avoiding the effects of inflation if a government is experienced, and determined that all capital shall suffer alike. The recent profits tax imposed upon industrial corporations by our

government is evidence, it would seem, that it is not its intention that common stocks shall escape entirely the effects of inflation.

The problem, therefore, of the investment department of casualty companies is to invest, if possible, a part of its funds in media which will increase in value under inflation, to an extent which will off-set the increase in the cost of liquidation of its personal injury reserve. I know of no sure way in which this can be done but the nearest we could come to the answer would be to own a home office building, and to have a portion of the company's investment portfolio in common stocks. The extent of such investments should be determined by the size of the personal injury suit reserve, the cost of liquidating its reserves, and the capacity of the surplus funds to withstand the shrinkage in market values under severe market recessions.

This leads us to the next point in the program—the proposed New York Code—as, in its present form it affects the general security of casualty company investments—their market stability—their income—and the amount of funds which could be invested in common stocks. The Code applies to all casualty companies doing business in the State of New York, whether incorporated in other states or not, and as practically all companies do, or want to do business in New York, the Code becomes the governing law affecting the investment of all casualty company funds. The major change made by the Code is that reserve funds may no longer be invested in common stocks or in certain fair grade bonds. It requires that the cash capital and reserves be invested in restricted securities. This leaves a free surplus available for stocks and ineligible bonds. Practically all companies own a sufficient amount of high grade securities to comply with the law without any change in their portfolios. That is, provided that cash and outstanding accounts, less than 60 days overdue, are considered as eligible. The language of the law, however, is not clear as to whether or not these two items are to be placed in the eligible class. It is probably the intent of the law that cash should be so included but most interpretations so far are that outstanding accounts are not eligible. Both of these items are of sufficient importance in size to be included specifically and not left in doubt. From the viewpoint of conservatism, both of these items are highly liquid and there is small probability of a

loss. They are generally considered two of the soundest assets of casualty companies. Unless they are considered eligible for reserve investment, not all companies would have sufficient free surplus to off-set these items, plus their common stocks and non-eligible bond investments.

There is another point in the Code—amortization of eligible bonds—which is not definitely covered although it is undoubtedly the intent of the law that amortization take place. The Code provides that eligible bonds of casualty companies may be amortized, in the discretion of the Insurance Commissioners. In the same paragraph, it definitely stipulates that all eligible bonds of life insurance companies shall be amortized. As the Code applies equally to both kinds of companies, so far as reserve requirements are concerned, it would seem only reasonable that the amortization feature should be mandatory to both types of company, and discretion left with the Insurance Commissioners as to eligibility of bonds.

It has been history in the casualty field that when market values of bonds are high, such values were used in the preparation of financial statements, but in depressions since 1900, when securities were selling under stress, average or other values have been determined by the Insurance Commissioners for use of casualty companies. Market values, therefore, have been fair weather values. A basis for casualty companies similar to that used by life companies would be more proper, it would seem, than market or average values, as the case might require. By making the amortization feature obligatory in the law, permanency of such values would be insured, and the bothersome question raised in periods of stress as to what values casualty companies should use in the preparation of their annual statement, would be eliminated.

The requirements of the Code will undoubtedly decrease the supply of eligible bonds, and such bonds will probably have a scarcity value in the future, similar to that of bonds legal for savings banks. This would have the effect of lowering the bond income of casualty companies somewhat, and it is not improbable that in time casualty companies might be forced into the real estate field, because of a scarcity of eligible bonds, in much the same way that life companies and savings banks have been forced into that field in the past.

If we are to assume, as previously discussed, that common stocks are not necessarily a hedge against inflation, then there is no justification for a casualty company purchasing common stocks in an amount greater than its surplus funds are geared to absorb the most severe market shrinkage. The Code's restrictions as to the amount of common stocks which may be purchased appears to be a sound and workable provision, and cannot be objected to on the grounds that a larger amount would offer an inflation hedge.

The intent of the Code, as relating to investments, is particularly constructive as it will have a stabilizing effect on the values of casualty company securities as reflected in published statements, and will improve the security position of casualty companies, although in so doing it may decrease their income.

The financial condition of casualty companies, on the whole, is excellent. They have weathered the past depression in good condition. There is some evidence, however, that a number of securities, of a quality which is not sufficiently high to make them eligible for reserves under the Code, were purchased during a time when confidence and prosperity were running high. It is possible that we may run into a similar period in the next few years, and I think that all companies in our field should take advantage of such an opportunity to exchange any marginal securities which may appear on their lists for higher type bonds. casualty companies are financial institutions. They resemble the banks in that they take in money, pay it out, or hold it for future payment under certain conditions. They have a dual obligation to their policyholders and to society in that financial strength protects the one and assures payment to the other. Earnings on investments is secondary to security. A high sense of the "trustee" responsibility and obligation to the public, on the part of casualty companies, will carry them in the future, as in the past, through whatever difficulties may lie ahead.

MR. FRANCIS S. PERRYMAN:

The first speaker, in the course of his remarks, had occasion to make mention of a "lunatic fringe"; in fact, he had two, one on one side, the other on the other. In a certain sense I think I am a part of a fringe (but not a lunatic one, I hope)—this is, after

all, an informal discussion, and I feel I am part of the "fringe," or transition from more or less prepared remarks to informal remarks. I made a number of notes about various things that could be talked about if they hadn't been dealt with by other speakers or could be thrown out as questions or topics that perhaps somebody else might discuss, and I hope that after I have made these few remarks we will have a lot of discussion from the floor and this will probably be similar to mine in that it is more or less impromptu.

First of all I will deal with the tentative New York code. The exact details of this code I am not going into, but the effect of it is to apply to casualty companies much the same restrictions as life companies have, and to limit their investments much more than is done under the present law, for instance, restricting their funds in common stock investments to certain proportions of what you might call "free" assets, in the sense of surplus assets, the premium reserves and the claim reserves being regarded more or less as trust funds to be held for the benefit of the policyholders and claimants, and therefore being required to be invested in bonds or real estate mortgages or something which is regarded as a secure investment. That is broadly the effect of it—to restrict much more than under the present law the freedom of investment of casualty companies.

To dispose of this point, while I, perhaps because of my early upbringing, am rather opposed to having much restriction, believing that it is a better thing to get people to do the right thing by persuasion and not by force, yet I believe the objectives of the proposed code are desirable and that a prudent casualty insurance company would conform to the spirit of these objectives without having to be forced. Thus, from the point of view of a prudent company, such as I believe the company with which I am associated to be, I am not particularly opposed to the investment ideas of the proposed New York code, but I have a feeling that I don't like to be forced to do it in a particular way. However, this is more or less academic if I am going to do it anyhow.

I come now to the notes that I have prepared; these notes are rather the opposite in philosophy to the paper that I gave yesterday, which is a sort of a microscopic survey of a comparatively restricted problem, for they are very general notes covering the

whole range of investment problems, a complete discussion of which could easily fill several volumes, if not a complete library.

Before we come to the question of what we want to do with investments we should consider first why we have them. What phase of our business gives rise to the necessity of investments? Then we should get along to discussing what we would like to invest in and what we are or should be allowed to do. Then we might cast an eye on what has been done in the past and guess at what is most likely to be done in the future. Of course, these are large questions.

This brings us to what should be our investments aims and principles. They of course will be something like this: First of all, the safety of our capital; that must be a prime consideration. The next will be the desirability of obtaining the highest yield consistent with safety, then the necessity of keeping an adequate margin of what was referred to a few years ago as "liquidity." (Incidentally, we hear rather less of liquidity than we did around 1933). Of course all these principles are very good ones, but they're not entirely compatible. It is an old truism in the investment field that obviously the highest yield is not consistent with the maximum safety.

Well, now, when we have considered and debated all those high principles, we come to the question of what we are going to do with the money we have to invest. We must consider the different types of investments that are available. There are the four broad types—stocks, real estate, mortgages and bonds. We can differentiate stocks and real estate, which are evidences of ownership, from bonds and mortgages, which are debts of money owed.

Then you have the question of the desirability of having a certain proportion of stocks and real estate as a hedge against inflation. I will say, at this point, that I am pretty well in agreement with the last two speakers about the effects of inflation on a casualty company, and also in agreement with Mr. Simmons that, considering the way we are going at present, I don't see how we can escape some measure of inflation.

After having considered these different types of investments, we would consider the proportions we would put in each, and take into account our needs, whether we needed long or short term investments, whether the short term or long term investments were

affected by the present market. We would come to a problem which comes up quite often in life business, in which, like Mr. Tarbell, I grew up, and we would have to consider whether our portfolio fits into our needs; and whether we should or could have our investment maturities more or less coinciding with those of our liabilities.

There are other things which we should attempt to consider such as the effect of various income taxes, etc., which might be quite an appreciable factor in our investment policy.

Well, that may be regarded as a rapid bird's-eye view of the investment problem. Now I am going to make just a few brief remarks as to where we are at present. Whether by practice or regulation, we find that most casualty companies, as has been pointed out, have very little real estate, and real estate is probably not a very good investment for any kind of an insurance company. We find a certain amount of stocks, a large amount of bonds and a few mortgages. Here, again, I agree with the previous speakers that mortgages are going to be a more important factor in the future than they have in the past, and I agree with them that you have got to set up a proper department and handle mortgages on a decent-sized scale.

There is one salient thing, to my mind, about the present investment situation of casualty companies in this country, and that is the fact that we are more or less on a market value basis, and I don't like it. It is fine to have the actual market values up when the market's up, but you have, in your statement, to take credit for those market values, and there is the danger. I wouldn't like to pay dividends out of "surplus" made up of unrealized appreciation; and don't like to see anyone else tempted to or forced to do it. It would be better to be on a statutory amortized basis where, if there is some unrealized profit, it doesn't have to be brought into the picture.

I am just going to make a few more remarks about another angle of the investment question. It was suggested to me that I touch on this, and I think it was a good idea and so I will tell you the practices of insurance companies in England, where my early training was. Of course it is a long time since I was over there and I didn't have a great deal to do with the investments of any companies over there, but I was more or less familiar with what

they did. Regulation of insurance companies is much lighter than it is here and the motto on which the regulation is founded is "Freedom and Publicity." They certainly have a good deal of freedom; there is no detailed supervision and strangely enough, there isn't as much publicity over there as there is here. For instance, they have no set form of accounting. There are set forms of accounts which have to be rendered to the government, but there are no rules, except very general ones, as to how they shall be made up. Every company handles them in the way it thinks best and some of the things they do would not be particularly well received by some of the insurance departments in this country.

A striking instance of where their publicity is much less than it is here is that companies don't have to publish any portfolio of securities. They publish balance sheets showing they have so much government bonds, stock exchange securities, etc., but they don't even tell you in all cases whether the stock exchange securities are bonds or stocks. That seems rather strange after you get accustomed to being able to get the details of the investments of any company in this country. Now, over there companies are on a market-value basis; but they're on it in a different sense. The market value is the upper limit. They show in their balance sheets the book values of their securities and they certify that the actual value of those securities is, in the aggregate, not less than what they show. It may be much greater, but they don't tell you; that is a "hidden asset." What they do is this: They keep writing down their securities or else building up their investment reserve funds (often out of profits on realization of investments) so that they have these investment reserve funds to take care of any time when the value of the securities is below their book value. If necessary, they bring in their investment reserve fund.

Of course that is quite different from the way in which we show values here. Their assets might be shown at a very much greater value than the actual market value, but they provide for this excess in the investment reserve funds on the liability side; both the assets and liabilities are inflated.

Those are the notes that I made and I don't think I am going to belabor those points any more. I think I will sit down now and hope that we will get a good discussion from the floor on various points.

MR. CHARLES HUGHES:

I would just like to say in the beginning, Mr. President, that I simply came up here to pick up what information I could. I picked up quite a lot and I did not expect to say anything. Although the Department knows that I am here they did not know I was going to talk on any subject, so anything I say represents my ideas and should not be interpreted as representing the views of the Department.

The one thing I can say for the New York Insurance Department is that it will appreciate receiving from you any criticisms regarding any particular section or subsection of the proposed Insurance Code which you think worthy of consideration after you have studied the Code. It is probable that many of you may feel that the language requires clarification in some places and may also fail to find certain things in the Code which you consider should be in it. If you will send to the Department, as soon as possible, a draft prepared by you of any section or subsection which you consider should be rewritten and a draft of any new section which you think should be inserted, those drafts will be carefully considered. It will assist the Department if you will send a letter giving your reasons for the proposed changes you submit. Your submission of proposed changes in the Code will not be considered as meaning that you are in favor of or against the whole Code if it is amended in accordance with your suggestions unless you specifically express your view in your letter.

Somebody told me at the Actuarial Society meeting in Swampscott that some parts of the Code seem to conflict with others to the extent that a company complying with one section could be interpreted as violating another section. I have no doubt that, in a few instances, one section or subsection may seem to conflict with another although every effort has been made to avoid inconsistencies. The Department will appreciate receiving a letter from you calling attention to any inconsistencies you discover.

As regards government bonds and other amortizable bonds, most of you think that amortized values should be used in the annual statements, yet there are quite a few states where, because of a strict interpretation of the law, the departments rule that you can't file statements showing amortized values. If the companies that do business in the states that won't accept amortized

values would take it up with the insurance departments of those states, with the companies incorporated in those states and the agents in those states, I think it is quite likely it wouldn't take more than a year or two before every state in the Union would allow amortized values, and I wish they would.

The question that a great many of you are interested in now and, which the last speaker more than touched upon, is what should be done about the values of stocks. There is doubt in many people's minds as to whether the price at which a particular stock is sold on any particular day really represents a fair value for the stock. The wide fluctuations which have taken place in recent years remind me of an incident which occurred when I first went into the insurance supervision business about 34 years ago as actuary of the Connecticut Insurance Department. Like most people who are "green" on the job I then thought it very important to check every detail in every insurance company's statement. At that time there was no Convention or Association Book of Security Values and it was assumed the companies used quotations they found in the various financial publications. In checking the statement of one large company we found that the values it used for practically all bonds, except government bonds, and for stocks were lower than the actual market quotations. I remember talking over the matter with the president, vice president and chief accountant of the company in its office and feeling quite satisfied with their reasons for using values which were lower than actual December 31st quotations. Among other reasons was the fact that, except in abnormal times, the sale price of a bond or a stock on a particular day is considerably higher than the price would have been if a large block of the particular bond or stock had been thrown on the market that day. Another reason was that the use of values lower than the market quotations resulted in a "cushion" which would eliminate to some extent sudden increases or decreases in the "paper surplus" of a company.

Since that time most states have required or allowed insurance companies to use amortized instead of market values for bonds and it is probable that this practice will be continued. It is my personal opinion that amortized values should be required instead of market values for amortizable bonds but that the Superintendent should have power to test a company's solvency on the basis

of actual market quotations for bonds and for stocks if other factors in the company's business make it seem doubtful whether it should be permitted to continue. Stocks cannot be amortized as they have no fixed date on which the principal will be returned to the purchaser. It has been my idea, however, for several years that any individual or insurance corporation which purchases stock for investment purposes should regard part of the dividends received each year on the stock as a sinking fund to offset the years in which the dividend might be smaller than in previous years and the possibility of having to sell the stock, at a time when the market price is low, on account of the need of actual cash. The high spot and the low spot reached in the stock market this year show the danger of regarding a market price of any particular date as representing fair value, investment value or intrinsic value.

The Book of Security Values as of December 31, 1937 which will be published by the National Association of Insurance Commissioners early next January will contain the actual December 31, 1937 quotations on all bonds and stocks except state, county and municipal for which values will be actual December 1, 1937 quotations. That book will be the 31st book prepared by the Committee on Valuation of Securities and of those books 13 have contained some sort of average values. That is a pretty good proportion and has resulted in the Committee on Valuation of Securities and many of the companies giving considerable thought during the last few years to the question of whether we should not abandon the use of actual December 31st quotations. The suggestion has been made that we should develop some sort of a basic value for each stock and adjust that basic value every year in some way or another. One of the methods suggested is the following:

December 31, 1938 Values: Add together the highest and lowest quotations in each year 1934-1937 inclusive. To that total add the highest and lowest quotations during the period between January 1, 1938 to December 1, 1938 and divide the total by ten. That final result would be printed in the Book of Security Values for use in December 31, 1938 annual statements.

December 31, 1939 Values: Multiply the values appearing in the

previous Book of Security Values by four and add to that product the mean between the highest and lowest quotations from January 1, 1939 and December 1, 1939 inclusive. By dividing that total by five we arrive at the value for each security to be printed in the Book of Security Values for use in December 31, 1939 statements.

The values for later years should be determined in a similar manner.

The advantages of this plan are that the market of the year of statement would never have more than one-fifth weight in the Association Value and the market quotations of the years commencing with 1934 would influence the Association values for many years thereafter.

The question as to whether actual market quotations as of any particular date are the proper values to be used in the financial statements of insurance companies first arose in 1907 and has been discussed in the annual reports of insurance departments and in meetings of the National Association (Convention) of Insurance Commissioners, the Actuarial Society of America, the American Institute of Actuaries and the Casualty Actuarial Society many times since. The matter is discussed at length in the *Proceedings* of the National Convention of Insurance Commissioners in 1908 and 1918, also in the Introduction to Part II of the 1908 report of the New York Insurance Department and the *Transactions* of the Casualty Actuarial Society in 1934.

MR. RALPH H. BLANCHARD:

One of the speakers mentioned the fact that it was well for insurance companies to remember that they were in the insurance business. It will be well for insurance companies to remember in the future that they are in the insurance business. Their prime purpose should be to make an underwriting profit and they should not rely on investments to offset underwriting deficits. Investments are incidental to the insurance business and should not be regarded as a means of making money except incidentally. The carriers should not conduct investment trusts.

In Great Britain, the carriers are free to conduct their business pretty much as they see fit, and very little effective publicity is

given to their operations. There have been several disastrous failures there under the policy of "freedom and publicity," and recently extensive evidence was taken by a committee appointed by the Board of Trade. From the report of that committee it seems clear that Great Britain is headed in the direction of much stricter regulation of solvency. The British authorities are not likely to concern themselves with regulating the details of the carriers' business, but they are becoming very much interested in their financial condition.

MR. HARDWICK STIRES:

I do not feel as though anything that I have heard is in direct contradiction to anything contained in my comments and so calls for rebuttal, but I have made one or two notes that might be worth your consideration.

I have received the distinct impression from various speakers that it was their feeling that my figure of the eighteen leading companies' percentage of total investments of 23% in common stocks seemed excessively high. Again harking back to my former comments where I said it was impossible to be categorical, I wonder if that is so. Possibly I misunderstood and they meant it was only slightly high. If it should be reduced only five to eight per cent, I agree it is only a question of a minor degree; if it should be sharply reduced, then the representation in common stocks means a sore spot in the industry.

Now I believe common stocks to be devilish instruments. I will contend, however, that they won't fare any worse than bonds in the event of inflation, and the previous speakers have all expressed their fear of a credit or possibly even a currency inflation.

At the present moment, with, we will say twenty-three per cent invested in stocks, it is evident that the companies have at least three times as much money invested in fixed income bearing securities or cash than they have in companies which provide a fluctuating income, and can be severely hurt by business depression. In other words, I'd say you're betting three to one against a rise in prices by having three times as much money in bonds as you have in stocks. I feel that probably no greater percentage should be invested in common stocks, but I should hate to see you

increase the odds at the present time by dropping your percentage in common stocks.

Now as to the New York code,—which I first heard mentioned, I hate to admit, only yesterday—I fail to see, from a practical point of view, how it can have any appreciable effect on you as exemplified by the position of these eighteen companies, as, at the moment, of your total assets, only 17.3 per cent are in common stocks. The surplus stands at 22.1 per cent, excluding of course the unearned premium reserve, and the liability loss reserve, so that earmarking your common stocks against surplus you see that surplus exceeds the total amount in common stocks leaving your reserves intact.

Now as to real estate bonds—versus preferred, which I am going to inject here—you have mentioned the narrowness of the high-grade bond market and the increasing competition for high-grade bonds as driving you into either governments or real estate mortgages. You know a great deal more about that than I do and you may be entirely justified in giving real estate mortgages a greater part, but in my study of these eighteen leading companies, it shows that at the end of 1937 you had only one-half of one per cent invested in real estate mortgages, and I was very much pleased to see that figure so low, frankly. The lesson recently learned in that field, it seems to me, is that it is very vulnerable to the business cycle and does not afford the degree of protection that you should look for in the average fixed income bearing security, leaving entirely out of consideration the lack of liquidity. On the other hand, considering that you are ready and willing to take the additional risk for the amount of compensation involved and, of course, know exactly what you're doing (and of course I do not and very likely my ignorance of it makes me over-cautious) it does occur to me that you might consider, possibly, high grade preferred stocks such as Continental Can, which was recently offered. I fear that that entire issue was largely absorbed by institutions and for the first time by many life insurance companies which never before owned any stocks. They felt that that issue which was obviously correctly priced at the time (I am not selling Continental Can) was preferable to bonds of companies operating in highly cyclical industries such as steel, and I simply throw out the suggestion that you might consider

high grade preferred stocks to a greater degree than to rely on real estate mortgages.

Finally, I believe it was your most recent speaker who referred to your underwriting business. These figures indicate that last year you definitely were in the underwriting business as far as I can see, and that the operations for the casualty companies resulted in a profit of thirty-four millions. This was the largest operating profit in the industry's history. In 1928 a profit of one-half of one per cent was reported on premiums.

REVIEWS OF PUBLICATIONS

CLARENCE A. KULP, BOOK REVIEW EDITOR.

Accidents and Their Prevention. H. M. Vernon. The Macmillan Company, New York, 1937. Pp. ix, 335.

What particularly interests me in this book of Mr. Vernon's is the fact that accidents are treated as phenomena that can be analyzed and studied like any other natural or social happenings. I do not know of anyone else who has treated the subject from such a comprehensive point of view.

There are many ways in which things can go wrong in this difficult world; accidents are only one of these but they have a peculiar quality of their own. In reflecting upon this fact, I was reminded of the time when we who are interested in safety education were trying to hit upon some means of discovering effectively and expeditiously whether the study of safety has educational value and is therefore a fit subject for the curriculum. Believing that if it has educational value it will also have dramatic value and conversely, we proceeded to give a safety play. Such a play, that is one dealing with accidents, has something of the quality of the Greek drama. The burden of the Greek tragedy is the struggle of man against fate, a wilful struggle against the world order. An accident is something even more primitive. It represents not the wilful pitting of man's selfish purpose against the set of the universe but a disorder produced through pure blundering and carelessness. The tragedy of accidents does not lie in their wilfulness but in their pitiful ineptitude and in their unnecessary waste.

Accidents are not subject merely to mathematical analysis, like other chance happenings; they can be studied from a great variety of points of view, and this is just what this book undertakes to do. Without much attention to the philosophy of safety beyond some consideration of the propriety of the slogan "Safety First," Mr. Vernon plunges into a practical description of the accident situation, the frequency of accidents both as a whole and in various fields, their cost and their social effect. Next comes the important question of susceptibility, that is accident proneness, and the

possibility of discovering accident proneness through psychological tests, one of the most important practical questions in the safety field today. The relation of accidents to such personal factors as health, age, mental attitudes, fatigue and the use of alcohol and to environmental factors such as atmospheric conditions, lighting, speed of production and night work are considered. These early chapters have to do almost entirely with industrial accidents.

The same type of analysis is used in the three chapters on traffic accidents. Two of these deal with prevention, the factors again analyzed subjectively and objectively, that is those related to personal qualities on one hand and to environmental conditions on the other.

There are single chapters on railway accidents, accidents in the home and coal-mining accidents. Finally Vernon adds three more chapters specifically on industrial accidents, including one on prevention through engineering methods and one on prevention through attention to the human element.

It is interesting to notice that on the whole the same questions are important in England and abroad that are important with us and that these countries have had, for the most part, the same general experience as we. One has, however, the feeling that the safety movement abroad has not on the whole got down to the use of as concrete and effective expedients. Safety education, for instance, has apparently made little progress; the schools seem to be hardly used at all as a medium for producing safety-mindedness. One gets the feeling also that the development of safety codes has not been carried as far in Europe as in this country. Most significant of all, the influence of insurance on the safety movement seems to be almost negligible; the index of the book, for instance, does not even contain the word "insurance." When one realizes the important part that insurance has played in this country in the safety movement particularly through the influence of schedule-rating and experience-rating, it is noteworthy that there has evidently been no comparable development abroad.

On the whole, one gets a very interesting and illuminating picture of the accident problem from this book. It represents a distinct advance in the treatment of the safety movement. One cannot help feeling, however, that something much more compre-

hensive will be possible in a few years, particularly if some of the missing elements are brought into the picture.

ALBERT W. WHITNEY.

Automobile Liability Insurance. E. W. Sawyer. McGraw-Hill, New York, 1936. Pp. 321.

In 1933 both the National Bureau of Casualty and Surety Underwriters, representing a very substantial portion of the stock insurance companies writing automobile liability insurance, and the American Mutual Alliance, representing a substantial portion of the mutual insurance companies writing automobile liability insurance, became firmly convinced that some degree of standardization of the automobile liability and garage liability policies was imperative. Each organization acting independently appointed a committee to develop for its member companies a standardization program. In March 1934, the work of these two committees was integrated in order that a single standardization program acceptable to both groups might result and a joint committee was appointed representing the membership of the two organizations.

Uniform policy language and uniform interpretation was the ultimate objective. After more than two years work a standard policy was prepared. This policy is now in use by all members of the National Bureau of Casualty and Surety Underwriters and all members of the American Mutual Alliance. Companies not affiliated with these organizations are also using the standard policy and it is estimated that 75% of the automobile liability insurance in the United States is now written on policies containing the standard provisions. Having obtained uniform language a part of the ultimate objective has been attained. Until this language is uniformly interpreted we still fall short of its complete attainment.

Suggestions have been made from various sources that a comprehensive analysis of the provisions of the standard policy and a statement of the intent of the committee which drafted the standard policy would greatly facilitate uniform interpretation. Mr. Sawyer attempts in his book to present that analysis and intent.

He points out in the foreword that committee sessions were conducted informally and that all interests were given ample opportunity to discuss thoroughly divergent points of view. Under such conditions a statement of the majority view on all questions of intent is a delicate task. Mr. Sawyer has accomplished a difficult job in a highly satisfactory manner. He points out that, of course, no company by using the standard provisions and no policyholder by accepting them necessarily adopts the intent of the committee members and decision on doubtful points must depend on the meaning the courts have placed on the language used.

Mr. Sawyer discusses first the reasons which prompted the preparation and adoption of the standard provisions for automobile policies and describes the development of such provisions. The second part of his book takes up each clause of the standard policy and indicates the thought and intent of the committee in recommending the language used.

In part three he does the same thing with the garage liability policy. Part four deals with the various endorsements usually required on automobile and garage policies.

This book is a fundamental necessity in any library of a company writing automobile insurance and is of great help to company underwriters and claim departments. Every automobile underwriter and automobile claim man should keep available a copy.

W. J. CONSTABLE.

Buying Insurance. P. D. Betterley. McGraw-Hill Book Co., New York and London, 1936. Pp. x, 192.

This volume is one of a series of insurance books edited by Ralph H. Blanchard and written by men specially qualified to deal with particular phases. The author has had 25 years of experience as an insurance buyer and consultant and evidences a thorough knowledge of insurance principles and practices. The purpose of the book is to stimulate interest in insurance buying as a management function and to afford guidance in the solution of insurance problems and in the building of an insurance program.

Care is taken throughout the book to avoid the classification

of subject matter under such traditional captions as "life," "fire," or "casualty." Instead, insurance is viewed from a functional standpoint and in considering, for instance, the various kinds of hazard against which insurance is commonly sought, the three main classes are called "property hazards," "liability hazards" and "earning power risk." At no point do we find separate lists of the coverages generally afforded by fire and casualty companies. This may be due to a desire not to limit the readers of the book to those within the United States where statutory limitations make definite segregation of risks necessary. While on the one hand there is value in viewing insurance practices broadly, one cannot avoid feeling, in the discussion of policy forms and terms peculiar to a particular line of insurance, that it would have been helpful if certain of these "trade" expressions were identified at the outset with the line to which they pertain.

Separate chapters are given to a discussion of *Insurable Interests*, *Causes of Losses*, and *Prevention of Losses*. There are descriptions of various types of policies such as comprehensive policies, broad forms, all risk types, combination, blanket, multiple location, excess covers and so forth. Various policy provisions, such as policy exceptions, warranties, the coinsurance clause, cancellation clause, restrictive features and others are explained but lengthy quotations are happily avoided. In setting forth the considerable number of factors which should be considered in determining insurable values, practical suggestions are made for the guidance of the policyholder in avoiding over-insurance and under-insurance. The close relationship between prevention and insurance cost is frequently emphasized and it is pointed out that the ultimate cost of insurance is increased by unnecessary losses, even though no immediate reductions in rate may be permitted for removal of loss-causing hazards.

The chapter on *Insurance Carriers* is a model of fairness and impartiality in weighing the merits of participating and non-participating carriers as well as of conference and non-conference companies. The buyer is advised to select an insurer solely because of its ability to render service and its capacity to preserve the policyholder from financial loss. In the two chapters dealing with the procedure to be followed after a loss has occurred, the importance of salvage work and of maintenance of complete rec-

ords is stressed. It is pointed out that it is at the time of loss that the soundness of the insurance program is tested and that a reputation for honest dealing on the part of the buyer is a decidedly helpful factor in achieving a satisfactory settlement. Little space, naturally, is given to the problem of rate-making but the fact is clearly brought out that in the long run the assured makes his own rates through his control of losses.

Insurance companies, selling an intangible thing, protection, have not made it a practice either singly or through their cooperative organizations to survey the market to determine the desires and preferences of the potential buyers of insurance. It may have been felt in the past that the constant contact with the public through agents and brokers makes this unnecessary, but there is a growing appreciation of the desirability of giving careful heed to suggestions emanating from the users of insurance, if insurance is to be of maximum service. It is therefore of interest to note some of the criticisms and suggestions made by Mr. Betterley, whose experience well qualifies him to represent the policyholder's point of view.

Granting that uniform rules and classifications are generally helpful, the author frequently emphasizes the inflexibility of much insurance practice and maintains that insurance provisions should be adjusted to meet the needs of the particular risk. (The increasing tendency to adopt standard policy forms, we observe in passing, and to define coverage in a uniform manner would seem to prevent companies from modifying coverage to any great extent.) It would seem that opportunity should be afforded to meet all reasonable needs of insured persons and to compensate any resulting increase or decrease in coverage by appropriate changes in premiums.

The author points out the confusion and inconsistency which exist in various lines of insurance, the lack of country-wide uniformity, the use of superfluous words in insurance policies and the great need of simpler contracts. He maintains that the insurance carrier which interprets policies broadly is a real provider of protection, while the insurer taking the risk at too low a price cannot afford to be liberal. He recommends the more general use of signed applications, policies providing automatic coverage, more comprehensive policies to cover allied hazards and

simplicity in policy wording as one method of bringing about a lower cost of insurance. He likewise favors a greater centralization of the control of the insurance business and elimination of many existing boards, conferences and organizations.

This book is primarily intended as a guide for the insurance user and should be of particular value to those who have the responsibility in an organization for the purchase of insurance and the development of an insurance program. It will also be instructive to those in insuring organizations who desire to keep insurance coverages and services fully abreast of all reasonable requirements of the insuring public and so are willing to view insurance through the eyes of the insurance buyer.

H. O. VAN TUYL.

Charco Charts—1937 Casualty and Surety Edition. Reviewers Charts Corporation, New York City, 1937. Pp. 211+4.

Charco Charts are published in book form in two editions—a Casualty and Surety and a Fire and Marine Edition—and were first presented in 1936.

The 1937 Casualty and Surety Edition contains certain information derived from insurance department reports and filed statements on 100 leading casualty and surety companies. The information is prepared by Woodward, Ryan, Sharp and Davis. Its accuracy is subject to verification by the companies' Home Offices to which proofs are submitted before publication.

Two pages facing each other are devoted to each company and give the following data:

(a) *A condensed financial statement as of December 31, 1936.*

Assets and liabilities are shown in condensed form together with the percent of each asset and liability item to the total assets and liabilities, respectively. Bonds and stocks are further classified by percent of total assets into the groups called for by the Convention statement. Loss reserves are also sub-divided percentagewise by principal lines of business. Surplus to policyholders, including voluntary reserves, is shown prominently. Because of the uniformity of presentation and the aid of percentages, a very handy comparison of companies is possible.

Some comments may be made on the question of security valuations. In the case of some companies a footnote indicates the amount of change necessary to bring bonds and stocks to market; for other companies there is no footnote. In the introduction no mention is made of a "norm," exceptions to which would be covered by these footnotes. Hence it is difficult to tell what is the basis of valuation. Moreover, in the past few years some confusion has arisen as to what constitutes market value. It may be based either on the values in the Convention book (on Valuation of Securities published by the National Association of Insurance Commissioners) or on actual December 31st quotations. Some remarks in the introduction to the Charts should cover this point.

(b) *Three charts covering the ten-year period 1926-36, showing assets-liabilities, policyholders' surplus, and premiums written-losses paid (including loss expenses paid).*

These charts are the same size throughout the book but each one is graduated differently to suit the values plotted thereon. For this reason care must be exercised in reading them. The scale of each chart is adequately shown. The values are plotted by years and a straight line curve drawn between points. There are two curves on each chart and the area between the curves is blank, as compared to the graph-paper rulings elsewhere. This causes some difficulty in reading certain charts. Light rulings or broken lines between the curves would help materially. The curve representing liabilities has been plotted both to include and exclude voluntary reserves, if any, and the area representing the voluntary reserve appears in black. The policyholders' surplus curve is similarly treated. A visual picture of the extent of the voluntary reserve is thus very easily obtained.

(c) *A circular or pie chart on 1936 operations.*

This is in the form of two semi-circles, one showing the sources of gross gains, such as underwriting, interest, etc.; the other the manner in which such gross gains were distributed: dividends, increase in surplus, etc. The monetary value and percent of total are shown for each item and the area of each semi-circle is marked off in proportion to this percentage. These charts afford an interesting picture of 1936 operations. It should be noted

that the total used is merely the sum of gross gains (for securities whether realized or not) and does not represent earnings as commonly determined for insurance companies.

(d) *An analysis of 1936 premiums written showing amounts by principal lines and the percent of each to the total premiums written.*

A tabular underwriting and investment exhibit, the basis for the circular chart on 1936 operations, appears on pages 208 to 211 and shows in detail for each company the various items contributing to the movement in surplus during 1936. It is based on the exhibits on pages 10 and 11 of the 1936 Convention statement and specific reference to lines on these pages is made for each column. One column, that entitled *Miscellaneous,* is somewhat ambiguous. Net gain from miscellaneous investment items (line 55 less line 60, page 11 of the Convention statement) and net gain from miscellaneous items (Miscellaneous exhibit, page 11 of the Convention statement) are shown separately in columnar form. However, if any company has a large non-recurring or special item in the miscellaneous exhibit, all of the above are shown in arithmetical total regardless of the effect they have on surplus and a footnote explains the exact nature and effect of the items that produce this total. An improvement in the table would be to consolidate the two columns: *Gain from Change in Book Value* and *Gain from Change in Market Less Book,* and include therein miscellaneous investment items from lines 55 and 60. This combined column could be called *Net Gain from Change in Valuation of Ledger Assets.* This would give a more logical and concise value and would simplify comparison between companies. The miscellaneous column would then be based on items appearing in the miscellaneous exhibit of the Convention statement.

Besides the charts on the individual companies, three basic charts show similar information based on averages:

(a) For all companies included in the 1937 Casualty and Surety Edition.
(b) For the 15 leading fire and marine companies (in premium volume).
(c) For the 10 leading casualty and surety companies (in premium volume).

The first two appear immediately after the tabular underwrit-

ing and investment exhibit. For the third, a unique and excellent arrangement is used. These data appear on the inside of the covers of the book so that by opening the book to any particular company, the data on that company can be compared with the averages satisfactorily and easily.

In conclusion it can be said that whatever information Charco Charts contain is ably and interestingly presented. This was essential in view of the recent entrance of this publication into the field of insurance statistics—a field already well filled with publications giving more complete data. As to the value of the data shown, although it is important, it is obviously not comprehensive enough to lend any great amount of weight to opinions derived from perusal of the charts. It must be said, however, that the publishers make no claims other than that the book affords a ready-reference on essential information, and this it accomplishes.

On the general question of insurance statistics compiled by private interests, too much stress cannot be made on the desirability of having proofs submitted to the insurance companies before publication so that they may have the opportunity of correcting or explaining items the publication of which might otherwise cause harm both to the carriers and the insuring public; especially when one company's results are compared with some average and found to be greatly above or below it. Figures are figures and they may never lie; but they certainly on occasion can be very misleading. It should never be overlooked also that companies differ so radically in management, type of business and territory covered that averages in some cases, because of possible unfortunate consequences of such comparison, may mean worse than nothing.

J. C. BARRON.

Fire Insurance Rating in Pennsylvania. Milton W. Mays, Jr. University of Pennsylvania, Philadelphia, 1935. Pp. 138.

This is a dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy. It is the author's purpose to examine the methods used in developing fire insurance rates in Pennsylvania with a view to determining whether the rating process can be considered satisfactory.

The qualifications of a satisfactory rating process are defined by the author as follows:

1. The rates produced should be adequate to enable the carriers to pay claims and reasonable expenses and earn a reasonable profit.
2. The rates should not be unfairly discriminatory.
3. The process should be flexible enough to reflect the changing importance of loss-causing factors.
4. The process should be simple enough to be easily understood by the insuring public and legislators, and it should be inexpensive.

The author proceeds to a description of rating methods now used in Pennsylvania. Certain types of risks have been considered so similar in hazard that they have been grouped into classifications and minimum rates have been promulgated for each classification. Other types of risks are subjected to schedule rating. (Accurate data are not available on the proportion of total insured value in Pennsylvania subject to schedule rating.) Twenty schedules are used, of which two are general schedules—one for buildings of fireproof construction, the other for buildings not fireproof —and eighteen are for rating special types of risks. The General Schedule for Buildings of Fireproof Construction, the most general and comprehensive, is chosen by the author for the purpose of describing the schedule rating process. The numerous charges and credits for items of inferior and superior construction, additions for various features of occupancy, miscellaneous deductions, credit for sprinklers, etc. are discussed in considerable detail.

It is the author's opinion that the Pennsylvania rating methods do not meet the qualifications of a satisfactory rating structure. On the basis of such experience data as are available, the premiums appear to him to have been greater than necessary to return a reasonable underwriting profit. Consistent treatment is not given to risks of the same class, nor to risks of different classes. Only a minority of causes of fires are reflected in the schedules. The rating structure is too complex and expensive. Rating methods, he concludes, should be completely revised.

The author then presents his plan for rating—a plan designed for application not only in Pennsylvania but throughout the United States. This plan is modelled after workmen's compensa-

tion insurance ratemaking methods. Rates would be made by a central organization functioning for the country as a whole, the function of state rating organizations being largely confined to seeing that the prescribed rates are adhered to. Experience would be reported by the carriers to the central ratemaking organization. A limited number of classifications, or hazard groups, would be created. Pure premiums would be computed both upon the basis of nation-wide and local experience. The extent to which rates for a given city would be based on local experience would depend upon the volume of its experience. In other words, rates would be based on local experience, or nation-wide experience, or a combination of the two in accordance with the indications of a credibility formula, as is the case in workmen's compensation insurance. The expense loading would be limited to an amount which would provide for reasonable expenses and a reasonable underwriting profit.

The author believes his plan would produce more equitable rates than do the present rating methods, and that such rates, having statistical basis, could be more easily explained and would be more acceptable to policyholders and supervising authorities. In addition, he believes such a ratemaking plan would be less expensive to the carriers than the present procedure.

To one accustomed to casualty insurance ratemaking, a plan such as Mr. Mays outlines seems commendable and a distinct improvement over existing rating methods. This reviewer, being unfamiliar with fire insurance problems, hesitates to venture an opinion, however, on its workability.

HOWARD G. CRANE.

Forest Fire Insurance in the Pacific Coast States. H. B. Shepard. Technical Bulletin No. 551, United States Department of Agriculture, Washington, D. C., 1937. Pp. 168.

If the United States is to make successfully the transition from a system of exploitation of its forest resources (without regard for the interests of future generations) to one of forest resource conservation and management, practical forest fire insurance appears to be a necessary aid. Acting on this thesis and with a specific appropriation for the purpose, the Forest Service assigned Mr.

Shepard, Senior Forest Economist, to undertake a study of the forest fire hazard in the Pacific Northwest and of the possibility of insurance against it. This Bulletin presents the result of that study.

One is a little surprised at the author's intimate familiarity with insurance problems, until one turns to the title page and notes the author's acknowledgment of assistance from sources which include The Board of Fire Underwriters of the Pacific, the Washington Surveying and Rating Bureau and the National Board of Fire Underwriters. His outlook on the underwriting aspects of the problem shows that he has taken full advantage of his contacts with these bodies.

After discussing the need for such insurance and the lack of present facilities the author considers the type of policy required for such experimental coverage. He recognizes that while it must give fair coverage to the insured according to his need, it must also protect the underwriter against moral hazard and give him a fair premium.

Among his proposals is a combined 100 per cent coinsurance clause and three-fourths value clause. Respecting this he says:

> The conjoint use of these two seemingly contradictory clauses would be highly desirable during the experimental stages of writing. While they seem to be contradictory, the actual intention is for the insured to carry only 75 per cent insurance. The 100 per cent average clause is inserted in order to provide that no losses shall be indemnified at more than three-quarters of their amount.

He does not discuss what seems to this reviewer a very serious question in respect to this device: how it would fare in the courts. Might not the contradictory character of the clauses lead the courts to rule out one or the other and so defeat the purpose of their joint use? It does not appear how far this suggestion was discussed with the rating organizations.

Since the region covered is characterized by a dry season in the summer when the hazard is at a maximum, and an almost negligible hazard during the rest of the year, a "dry-season clause" is proposed. This would split the premium, for purposes of cancellation, into two parts for the two seasons, 80 per cent applying to the shorter dry season. In the case of cancellation by the

assured (almost certain not to occur in the dry season) the return premium would be calculated at the customary short rates for the difference between the dry season charge and the full premium.

Since the value of timber per acre in a forest varies considerably even within the same forest, it is suggested that a pro rata distribution clause based on acre-values also be used.

The author discusses many other practical insurance aspects: underwriting, policy forms and the technique and policy of appraisal and adjustment. He suggests, for example, a lengthened period for adjustment to allow for potential recovery or salvage.

The major part of the report is devoted to a study of the causes of fire hazards, including predisposing and aggravating associated factors such as climate, protection and other retardant forces. This leads to a discussion of tentative suggested rates for typical parts of the territory and presentation of suggested schedules for arriving at individual rates. For this part of the work the author was fortunate in having at his disposal the carefully kept fire records of the Forest Service, and data on meteorological conditions kept by the Weather Bureau. The weather stations, of course, are not in the forests but are so located in adjoining regions as to furnish a fairly accurate picture of forest conditions.

Those of our members who have been through the earliest stages of pioneer work on workmen's compensation insurance rates, policy forms and rating plans will feel a certain kinship with this effort; perhaps a little envy at the extent and reliability of the data.

While the present reviewer does not see anything in this study of which a casualty actuary may make immediate practical use, he commends it as interesting reading to any insurance man interested in the broad aspects of his whole field.

A. H. MOWBRAY.

Life Insurance Speaks for Itself. M. Albert Linton. Harper & Brothers, New York and London, 1937. Pp. xvii, 113.

Sturdy old Samuel Johnson was sensible enough to avoid giving importance by so much as even a retort to any of the hundred bad writers who misrepresented and reviled him. He realized that the reputations of men and books finally live or die by what they are—not by what is written about them by

obscure time-servers seeking a cheap notoriety through assailing the honorable and sneering at the good. It was a favorite saying of the sage's that no man is ever written down but by himself.

The precept may usually be followed to advantage by great and benevolent institutions as well as by great and benevolent men like Dr. Johnson. Constitutional government, well established and successfully administered, deriving its just powers from the consent of the governed, is an example. Bitter things are said of it by men who, never having learned to govern themselves, feel amply competent to rule the world. Anarchists and bolshevists would gladly dance the carmagnole beneath the dome of the Capitol. But constitutional government can afford to ignore most of their threats, unless occasionally it becomes expedient to transplant some exceptionally vociferous critic to a more congenial atmosphere, placing him again among his kind.

Life insurance, the most successful cooperative enterprise of the ages, is another great and benevolent social institution so firmly established and so beneficently operative that no detractor, however malicious or influential, is likely to deserve serious attention or deliberate refutation. Yet a Mr. ————, in recent numbers of ————————, has misrepresented the basic principles of the business so ingeniously that some unwary policyholders will probably believe him. It can do no particular harm to attempt a simple answer to some of his charges . . .

Thus in 1923 the reviewer proceeded to administer sound wallops in four or five thousand words to one crazy tilter at the windmill, whose name, assaults and periodical are now buried in oblivion on account of their own ineptitude and imbecility and not at all because of your reviewer's learned and virulent counter-attack.

But every year a new crop of these hardy perennials, some of them self-seeking twisters, some of them well-intentioned reformers with little patience, less knowledge and no humor, springs up to take one more ill-natured thrust.

To think that two and two are four
And neither five nor three
The heart of man has long been sore
And long 'tis like to be.

But the windmill, like Old Man River, just keeps on rolling along —or must one say, around?

In times of general unrest, this particular crop is naturally most abundant. Unfortunately, the fresh crop has only the stale cry: Take only term! Keep your money in your pocket! Don't be robbed of your reserves! See how expensive your insurance really is!

Even a Quaker actuary may be pardoned for thinking that, in spite of Johnson's dictum, a brief reply in book form to these incessant carpings is justified. Hence Mr. Linton's conveniently-arranged little book intended for the enlightenment of the man in the street. In barely a hundred brief pages, with a foreword and supplementary note, he examines the ancient plaints in considerable detail and answers them, I think, as cogently as the layman's understanding of a necessarily complicated subject based on mathematical principles will permit. The author would be the last person to claim that all his answers are complete or definitive. Indeed, the subject of Chapter XIII, *The Obsolete American Experience Table of Mortality Makes Life Insurance Cost Too Much,* is even now under judicious and semi-judicial consideration, while it is to be regretted that the cogency of Chapter VI, *When I Borrow My Own Funds You Charge Me 6% Interest,* eluded the intelligence of responsible officials in at least one insurance quarter. The concluding chapters include disarmingly frank admissions on the expense involved in merchandising insurance products. Perhaps Mr. Linton might properly have gone farther in pointing out that American life insurance is conditioned by American life; that we are a wasteful people, prodigal of natural resources, thriftless in scrapping the old and still useful for the new and more fashionable, forgetful every day of Poor Richard's precepts, neglectful every day of thoughtful plans for tomorrow. Inevitably, in the American environment, even an institution based on thrift and on foresight must in its conduct reflect something of these national traits.

The tilters themselves will never profit by this book. They seek publicity, not enlightenment. Very likely, too, the effectiveness of their cries is in inverse ratio to their vociferousness. Yet it is well that the life insurance salesman should have a chance to refer a perturbed policyholder or prospect to a sincere exposure of some of the fallacies and half-truths so frequently uttered against his product. Mr. Linton's attractive little volume serves this purpose

well. Certainly Chapter VIII, *A Page from the History of Renewable Term Insurance,* is an admirable exposition, to excellent purpose, of a too little remembered episode in American life insurance history. The man in the street should find this, and indeed the other chapters, persuasively interesting if he will only read them. I hope he will.

HENRY H. JACKSON.

A Study of Law Administration in Connecticut. Charles E. Clarke and Harry Shulman. Yale University Press, New Haven, 1937. Pp. iii, 239.

This work contains the result of an intensive study carried on over a period of years. The study is limited to the Superior Court of New Haven County, Connecticut. Its numerous charts and tables set forth in great detail interesting and carefully developed arrays of statistical facts. Obviously the field covered is too limited and the volume of statistics too small to make the work more than an item in a general consideration of the problems involved but it has a genuine value as suggesting a means whereby a broader and more far-reaching study could be undertaken.

Professor Clarke in an article reprinted as Appendix I points out the need of a more accurate knowledge of the administration of justice, and indicates that lawyers and law schools have performed but little actual research along this line. There are really two problems with regard to our courts. There is the question, and a very real one in this day and generation, whether the legal principles applied to controversies between litigants are properly adjusted to the business and social habits of the day and to the ideals and aspirations of the community. The considerable volume of legislation addressed to modifications of established legal principles indicates that in some fields this is not the case. There is further a very real question whether the procedure of the courts operates satisfactorily, affording a remedy at once expeditious and adequate. On both these problems a statistical basis can be laid for the solution. The number of cases and their character will indicate in some measure the points of the social structure which develop trouble, the places where something needs to be done. Statistics do not of course always indicate what ought to be done,

but they at least furnish a groundwork of fact which enables the legislator to set about his task with more assurance, and pave the way for an intelligent result.

Several parts of the work are of interest to those concerned with casualty insurance. There are certain figures relating to appeals to the courts in compensation cases. This is a field in which the collection of statistics is highly desirable, as it furnishes a check on the operations of industrial commissions. A multiplicity of appeals indicates a lack of satisfaction; a multiplicity of appeals involving law points indicates something wrong, either with the law or with the interpretation placed on it. The number of appeals in Connecticut does not appear unduly large.

Chapter 3, *The Jury,* deserves to be read with careful attention. That the jury system is slow and cumbrous, that it involves a considerable cost and that the results produced are not free from criticism cannot class as news. The authors feel that the facts developed indicate the picture of "an expensive, cumbersome and comparatively inefficient trial device employed in cases where exploitation of the situation is made possible by underlying rules." They feel also that the facts developed give persuasive reasons for "the definite limitation of trial by jury to the role of safety valve"; for the greater use of the summary judgment process in debt cases; for the requirement of substantial jury trial fees; and for the reduction in the number of jurors required for a petit jury to nine or even to six. It is indicated, however, that jury trial in civil cases is now mainly taken up with automobile accident cases, and if as has been proposed legislation be enacted for the settlement of automobile accidents on a compensation basis, the number of jury trials would become entirely insignificant.

On these matters the reviewer expresses no opinion save to mark all of them as matters well worth considering. The preparation of lists indicating the number of tort cases per individual lawyer, as done here, has also been done elsewhere in connection with drives against ambulance-chasing, and should be done on a more comprehensive scale and with regularity. A part at least of the mischief of negligence cases is due to the demoralization of a certain section of the Bar.

Chapter VI, *Automobile Negligence,* is also well worth careful

study. This contains a certain diatribe upon liability insurance which is not entirely warranted. While no doubt the interest taken by insurance companies in reducing losses is primarily for business reasons, it has not taken the form merely of intensive following and investigating of accidents and of procuring inexpensive settlements, as the paragraphs on pages 167 and 168 would indicate. The matter of automobile accident prevention has been of interest to the insurance carriers since 1922, not merely as a theme of study, but backed up by costly statistical work and by the contribution of considerable sums of cold cash. The expenditures of the stock carriers through the National Bureau of Casualty and Surety Underwriters (the work has recently been taken over by the Association of Casualty and Surety Executives) have amounted to about $100,000 annually. Something like half a million additional has been contributed to the work of the National Safety Council. Very substantial additional work has been done in statistical study, public education and in the contributions of several individual carriers, especially by two located in Connecticut. The authors' statement that this is done "as a matter of business purely" seems a trifle narrow. Even a business concern which does something in the public interest merits a certain credit, and in this respect certainly the situation is better and not worse because of the insurance companies.

On the basic point involved in this question the authors state:

> The diligence of insurance companies in following and investigating accidents and procuring inexpensive settlements was accompanied by diligence on the part of plaintiff's lawyers in behalf of their end of the business. This was business, not law. And just as insurance companies and their adjusters were limited only by commercial, rather than professional, legal ethics, so also the other end of the business, the collection for the injured, came to be conducted on a commercial rather than on a professional plane.
>
> The effect on the prestige of law and judicial administration has been very disturbing.

The reviewer has been a member of the Bar for more than thirty years. He once heard a former attorney-general of Massachusetts comment acridly that a code of legal ethics is a series of principles for the conduct of members of the Bar, drawn up by a Committee the members of which are the chief violators. Draw-

ing comparisons in the ethical field is none too easy, but there seems very little reason for the authors' clear implication that "professional legal ethics" are superior to commercial ethics. The law should be an instrument of justice, the courts a means for ascertaining truth and rendering judgment in accordance with the law and the facts. But these can hardly be said to be the motivating ideals of the members of the Bar. The lawyer is an advocate, not a logician nor a moralist, and for the development of truth and the working of justice he cares relatively little. He is set to play a game with rules of law and concrete situations of fact, and his purpose is to get as much therefrom for his client as possible. In the trial of a case, he does not think it wrong to attempt to make the worse appear the better reason; to seek to defeat a meritorious case on a clever technicality; to color and distort facts in the interest of his client and to hinder or prevent the development of facts bearing against his client; to browbeat, confuse or embarrass witnesses; to play upon the sympathies or prejudices of judge or jury. If engaged to settle a case, he gets just as good a settlement as he can, and thinks as much of the interests of his client and as little of the interests of the other party as any commercial person possibly could. He is seldom forgetful of his own interest; has in fact, a fairly keen eye for the main chance. All this he can do and not prejudice his professional standing in the least. In fact, the better he does it, the higher his standing. But that is a thoroughly amoral attitude, and leads with facile ease to an entire disregard of ethical principle, to the complete ignoring of the high ideals of truth and justice and not infrequently to contempt of the law itself. The authors themselves comment upon "commercial rivalry between lawyers for negligence business, contingency arrangements between lawyers and clients, advancement or assumption of costs by lawyers, jury pandering, if not jury tampering, constant bickerings and delays." These they seek to alibi by constituting the insurance companies chief villains. But liability insurance is not so very old, and all these were known to the Bar before the first liability insurance policy was written.

Insurance companies are in fact fairly well-behaved institutions, partly because they want to be, partly because they must. Insurance companies do business in all states save the state of

incorporation by virtue of a license issued annually and revocable at any time. The equity of their settlement practices can be and is reviewed by the licensing authorities and they must perforce give heed to the concepts of fair dealing prevalent in the community. As to the lawyer, disbarment is not a facile process. The profession is overcrowded, and there are in it enough of the unscrupulous so that not even the most degraded criminal need lack his mouthpiece, nor the usurer nor the racketeer his legal staff. Judge the profession by the practices of its members and there seems mighty little justification for the elevation of the professorial nose at commercial ethics. There is still something in the courts reminiscent of the words of the prophet of old:

> And judgment is turned away backward, and justice standeth afar off; for truth is fallen down in the street, and equity cannot enter.

And in the conduct of the Bar itself, still some justification to the ancient indictment:

> Woe unto you, lawyers: for ye have taken away the key of knowledge: ye entered not in yourselves, and those who were entering in, ye hindered.

This slur upon the insurance business should not be permitted to obscure the value of the work, which seems on the whole excellently conceived and deserving of a further extension. But it appears in the main to lay foundations for a critique of law and law enforcement, and one remedy, several times suggested, the putting of automobile cases on a compensation basis, is tantamount to an indictment of the whole law of negligence, an assertion of the incompetence of the courts and of the Bar to administer it.

CLARENCE W. HOBBS.

Workmen's Compensation. Douglass Argyle Campbell, A.B., J.D. Parker, Stone and Baird Co., Los Angeles, 1935. 2 Vols., Pp. xi, 2059.

This book can hardly class as a general work on workmen's compensation. Practically and essentially it is centered about the California Compensation Act and is devoted to a detailed discus-

sion of the interpretation and application of that Act by the Industrial Accident Commission and the courts. There is some attempt to bring in varying laws and practices by reference, but this is not entirely successful, and is entirely overshadowed by the author's main theme, which dominates and controls the entire work. This is as it should be. A work cannot be at once general and special and one cannot but feel that this would have been none the worse had the author frankly devoted it to the California Compensation Act.

The chapters of the work which deal with the California Act are richly detailed, full and on the whole finely conceived and arranged. An elaborate test of the intrinsic merits of the work is hardly possible within the brief confines of a review. One is inclined to believe that the author, dealing with a subject with which he ought to be thoroughly familiar, has given an adequate and impartial analysis of the decisions of the Industrial Accident Commission and of the courts. A certain shadow of doubt may result from his own admission in the Foreword that he has used a degree of selection. In reading over the work one runs here and there upon passages in which one cannot quite concur; where one feels that the author has been a little too sweeping and uncompromising in laying down a rule, not entirely supported by the instances adduced. This may, however, be due to the fact that California practice under the compensation act has its points of distinctiveness.

A high degree of praise is due to the chapters on interstate commerce, maritime commerce and the Longshoremen's and Harbor Workers' Act. These are fully detailed, well arranged, and on the whole the best treatment of the subject this reviewer has seen. That much may fairly be said; and if now one starts to point out a few of what he considers to be errors, it is in no spirit of carping criticism.

> *Section 581,* last paragraph. The difference in the remedy for wrongful death given by the Federal Wrongful Death Act and by the Jones Act does not lie alone in the matter of jury trial. The Wrongful Death Act may be enforced by libel *in rem*, while the Jones Act cannot; and this difference may be very material. Again, the Jones Act applies in some cases where the other Act does not, namely, deaths on navigable waters of the United States.

Section 595. The "Rhode" case, referred to here, and in a number of footnotes should be the "Rohde" case. The title of the case is, *Grant Smith-Porter Ship Co. v. Rohde.*

Section 615. The author seems to have misread *Spencer-Kellogg Co. v. Hicks* referred to in the footnote as "The Linseed King." This case involved actions to recover for the death of a large number of employees, drowned while being transported from New Jersey to New York. The holding in the court below was that the right of parties were governed by the Compensation Act of New Jersey. The Supreme Court held that the fact that the employer was guilty of a maritime tort brought the cases within the maritime jurisdiction of the United States and that recovery might be had, not under the Longshoremen's and Harbor Workers' Act as stated, but under the death statute of New York. A later case *Heaney v. P. J. Carlin Construction Co.*, 199 N. E. 16, 298 U. S. 637, where the employees were killed while being transported on navigable waters by a steamer with which the employer had made arrangements for transportation, held that the cases came under the New York Compensation Act. The principle involved in these cases renders desirable some qualification of the rule laid down in Section 600.

Section 612. The rule as to dredges is laid down a thought too absolutely. While one may admit that many dredge cases are compensable under state law, there are four cases which indicate that under some circumstances dredges come under maritime jurisdiction. *Zurich General Accident and Liability Company v. Industrial Accident Commission*, 218 P. 563; *Arundel Corp. v. Ayers*, 175 A. 587; *Kibadeaux v. Standard Dredging Co.*, 81 F. 2nd 670; *Puget Sound, etc., Co. v. Department of Labor and Industries*, 54 P. 2nd, 1003. It seems possible that a line of cleavage may ultimately be established on the same lines as in case of maritime liens. This was mentioned in *Fuentes v. Gulf Coast Dredging Co.*, 45 F. 2nd 69. Note 70 in this section should refer to Section 564 instead of Section 544.

Section 616. The rule as to rafts is probably laid down a little too absolutely. Some rafts have been held vessels for purposes of the Maritime Law, others have been held not to be vessels.

These errors are not very material and do not detract from the general excellence of the chapters. There are, however, certain parts of the work which seem out of keeping with the rest. The treatment of the law of negligence in Chapter I is slight. Section 3 fails to give any real idea of the common law duty of the employer

to his employees; Section 6 is the mere reflection of the somewhat elaborate fellow servant rule, and Section 8, on the basis of the defense of contributory negligence, is very questionable indeed. Perhaps the most amusing bit of sketch work is Section 4 where the grandiose subject, *Condition of Industry under the Common Law,* is disposed of in four banal sentences. One ventures to question the initial sentence of Section 17, that "Compensation acts uniformly abrogate these common law defenses." The abrogation is generally limited to the cases where under an elective act an employer elects to stay outside, or where under a compulsory act an alternative right of action is provided against an employer who has failed to comply with the security provisions. Note 31 to this section should properly refer to Section 19 instead of to Section 29.

Again Sections 1397-1432, which purport to discuss compensation rate-making are very, very poor. The author has relied overfondly, and overconfidently, on United States Labor Department Bulletins dating from 1917 to 1926, with the result that he is not talking about rate-making as it is, but of rate-making as it was in the revisions of 1917 and 1920. About all he gives of the production of state pure premiums is an indication of a process of combining state experience to produce national pure premiums and the reversion of these to the level of individual states. In Section 1422 he indicates that this is achieved by law differentials, not used since 1917 for this purpose. And in Section 1423, he very evidently had in mind the method of conversion and reversion used in 1920 but never since. Of the present process of producing state pure premiums by the formula method, he has apparently no idea.

It suffices to note without discussion the two errors in nomenclature in Section 1397; the stating in Section 1399-1401 of the statutory provisions for the rates of the California State Fund as general statutory rate-making criteria; the reference in Section 1425 to the method "heretofore discussed" of developing loss change factors from the Standard Accident Table, which were, as a matter of fact, not discussed; the statement in Section 1427 that a 5 per cent excess of credits over debits in a rating plan is taken up by multiplying the final pure premium by a factor of 1.05; the statement in Section 1430 that "indemnity losses not

exceeding fifty weekly payments per case" are considered "normal"; and the statement in Section 1432 that the weight of normal losses is approximately twice that of excess losses.

There are a number of other points discovered in running through the work which invite discussion, but the above seem enough. The author deserves no little credit for having set forth in fine detail the California Compensation Act, its interpretation by Commission and Courts and practice and past procedure under it. He deserves also a great deal of credit for the three fine chapters on interstate commerce, maritime commerce and the Longshoremen's and Harbor Workers' Act. While the main value of the work is probably to those who are concerned with workmen's compensation in California, it is a most interesting work for a student of the general subject. Nor can one avoid a word of commendation on the handsome appearance of the volumes, both without and within, a credit to any publisher. Some time, we hope, we too shall find a publisher who will let us insert two hundred pages of forms and statutes and three hundred pages of index; in these days of rising cost and pessimism, these are rare indeed.

CLARENCE W. HOBBS.

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CURRENT NOTES

T. O. CARLSON, EDITOR

AUTOMOBILE

Massachusetts Compulsory Automobile Rate Case

The 1937 automobile liability rates for statutory coverage promulgated by Commissioner De Celles in September of 1936 were determined by a procedure differing in two important particulars from the standard procedure proposed by the insurance carriers. In the first place, the commissioner approved a statewide rate level based upon the indications of the latest five years of experience, as opposed to the proposed level based upon the latest two years. Secondly, the commissioner reduced by 10% the companies' estimates of the value of the outstanding claims against them for losses for the years prior to 1936 as reported to the Massachusetts Bureau. The carriers petitioned in equity for a revision of the Commissioner's order promulgating the new rates. The State Supreme Court appointed a Master to hear evidence and report findings of fact. The Master's report, made public in February 1937, upheld the position of the petitioning carriers, and recommended that the rates promulgated by the Commissioner be accordingly increased 5.8% for private passenger cars and 6.6% for commercial cars.

The Supreme Court withheld decision until the middle of September. In its decision the Court did not rule upon the relative merits of the two rate-making procedures under dispute, but annulled the rates promulgated by the Commissioner on the ground that his method of determining them was improper in that he based them in part on data not before him as "evidence" at the time of the hearing on the rates. The data referred to consisted of the report of the chief examiner on the basis of which the Commissioner reduced the companies' estimates of loss reserves by 10%.

About a month later, the Commissioner after conference with the companies reissued the original 1937 rates with a joint statement to the effect that "both parties have agreed that the public good will be best served by immediate promulgation of the

schedule of rates upon which the policies of 1937 have been actually written."

In promulgating the 1938 rates the Commissioner again used the procedure which had been contested by the carriers in connection with the 1937 rates.

Financial Responsibility Legislation

Wide interest has been aroused by the amendment to the Financial Responsibility Act in New Hampshire effective September 1, 1937. The new departure in financial responsibility legislation which makes this amendment noteworthy is its provision that proof of financial responsibility must be furnished by the owner of any motor vehicle upon which exists any mortgage or lien or for which there is any sum due upon the purchase price, before such motor vehicle may be registered. This extends the operation of the act to a far greater proportion of the total number of cars licensed than under any other act made effective to this date. Under the usual financial responsibility law a person must have failed to satisfy a judgment resulting from an accident, or have been convicted of certain serious infractions of the motor vehicle law before being required to furnish proof of financial responsibility. In New Hampshire and a very small number of other states, if a car is involved in an accident the owner must furnish proof of financial responsibility regardless of whether a judgment has been obtained against him.

There are now Automobile Financial Responsibility laws in effect in twenty-eight States and the District of Columbia. The laws vary widely in effectiveness.

Montana was the only state which newly enacted financial responsibility legislation in 1937, its act becoming effective on May 1, 1937.

Safe Driver Reward Plan

Although the effective date of this plan has not been announced at the time of writing this notice it has caused sufficient discussion already to be worthy of mention.

On December 20, 1937 publicity was released to the effect that private passenger cars will shortly be written on an entirely new

basis in the majority of States by member companies of the National Bureau of Casualty and Surety Underwriters. Under this new basis, known as the "Safe Driver Reward Plan," an automobile policyholder is guaranteed a return of 15% of the annual premium provided no claims are brought under his policy during the twelve months it is in force after the effective date of the plan. The reward will be payable thirty days after the expiration of the policy year. The plan will be applicable to all private passenger automobiles insured for both Bodily Injury and Property Damage on the specified car basis at the regular manual rates provided such automobiles are not subject to any rating plan such as the experience rating plan or the automobile fleet plan.

Under the new plan the policyholder who has a claim will pay a slightly higher rate than would be necessary if a flat rate were fixed for all car owners indiscriminately. However, while in some cases the new basic rate will be slightly higher than at present, in other cases it will be lower. All new rates will reflect the most recent experience of the Bureau Companies.

The companies and producers will share in the contribution of the reward to safe drivers. Commissions will be paid on gross premiums and wherever the reward is made no return commission on that proportion of the premium will be required.

The plan will become effective in most states probably by February 1, and in other states as soon thereafter as filings can be made and approvals obtained. No action is contemplated for Massachusetts where rates for the coming year have already been fixed by authority.

Rate Revisions

The only rate revision of particular importance in the last six months was the revision affecting all types of cars in New York State which was made effective on November 15, 1937. Especially noteworthy was the improvement in the New York City experience, which may be attributed to a large degree to the claims investigation in the city and in part to a general reduction in the frequency of claims evidenced throughout the state. Substantial reductions in rates were made for private passenger and commercial cars, both in New York City and in virtually all of the

upstate territories. Bodily Injury coverage for garages was the only coverage requiring an increase.

Workmen's Compensation

Legislation

The year 1937 was one of the most active ever known as respects legislation affecting Workmen's Compensation insurance. The National Council on Compensation Insurance reports that, with nearly every state legislature in session, approximately 35 bills directly affecting compensation cost were enacted, in addition to many other bills affecting administrative procedure.

The most radical change in benefit provisions was made in the Pennsylvania law. The 56% increase in rates promulgated by the Commissioner effective December 31, 1937, reflected among other factors an increase of 70% in the benefits payable under the act exclusive of occupational disease, and an increase of 4% due to the extension of compensation to certain specified occupational diseases.

The following table, prepared by the National Council, shows the estimated effect on compensation costs, exclusive of occupational disease, of legislation in other states which became effective in 1937.

State	*Estimated Increase*
Connecticut	+ 0.4%
Florida	14.1
Georgia	2.9
Idaho	.5
Illinois	.3
Indiana	1.2
Iowa	3.6
Kentucky	4.4
Maryland	.5
Massachusetts	3.7
New Hampshire	.9
New Mexico	13.4
South Carolina	18.5
Utah	4.4
Vermont	2.8
Wisconsin	.7

During 1937, legislation providing for Occupational Disease coverage was newly enacted in five states as noted below:

State	*Effective Date*
Delaware	May 19, 1937
Indiana	June 7, 1937
Michigan	October 29, 1937
Pennsylvania	January 1, 1938
Washington	June 11, 1937

It is of further interest to note that in the state of Ohio, which like Washington in the above table has a monopolistic state fund, silicosis was added to the list of occupational diseases compensated under the act. In the state of Nebraska, also, the field covered by occupational disease legislation was extended slightly.

Rate Revisions

The annual report of the National Council on Compensation Insurance reveals that the downward trend of Workmen's Compensation loss ratios, first evidenced in the revisions effective in 1936, has been continued to such an extent that only two states in 1937 received increases due to adverse experience. The other states receiving increases, only seven in number, all had law amendments effective in 1937 which increased benefits payable under the respective acts sufficiently to necessitate those increases. (This number includes Pennsylvania, upon which comment has already been made.) In three of these seven states, reductions effective at other dates than the increases reflecting law amendments more than offset the effect of those increases. In twenty-one other states reductions were made effective ranging as high as 17.9%.

Indiana Occupational Disease Coverage—Rate Supervision

The occupational disease legislation made effective in the State of Indiana on June 7, 1937 led to a novel complication. An act effective on March 14, 1935 made Workmen's Compensation Insurance in Indiana subject to the supervision of a rating bureau established by that act. The carriers contended that this "Rating Bureau Act" did not apply to the Occupational Disease law

which was enacted as an act distinct from the Workmen's Compensation law, and that they should therefore be free to contract with each employer as to the rate to be paid by him for insurance under the Occupational Disease Act. The case was carried to court and the court returned a decision in favor of the contention of the carriers, definitely holding that the 1935 rating bureau law of Indiana has no application to insurance under the new Occupational Disease Act of Indiana.

Retrospective Rating Plan

In the extension of this plan to the State of Kansas effective October 1, 1937, the Commissioner granted his approval on condition that the plan be made available to all risks in Kansas with premiums at standard rates of at least $1,000 annually. The annual premium necessary for eligibility in all other states is $5,000. No interstate application of the plan is permissible, in view of the fact that Kansas is the only state qualifying risks of $1,000 premium, unless the total risk premium for states that have approved Retrospective Rating meets the minimum requirement of $5,000 annual premium.

In extending the application of the plan down to risks of $1,000 premium, the basic premiums below $5,000 are all .30, the minimum premium ratios are graduated from .75 at $5,000 to .87 at $1,000, and the maximum premium ratios are graduated from 1.75 at $5,000 to 1.95 at $1,000.

Personal Notes

Walter T. Eppink was recently elected Vice President of the Merchants Mutual Casualty Company, Buffalo, New York.

Frederick L. Hoffman is Consulting Statistician of the Biochemical Research Foundation of the Franklin Institute of Philadelphia, Pennsylvania.

Robert S. Hull is now connected with the Bureau of Federal Old-Age Benefits of the Social Security Board at Washington, D. C.

F. Robertson Jones is now Secretary of the Association of Casualty and Surety Executives, as well as Secretary-Treasurer of the Bureau of Personal Accident and Health Underwriters.

William L. Mooney, Vice President of the Aetna Life Insurance Company and its affiliates, has retired from active business.

Albert W. Whitney is now Consulting Director of the National Conservation Bureau of the Association of Casualty and Surety Executives.

Charles N. Young has entered the Engineering and Inspection Division of the Eureka Casualty Company of Philadelphia, Pa.

L. A. H. Warren has been appointed the head of the newly created Department of Actuarial Science in the University of Manitoba, Winnipeg, Canada.

H. E. Economidy is now Senior Examiner of the Board of Insurance Commissioners of Texas.

H. Lloyd Jones in addition to the other positions he holds with the Phoenix-London Group, was recently appointed Deputy United States Manager of the London Guarantee & Accident Company.

Fritz Muller has been appointed Director of the Agrippina Life Insurance Stock Company of Berlin, Germany.

LEGAL NOTES

BY

SAUL B. ACKERMAN

(OF THE NEW YORK BAR)

ACCIDENT

[Gilbert *vs.* Inter Ocean Casualty Co., 71 P., 2nd, 56.]

The insured procured an accident and health policy, which undertook to pay her $100 a month "if the insured should be wholly and continuously disabled by bodily injuries from engaging in any occupation for wage or profit."

The application contained the question "Are you now carrying or have you applied for any other accident or health insurance?" The insured replied in the negative. At the time she held life insurance policies which included disability benefits.

The policy also contained a proration clause. This clause provided that in the event the insured failed to give the company written notice of any other insurance, covering the same loss, the company would be liable only for that portion of the indemnity as the indemnity of the policy bears to the total amount of like indemnity.

The insured became disabled and the company paid the full amount for a time and then refused to continue because of the discovery that the insured had other policies. The policyholder sued. The company attempted to introduce the testimony of the company's state manager whether he would have written the insurance if he had known of the existence of the other policies. Could the company introduce this evidence?

The court held such testimony was proper. While state legislation made the statements of the insured representations rather than warranties in the accident policy, in the absence of fraud, nevertheless, it could not be determined as a matter of law that the representations in this instance were not material. Therefore, the company should have been allowed to offer evidence concerning its action if it had known of the existence of the other policies.

AUTOMOBILE

[T. M. Crutcher Dental Depot, Inc. *vs.* American Indemnity Co., Inc., 106 S. W., 2nd, 621.]

A policy was issued to a business concern providing protection against loss arising out of the operation of automobiles owned by its salesmen and used by them in its business. The policy provided for an endorsement to be attached naming the salesman using the automobile and the kind of automobiles he owned. The policy also provided specifically that no coverage was granted to any automobile owned in whole or in part by the insured, hired or leased by the insured, or registered in the name of the insured.

When the policy was issued, an endorsement was attached naming a salesman as owner of a Chevrolet automobile. Later, a second endorsement was added naming another salesman as owner of the same automobile. The automobile, however, was owned by and registered in the name of the insured. This automobile was subsequently traded in for a new car registered in the same name. The salesman and the insured had entered into an agreement whereby the salesman agreed to purchase the old automobile. However, the agreement was verbal and no bill of sale was ever executed for this automobile. The insured had executed a bill of sale for the new car to the salesman but the registration remained unchanged.

The automobile was involved in an accident and several persons were injured. The company refused to defend the insured since the automobile was registered in the name of the insured.

The insured claimed that the registration was an error and that it did not have knowledge that registration was not in the salesman's name.

Was the company liable?

The court held that the company was not liable, stating that this was an instance of the well settled rule that when one of two innocent parties must suffer, the burden will be placed on him who made the loss possible. Here there was no misunderstanding as to the terms of the contract. The policy did not undertake to cover an automobile registered in the name of the insured and therefore the company was not liable.

Compensation

[Leef *vs.* Dainty Kiddie Cap Co., Inc. et al., 295 Sup. 525.]

The president and vice-president of the employer-corporation was injured on July 27, 1935. On July 25, 1935 there was issued to the corporation a workmen's compensation insurance policy which contained an endorsement purporting to exclude certain named executive officers of the corporation, one of which was the claimant. This endorsement stated: "The executive officers above named shall each personally subscribe his name to the notice of election prescribed by the Industrial Commissioner pursuant to subdivision 6, Section 54, of the Workmen's Compensation Law."

At the time of the accident, the claimant had not subscribed a notice excluding him from coverage in the form required by law. The language of the statute provided that an executive officer of a corporation should be deemed to be included in the compensation insurance coverage unless he elected not to be brought within the coverage and that election should be made on the form prescribed by the Industrial Commissioner. Was the officer covered by the policy?

The court held that from the wording of the statute it was mandatory that this certificate of election be executed prior to the occurrence of the accident. The claimant, not having done so, he was deemed to be included in the compensation policy.

Contractors' Property Damage Liability

[Isaacson Iron Works *vs.* Ocean Accident & Guarantee Corporation Limited, 70 Pac., 2nd, 1026.]

The insured undertook as a sub-contractor to erect a steel frame for an illuminating sign upon the roof of a building. The building had a false roof, covering concrete. In order to anchor the steel frame to the solid concrete slab, the insured cut many holes through the false roof. One afternoon, upon quitting work, the insured's workmen did not cover various openings. During the night rain fell, ran through the holes and leaked through the concrete roof into a vault. Valuable records and blueprints belonging to the owner of the building were damaged. He sued the sub-contractor on the theory of negligence and recovered a judgment.

The policy provided "against loss by reason of liability imposed by law for damage to property as the result of an accident," and stated further, "it being the purpose of this policy to apply solely to 'accidental' property damage, by which term is meant an unexpected, fortuitous occurrence, an unpremeditated mishap or event." The company disclaimed liability. Was the company obliged to defend or indemnify the insured?

The court held that since the insured was suing as a result of a judgment recovered in the previous action, it was necessary to inquire into the basis of that judgment. The complaint in this action sought to recover a sum the insured had to pay for a negligent act. If there had been no negligence there would have been no judgment. However, the policy was one insuring only against accidental damage to property. This damage not being the result of an accident, by the definition in the policy, there was no duty upon the company either to indemnify or to defend the insured.

Employers' Liability

[Taylor Dredging Co. *vs.* Travelers Ins. Co. of Hartford, Conn., 90 F., 2nd, 449.]

An employee contracted a cold and pleurisy which developed into pulmonary tuberculosis. The employee sued claiming injuries were due to the negligence of the employer since the living quarters maintained upon the insured employer's barge were unsanitary, wet, damp and improperly ventilated.

The company was notified but refused to defend the insured. The employer defended and brought this action to recover legal fees and disbursements.

The policy indemnified the insured against loss by reason of liability imposed by law for injuries to an employee sustained by reason of accident occurring during the policy period. The company was required to defend any suits or other proceedings which might be instituted on account of such injuries. Was the company liable?

The court held that the policy covered only such injuries which were due to accidental causes. The injury was a sequel of a gradual process rather than of any specific occasion or event and

consequently was not an accident. There was therefore no duty upon the company to defend such an action and the company was not liable for the legal fees and disbursements claimed by the insured.

EMPLOYERS' LIABILITY

[Soukop *vs.* Employers Liability Assur. Co., 108 S. W., 2nd, 86.]

An employee sustained a partial paralysis from lead poisoning because the employers failed to furnish certain contrivances and a reasonably safe and healthful establishment as required by statutes. The employee recovered a judgment against the employer and brought an action against the company which had issued an employers liability policy undertaking to indemnify against loss for injuries sustained by reason of accidents due to the employer's negligence. The word accident was not defined by the policy.

The company contended that this injury was not due to an accident. Was the company liable?

The court held the company liable, stating: "The term accident has many meanings, and when used in a contract of indemnity insurance, unless otherwise stipulated, it should be given the construction most favorable to the insured. It is true that, generally, accident insurance policies provide for risks only where the insured suffers an accidental injury by external, violent means. There is in the policy no attempt to define the word 'accident.' Consequently the meaning of the word most favorable to the insured should be accepted." The court also held that there was no need to give the company notice of the accident until such time as the facts of the injury and its progress suggested to a reasonable person the possible liability of the insurer.

FIDELITY

[City Bank and Trust Co. *vs.* Commercial Casualty Co. et al., 176 So. 27.]

A fidelity bond was issued to a bank, undertaking to reimburse the bank for any pecuniary loss sustained, of money, securities, etc., occasioned by the larceny or embezzlement of its cashier. Soon thereafter a deficit was discovered. The cashier returned

part of the money, and an action was instituted to recover the balance of the loss from the company.

The company refused to reimburse the bank claiming certain answers made by the bank president in his application for the bond were false. Therein he had stated, (1) that the business was so systematized that books kept by other employees would act as a check on the cashier, (2) that the books were audited twice yearly by both the state auditors and a director's committee, (3) that monthly statements were sent by the assistant cashier and the replies were received by the president. The company contended that had it known that the statements were not true the bond would not have been issued.

The bond contained the following language: "it is hereby understood and agreed that those statements and such promises, etc., are warranted by the employer to be true, and shall constitute a part of the basis and consideration of the contract hereinafter expressed."

Was the company liable?

The court held that the statements of the president were warranties and were conditions precedent to the lodging of liability. The company did not have to show fraudulent intent on the part of the bank president. The establishment of the falsity of the statements and the fact that the company would not have issued the bond, had it known the statements to be false, freed the company from liability.

Forgery

[Greis *vs.* Fidelity and Casualty Co. of N. Y., 19 Fed. Sup. 480.]

An employee of the insured altered and in some instances prepared fictitious invoices which were rendered to the insured for supplies furnished. These invoices were used in the regular course of business to prepare vouchers for their payment. The employee used these vouchers to obtain supplies which he appropriated to his own purposes.

The bond was one indemnifying the insured and any bank in which he carried a deposit against loss through payment by insured or his bank "(1) of any check, draft, note or any other written promise, order or direction to pay a sum certain in money (a) upon which the signature of the obligee as maker or drawer or

acceptor thereof, shall have been forged; and/or (b) made or drawn or accepted by the obligee upon which the signature of any endorser thereof shall have been forged; and/or (c) made or drawn or accepted by the obligee which shall have been raised or altered in any other respect; and/or (2) of any draft or any other written direction or order to pay a sum certain in money directed to or drawn upon or against the obligee upon which the signature of the maker or drawer or any endorser thereof shall have been forged."

The insured claimed that the invoice when signed by the employee was an approval of the account to be paid and that when attached to the voucher it became a part of the voucher and therefore the voucher was an order or direction to pay. Was the company liable?

The court held that invoice was merely another term for a bill rendered and that the approval of such a document was merely a verification of the correctness of the creditor's bill. No one could have taken the approved invoice and collected money because of anything contained in the invoice. Consequently the invoice was not an instrument covered by the bond.

Product Liability Policy

[Kelley *vs.* Indemnity Ins. Co. of North America, 297 N. Y. Sup. 228.]

A manufacturer insured against "any loss by reason of the liability imposed by law upon the insured for bodily injuries, including death at any time resulting therefrom suffered by any person or persons due or alleged to have been due to the possession, consumption, handling or use, elsewhere than upon the premises of the assured, of any merchandise or product manufactured, handled or distributed by the assured which has actually been sold to a purchaser for a consideration during the term of this endorsement, including the explosion or rupture of any container within which such merchandise or product is shipped or delivered by the assured, etc."

This policy was issued on November 17, 1933, renewed on November 17, 1934 and cancelled by the company on May 30, 1935. On May 17, 1934 while the policy was in effect, the

insured sent a customer a consignment of one of its manufactured products. On June 5, 1935, while the plaintiff was unpacking this shipment of May 17, 1934 one of the bottles exploded and he sustained personal injuries. He instituted an action against the insured and recovered a verdict. Thereafter the insured being insolvent the plaintiff brought an action upon the judgment against the insurer. The company contended that the policy covered only injuries which occurred during the policy term. Was the company correct?

The court held that the language of the policy was such that the policy included liability for an injury sustained from goods sold during the term of the policy even though the accident occurred after the expiration of the policy term.

Teams' Liability

[Franklin Co-op. Creamery Assoc. *vs.* Employers Liability Assur. Corp. et al., 273 N. W. 809.]

An employee of the insured while delivering milk to customers in a loft building attempted to operate an elevator and injured an employee of the building. A verdict was rendered against the insured.

The teams liability policy of the employer provided that the company undertook to investigate, settle and defend against claims and suits and to pay judgments rendered against the insured as a result of liability for "bodily injuries including death at any time resulting therefrom, accidently sustained by any person or persons other than employees of the assured (1) caused by, and/or owing to the ownership, the maintenance, the use and/or operation of, all horses, draft animals and/or vehicles used in connection with the business operations of the assured described in the declarations (2) caused by or resulting from the loading and/or unloading of said vehicles."

The insured sought to show that the term unloading had a particular meaning for the trade in that locality, which meaning included delivering the milk to the customer.

The company disclaimed liability. Did the term unloading in subdivision (2) cover this accident?

The court held in the negative, stating that the employee of

the assured was some fifty feet away from his wagon when he attempted to operate the elevator and therefore the process of unloading the wagon was completed before he had entered the building.

The court refused evidence of the special definition of the term unloading, stating that such parole testimony would be admitted only when proof shows uniform use of the word in the particular business in a sense entirely different from the prevailing meaning and that persons dealing in respect to the subject would be presumed to be familiar with such customary usage.

OBITUARY

HENRY MOIR

1871 - 1937

In the passing on June 8, 1937 of Henry Moir, the Casualty Actuarial Society lost one of its most valued charter members. Born in Midlothian, Scotland, February 22, 1871, he had completed over fifty years of an outstanding actuarial career.

Mr. Moir was educated at his village school and at the famed George Watson's College for Boys, Edinburgh. In 1886 he started his life insurance career with the Scottish Life Assurance Company of Edinburgh where he remained for 15 years, at which time he came to New York and became Actuary of the Provident Savings Life Assurance Society of New York City. In 1908 he joined the Home Life Insurance Company and later became its Second Vice-President and Actuary.

Late in 1922 he became associated with the United States Life Insurance Company, becoming its President in 1923 and on October 20, 1936 retired from that office, but continued his active association with the company as Chairman of the Finance Committee and a member of its Board of Directors.

His marked ability and broad understanding resulted in his being selected for many posts of responsibility. He served as President of the Actuarial Society from 1918 to 1920, as President of the Insurance Institute of America from 1929 to 1931, and as Secretary of the Faculty of Actuaries in Scotland of which he became a member in 1892. He was a member of the American Institute of Actuaries, the American Mathematical Society and the Royal Society of Edinburgh.

Outside of the insurance field Mr. Moir had many interests, both in the United States and abroad. He was a former President of St. Andrew's Society of New York and of the Burns Society. He was past President and permanent member of the Board of Directors of the British Schools and Universities Club. He was a director, trustee and member of many clubs and philanthropic institutions and an ardent advocate of all forms of games, being for several years champion of the Upper Montclair Golf Club.

Mr. Moir had one of those pleasing personalities that made him the friend of all those with whom he came in contact. His many friends feel that they personally, as well as the whole Actuarial profession, have suffered a profound loss.

OBITUARY

WILLIAM BROSMITH

1854 - 1937

William Brosmith, a Fellow of this Society, passed away at his home in Hartford, Connecticut, on August 22, 1937.

Mr. Brosmith was born November 8, 1854 in New York City. At an early age he found it necessary to continue his education in the evening schools. Later he studied law, was admitted to the New York State Bar and began a general law practice. He early specialized in corporation law, particularly as relating to insurance.

In 1895 he became attorney for The Travelers Insurance Company, beginning an association with that organization which was to endure for 42 years. Six years later he was promoted to general counsel and in 1922 became vice-president and general counsel of both The Travelers Insurance Company and The Travelers Indemnity Company. Subsequently, at the organization of The Travelers Fire Insurance Company and The Charter Oak Fire Insurance Company, he was elected to a similar office in those companies. He was also a director of The Travelers Bank and Trust Company, the Connecticut River Banking Company and the Dime Savings Bank of Hartford.

For many years, Mr. Brosmith was recognized as an eminent authority on insurance law and came to be regarded as the dean of American insurance counsel. He represented his own company and the insurance business in general on numerous occasions in important capacities, often serving as consultant of legislative committees and commissions. He was a former president of the Association of Life Insurance Counsel, the International Association of Accident Underwriters and the International Association of Casualty and Surety Underwriters and a former chairman of the insurance committee of the American Bar Association.

He was an active member in the American Bar Association, the

state bar associations of Connecticut and New York, the American Law Institute and the Hartford Bar Association. He also served as president of the Hartford College of Law. In 1928 he received the honorary degree of doctor of laws from the faculty of Holy Cross College. He took an active interest in this Society and contributed a number of book reviews to our *Proceedings* in addition to being a helpful advisor in connection with the insurance law section of the Society's educational program.

In addition to his professional responsibilities, he served his city and his state for many years on various commissions. In 1931 and 1932 he was president of the Hartford Chamber of Commerce.

Mr. Brosmith was one of the most prominent lay members of the Roman Catholic Church in this country and was long a leader in Hartford diocesan and St. Joseph's Cathedral parochial activities. He was made a Knight of the Order of St. Gregory by Pope Pius.

In the words of President Zacher of The Travelers—"The institution of insurance in general and The Travelers in particular has lost an invaluable personality. He was an astute legal counsel, a penetrating thinker and a lovable character. He was to me a friend and a trusted counsellor, as he had been to my predecessors, Sylvester C. Dunham and Louis F. Butler. He was most helpful and considerate in all conditions with which insurance has been confronted during the past few years. He had a remarkable ability to anticipate many of the circumstances which later became actualities and, through his long experience, knew how to cope with them. He was always considerate of those who worked with and for him. His loyalty to the Company was one of his outstanding qualities. He was a dear associate who will be sorely missed."

OBITUARY

STANLEY L. OTIS
1869 - 1937

Mr. Otis died of a heart attack at the home of his son in Scarsdale, N .Y., on October 12th. He was born in Otisville, Michigan in 1869. He made his entry into the insurance business some 42 years ago in his native state as State Manager for the

Canada Life Assurance Company. From this work he went to the Michigan Insurance Department as Chief Examiner. From 1901 to 1911, he was at first Assistant Actuary and later Actuary of the Bureau of Liability Insurance Statistics, sometimes referred to as the "Liability Conference," and continued as Actuary when it was merged with the Workmen's Compensation Service and Information Bureau in 1911, becoming in 1913 Secretary-Treasurer of the same Bureau reorganized under the name of the Workmen's Compensation Service Bureau. On leaving the Bureau in 1916, he became Executive Secretary of the New York Insurance Federation and for two years was Director of the Bureau of Workmen's Compensation in the New York State Department of Labor. In recent years he was senior partner in the brokerage firm of Otis, Jones and Company and in 1923 he founded the Otis Service, a company that publishes digests of court decisions in workmen's compensation insurance cases.

The work that Mr. Otis did for the Bureau of Liability Insurance Statistics and the Workmen's Compensation Service Bureau in the collection and compilation of statistics and in the making of manuals was pioneer work and will always have a definite interest and importance in the history of casualty insurance.

Mr. Otis was a charter member of the Casualty Actuarial Society and may perhaps have been the first person to visualize the need for such an organization for in 1909, five years before the foundation of the Society, he sent a letter to heads of companies transacting liability insurance in the United States proposing "that a meeting be called of the Actuaries and Statisticians of the several companies for the purpose of considering the possibility of forming a society of Actuaries and Statisticians of liability companies."

Mr. Otis had a generous and friendly spirit and personality and he had the esteem and confidence of his associates in an unusual degree. He should be remembered in the Society not only as a pioneer but as a man of fine quality and ability.

CASUALTY ACTUARIAL SOCIETY

NOVEMBER 18, 1937

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ABSTRACT FROM THE MINUTES OF THE MEETING

NOVEMBER 18 AND 19, 1937

The twenty-fourth annual (forty-ninth regular) meeting of the Casualty Actuarial Society was held at the Hotel Biltmore, New York, on Thursday and Friday, November 18 and 19, 1937.

President Senior called the meeting to order at 10:20 A.M. The roll was called, showing the following fifty-two Fellows and twenty-nine Associates present:

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BARBER
BARTER
BERKELEY
BLANCHARD
BROWN, F. S.
CAHILL
CARLSON
CLEARY
COMSTOCK
COOK
CRANE
DAVIES
DAVIS, E. M.
DORWEILER
EPPINK
FONDILLER
GINSBURGH
GODDARD
HATCH
HOBBS
HUGHES
HULL
KORMES
KULP
LAWRENCE
LINDER
LYONS
MARSHALL
MASTERSON
MATTHEWS
MAYCRINK
MOORE, G. D.
MULLANEY
NICHOLAS
O'NEILL
ORR
PERKINS
PERRYMAN
RICHTER
SENIOR
SHAPIRO
SILVERMAN
SINNOTT
SKELDING
SMICK
SMITH, C. G.
TARBELL
VALERIUS
VAN TUYL
WILLIAMS
WOLFE

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BARRON
BLACK, N. C.
BUFFLER
CRAWFORD
CRIMMINS
FARLEY
FITZ
FITZGERALD
FLEMING
GILDEA
HARRIS
HIPP
JONES, H. L.
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KIRK
KOLODITZKY
LASSOW
MARSH

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MOTHERSILL	THOMPSON, A. E.	WOOD, D. M., JR.
POTOFSKY	WASHBURN	WOODWARD
SMITH, A. G.	WILLIAMSON	

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

Mr. Senior read his presidential address.

The minutes of the meeting held May 14, 1937, were approved as printed in the *Proceedings*.

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

The following Associates had passed the necessary examinations and had been admitted as Fellows:

JOHN A. MILLS GEORGE I. SHAPIRO

The following candidates had passed the necessary examinations, had met the experience requirements, and had been enrolled as Associates:

JARVIS FARLEY	EDUARD H. MINOR
MORRIS KOLODITZKY	ROBERT J. MYERS
WILLIAM LASSOW	DONALD A. WOOD, JR.

The following candidate has been successful in completing the examinations for Associate, but has not yet been enrolled by reason of the terms of Examination Rule 4:

ELI GROSSMAN

Diplomas were then presented by the President to John A. Mills and George I. Shapiro, who had been admitted as Fellows under the 1937 examinations.

The President announced the deaths, since the last meeting of the Society, of three Fellows, William Brosmith, Henry Moir, and Stanley L. Otis, and the memorial notices appearing in this Number were thereupon read.

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

CASUALTY ACTUARIAL SOCIETY

ANNUAL REPORT OF FINANCES

Cash Receipts and Disbursements from October 1, 1936 to September 30, 1937

INCOME

On deposit on October 1, 1936 in Marine Midland Trust Company		$2,154.08
Members' Dues	$2,540.00	
Sale of *Proceedings*	1,548.99	
Examination Fees	638.00	
Examination Data	9.00	
Luncheons	444.00	
Interest and Miscellaneous	40.80	
Michelbacher Fund	184.65	5,405.44
Total		$7,559.52

DISBURSEMENTS

Printing and Stationery	$2,987.96
Postage, Express, etc.	173.55
Stenographic Services	440.00
Library Fund	3.08
Luncheons	531.01
Examination Expense	39.87
Insurance	38.19
Miscellaneous	85.67
Total	$4,299.33
On deposit on September 30, 1937 in Marine Midland Trust Company	$3,260.19
Total	$7,559.52

Income	$5,405.44	
Disbursements	4,299.33	
Excess of Income over Disbursements	$1,106.11	
1936 Bank Balance	2,154.08	
1937 Bank Balance	$3,260.19	

ASSETS

Cash in Bank:		
Michelbacher Fund	$ 732.84	
Other Funds	2,527.35	
Total Cash in Bank		$3,260.19
Bonds		1,000.00
Total		$4,260.19

The Auditing Committee (W. P. Comstock, Chairman), reported that the books of the Secretary-Treasurer had been audited and his accounts verified.

The Examination Committee (R. M. Marshall, Chairman), submitted a report of which the following is a summary:

1937 EXAMINATIONS—SUCCESSFUL CANDIDATES

The following is a list of those who passed the examinations held by the Society on May 19, and 20, 1937:

ASSOCIATESHIP EXAMINATIONS

PART I:

Andrew Aguele
Donald D. Cody
Sydney L. Cohen
Gene Diorio
Eli Grossman
Samuel W. Joffe
Henry F. Keale
Morris Kolodítzky
Raymond W. Lewis
Charles G. Lincoln
Eduard H. Minor
Robert J. Myers
Franklin D. Wanner
J. Clarke Wittlake
John C. Wooddy

PART II:

Robert D. Bart
Walter G. Cameron
Morris Kolodítzky
Albert H. LeShane
John H. Lewis
Raymond W. Lewis
G. R. Livingston
Henry D. Locke
Vincent Mellor
James R. Miles
Eduard H. Minor
Robert J. Myers
Seymour E. Smith
D. R. Uhthoff
Arthur J. Walrath
Bernard Weinflash
Eric H. Wood
John C. Wooddy
William W. Wright

PART III:

Donald D. Cody
Roger A. Johnson, Jr.
Morris Kolodítzky
Charles G. Lincoln
Eduard H. Minor
Robert J. Myers
J. Clarke Wittlake
Eric H. Wood
Bernard Yagman

PART IV:

Donald D. Cody
Elmer W. L. Davis
George B. Elliott
Jarvis Farley
Samuel W. Joffe
Morris Kolodítzky
William Lassow
Raymond W. Lewis
P. H. Louis
Eduard H. Minor
Robert J. Myers
J. Clarke Wittlake
Donald M. Wood, Jr.

FELLOWSHIP EXAMINATIONS

PART I:	JOHN CARLETON	FRED J. FRUECHTEMEYER
PART II:	JOHN CARLETON FRED J. FRUECHTEMEYER	JOHN A. MILLS
PART III:	ELSIE KARDONSKY JOHN A. MILLS	GEORGE I. SHAPIRO
PART IV:	JOHN A. MILLS	GEORGE I. SHAPIRO

The Council's election of Clarence W. Hobbs as Editor, subject to confirmation by the Society, was announced.

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

President	LEON S. SENIOR
Vice President	SYDNEY D. PINNEY
Vice President	FRANCIS S. PERRYMAN
Secretary-Treasurer	RICHARD FONDILLER
Editor	CLARENCE W. HOBBS

Members of Council (terms expire in 1940):

HARMON T. BARBER G. F. MICHELBACHER
N. E. MASTERSON

By unanimous motion, the President was authorized to express the hearty thanks of the Society to Mr. William Breiby, who had served with distinction as Librarian for the past twelve years.

The presentation of the new papers printed in this Number was begun.

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

The presentation of new papers was concluded.

The meeting adjourned at 4:40 P.M.

An informal dinner was held in the evening at the Hotel.

On November 19th the meeting was called to order at 10:15 A.M. by the President.

The Council's election of Thomas O. Carlson as Librarian, subject to confirmation by the Society, was announced. The election was then held and Thomas O. Carlson was declared elected.

A. R. Lawrence was elected a member of the Council, with a term to expire in 1939.

Informal discussion was participated in by a number of members and representatives of insurance and other organizations, upon the following topic:

Investments of Casualty Companies—

a. Appraisal of present investment position of Casualty Companies from standpoint of
   1. Income
   2. Security of principal
   3. Effect of market fluctuations upon net worth as reflected in published statements.

b. Desirability of present tendencies to require fixed interest securities—bonds, mortgages, etc.—in view of tremendous requirements of Life Insurance Companies in this field and of dangers possible in still further widening the bond market. Is there a larger place for mortgages and can a workable Common Stock Program be devised for Casualty Companies on an investment basis?

c. Effect of changes in money levels, (inflation or deflation), on the relationship between Casualty Companies' Assets and Liabilities.

The papers read at the last meeting of the Society were discussed.

Upon motion the meeting adjourned at 1:20 P.M.

REPRESENTATIVES OF CASUALTY COMPANIES AND ORGANIZATIONS PRESENT

EDWARD J. BILSON, Chief Statistician, Ocean Accident and Guarantee Corporation, New York

R. H. CAPLAN, JR., Chief Accountant, Fireman's Fund Indemnity Co., New York

JAMES B. CLANCY, Secretary, Royal Indemnity Co., New York

CHARLES E. CLYMER, Statistician, Bankers Indemnity Ins. Co., Newark, N. J.

ARTHUR W. COLLINS, Retired Manager, Zurich General Accident & Liability Ins. Co., Chicago, Ill.

J. F. CUNNINGHAM, Treasurer, London Guarantee & Accident Co., New York

MARSHALL DAWSON, Associate Industrial Economist, U. S. Bureau of Labor Statistics, Washington, D. C.

GEORGE A. DIERAUF, Secretary-Treasurer, Compensation Insurance Rating Board, New York

WILLIAM F. DOWLING, Assistant Treasurer, Lumber Mutual Casualty Ins. Co. of N. Y., New York

A. J. GAVEY, Manager, Casualty Dept., Alfred M. Best Co., New York

HARRY W. GIBSON, Assistant Secretary, Interboro Mutual Indemnity Insurance Co., New York

RAYMOND L. HARDESTY, Assistant Secretary and Statistician, New Amsterdam Casualty Co., Baltimore, Md.

ROY E. HATFIELD, Assistant Manager, Massachusetts Rating and Inspection Bureau, Boston, Mass.

MARTHA A. HENDERSON, Compensation Insurance Rating Board, New York

R. L. INGLIS, Assistant Secretary, Associated Indemnity Corporation, New York

ROGER A. JOHNSON, JR., Compensation Insurance Rating Board, New York

DEAN W. KELLY, Vice-President and Counsel, Wolverine Insurance Co., Lansing, Michigan

GREGORY C. KELLY, General Manager, Pennsylvania Compensation Rating & Inspection Bureau, Philadelphia, Pa.

MYRTLE S. KELLY, Statistician, Pennsylvania Compensation Rating & Inspection Bureau, Philadelphia, Pa.

CHARLES W. LEACH, Assistant Superintendent, Statistical Dept., New Amsterdam Casualty Co., Baltimore, Md.

PETER H. MAY, Vice President-Comptroller, Maryland Casualty Co., Baltimore, Md.

W. A. MCNEELY, Treasurer, Merchants Mutual Casualty Co., Buffalo, N. Y.

LAWRENCE W. MILES, Assistant Secretary, Joseph Froggatt & Co., Inc., New York

E. B. PATTON, Director, Division of Statistics, N. Y. State Dept. of Labor, New York

MIRIAM PEARL, Librarian, Compensation Insurance Rating Board, New York

HENRY A. PLATZ, Assistant Secretary, Wolverine Insurance Co., Lansing, Michigan

ARTHUR H. REEDE, Research Assistant, Harvard University, Cambridge, Mass.

HENRY REICHGOTT, Group Underwriter, Equitable Life Assurance Society, New York

H. WALTER REYNOLDS, Counselor at Law, 36 West 44th St., New York

JOHN RIDDELL, Statistician, Norwich Union Indemnity Co., New York

L. W. SCAMMON, Statistician, Massachusetts Rating & Inspection Bureau, Boston, Mass.

C. L. SCHLIER, Statistician, New Jersey Rating & Inspection Bureau, Newark, N. J.

WILLIAM SCHOBINGER, Attorney, London Guarantee & Accident Co. and Phoenix Indemnity Co., New York

F. B. SCHROETER, Zurich General Accident & Liability Insurance Co., New York

JESSICA W. SCOTT, Assistant to President, Mutual Casualty Insurance Co., New York

OSCAR H. SIMMONS, JR., Treasurer, Liberty Mutual Ins. Co., Boston, Mass.

I. SOFFERMAN, Supt. Rating Division, Compensation Insurance Rating Board, New York

HARDWICK STIRES, Partner, Scudder Stevens & Clark, New York

R. W. STORER, London Guarantee & Accident Co., New York

H. L. VAN HORN, Joseph Froggatt and Co., Inc., Newark, N. J.

SIDNEY W. WILCOX, Chief Statistician, U. S. Bureau of Labor Statistics, Washington, D. C.

HUBERT W. YOUNT, Vice President and Actuary, Liberty Mutual Insurance Co., Boston, Mass.

B. H. ZIMELS, Vice President, Consolidated Taxpayers Mutual Insurance Co., Brooklyn, N. Y.

VOL. XXIV, PART II NO. 50

PROCEEDINGS

MAY 20, 1938

PRINCIPLES OF EQUITY APPLIED TO CASUALTY AND OTHER FORMS OF INSURANCE

PRESIDENTIAL ADDRESS BY LEON S. SENIOR

I.

Throughout various periods of the world's history, prophets and philosophers have been devoting a great deal of thought to the study of human behavior, and have bequeathed to posterity a complete library that contains a large assortment of ideas on ethics as a guide for the ideal life. Their doctrines on moral conduct were either accepted or rejected by mankind, depending on the extent of their practical application to a civilization where customs and manners are undergoing rapid change. Certain fundamental ideas endured as imperishable. To act justly, to love mercy and to deal honorably with your fellowmen—the value of these precepts have not changed during all the years whereof records have been kept in story and in fable. Other lessons were abandoned as impossible in practice. The Buddhists and the early Christians were taught to believe that humility was greater than pride, poverty preferable to riches and forgiveness superior to satisfaction. These ethical abstractions were soon forgotten in a world of practical endeavor. With the exception of a small group of men and women who sought refuge in monasteries or who devoted their lives to carry the gospel to the heathen, mankind has been willing to accept the comforts of a materialistic world where science, through its miraculous inventions, is daily realizing the fantasies of "Gulliver's Travels" and "Alice in Wonderland". Men ambitious to succeed seek fame, power and material possessions. If a substantial part of our population were to accept the

doctrine of forgiveness for personal injuries, the profession of law and the business of insurance would suffer a permanent depression. Our courts of justice could afford a long vacation and the congestion of calendars would no longer be a judicial problem.

Insurance affects every profession and comes in contact with all human endeavors. Insurance reaches out and rubs elbows with the lawyer in the court, with the doctor in the hospital, with the worker in the shop and with the builder in his construction work. There is a close affiliation between insurance and the professions of law, medicine and engineering. In fact there is hardly any phase of human enterprise to which insurance is a stranger. No doubt many of us have considered the suggestion that in the conduct of our business it would be desirable to establish a standard which might be used as a guide in our relations with policyholders, claimants, state authorities and the general public. The methods of carrying out the obligations of our contracts, the manner of applying premium rates, the duty of preventing losses, the mode of meeting competition—all this may become the subject for a code of ethics which future events may serve to develop. But it will have to be a practical code, free from the abstractions which idealists have been advancing in various periods of our history.

Casualty Insurance is operating now under an unwritten law which, if codified, would include certain fundamental principles such as equity in ratemaking, justice to claimants and fairness in dealing with competitors. In our daily talk we find the term *equity* frequently used and more frequently abused. For a correct understanding of this word, one needs to refresh his memory by going back to the origin of Equity as a fascinating chapter in the history of English jurisprudence. Writers on the law of England often refer to the fact that the King was the fountain-head of justice, and that the Chancellor was the keeper of the King's conscience. It is true, however, that in the age of the Tudors and the Stuarts, the King was mostly the fountain-head of cruelty and injustice. The Lord Chancellor, as the guardian of the conscience, must have spent many a sleepless night. Practically the whole of the chancery procedure and practice was borrowed from the Roman law. John M. Zane points to the fact that Lord Mansfield, the greatest of all English judges, was responsible for

bringing into our law all the equitable doctrines of the Roman law affecting relations arising out of quasi-contract, and that a period of two hundred years was required to bring to a climax the triumph of the system of equity borrowed from the Roman law.

Historically the Courts of Chancery had extraordinary jurisdiction and were enabled to give relief where the Courts of Common Law could not do so. When the latter became enmeshed in the rules of technical pleading, so that the litigant could have no remedy for a wrong because he could find no writ in existence that would enable him to state his right, the Courts of Chancery provided the desired remedy. The maxim that "Equity will not suffer a right to be without a remedy" has served as the foundation for a branch of the law designed to render ideal justice without red tape and without red seals. Other maxims of equal importance, which subsequently developed in the practice of equity and which have a bearing on my theme, will be referred to later on in this address. Since I have no intention to give a lecture on "Equity Jurisdiction", I must stop at this point and explain my reference to this important branch of the law.

The peculiar dual system of the English law, where Courts of Equity existed to modify the rigor of the Common Law, bears a close analogy to our own rating system, where merit rating plans have been introduced to modify the tyranny of the average rate. The Merit Rating Plan provides a remedy to the perplexed policyholder or to the discontented insurance carrier where the Manual, because of the rigor of statistical data, has created an average rate which is not suitable to the risk or to either party of the contract. For a large group of policyholders the average rate merely serves as the first step in the classification of the risk and as the starting point from which the underwriter may determine the final premium to be derived upon final audit. If we are able to devise a system for adjusting the rate for each risk to represent with approximate accuracy the quality of the risk and to reproduce the total premium on basis of the average rate, then we are on the road to a plan which is in complete accord with the principle of equity. Whether or not we have actually devised a system so perfect as to come within the prescribed specifications is not precisely my point. Very likely we are still far from perfection, but our efforts should be aimed towards the attainment of the ideal

where all risks that come to us with clean hands will be treated justly and in a spirit of equity.

II.

Just twenty-three years ago, I appeared on this platform for the purpose of presenting a paper on the effect of schedule and experience rating in New York,* which showed the results derived after a brief period of experimentation with empirical plans that were adopted in the early years of Workmen's Compensation. The object of that paper was to reveal the defects of the system in that the application of the plan resulted in depressing the general rate level, and to point out the necessity for correction. The actuarial committees in the rating organizations recognized the merits of the case and eventually adopted factors of correction, the details of which need not be gone into at this time.

Since then much water has gone over the dam. Carl Hansen's universal Analytic Schedule, introduced in 1914, was succeeded by the Industrial Compensation Rating Schedule in 1916. The latter was materially revised in 1918 and again in 1923. With the exception of a limited schedule for Foundries to cover dust hazards, the practice of schedule rating has been entirely abandoned in a number of states and considerably emasculated in others. From the very beginning of Workmen's Compensation it was recognized that a physical rating schedule does not furnish a complete merit rating system; that its limitations were not suitable to a great many risks whose operations were of a migratory character, and that it lacked the quality of appraising the moral hazard of the risk. A system of experience rating was then brought into play, crude and imperfect at first, but after much travail developed into a workable and scientific scheme through studies undertaken by a veritable galaxy of stars—all Fellows of this Society. Whitney, Woodward, Flynn, Mowbray—they and others whose names you will find appearing frequently in our *Proceedings* —have laid down the mathematical foundation for the merit rating plans now in use, not only for Workmen's Compensation, but also for Public Liability and other casualty lines. If I cor-

* *Proceedings,* Vol. I, page 227.

rectly interpret the history of merit rating and the course of its development, the main objectives of the men engaged in producing a scientific system was to provide a standard for evaluating the character of the risk, to promote equity, and to encourage accident prevention. It is not necessary for me to go into any length at this time as respects the need for a yardstick that would enable differentiation between risks within a given classification. That a uniform average rate for all risks within a certain industry is inequitable, needs no argument. Risks within a given industry will differ from each other in many important details, both as respects physical conditions and also with respect to items of an incorporeal character, reflecting the attitude of management on matters affecting safety organization.

Since the adoption of Workmen's Compensation Laws, industry has become increasingly conscious of the need and importance of safety work. Substantial results have been achieved in this direction by individual employers as well as by trade associations. The National Safety Council, represented in all states, and the Associated Industries of New York, operating in this State, are fine examples of the vigor with which the work has been conducted and of the interest displayed by employers through their local and national organizations. The states and the Federal government have contributed their part by coordination of activities, analysis of methods and publication of literature for the information of the general public. The insurance companies have played an important role in this work by inspection and safety engineering service, advising the employers on ways and means by which hazardous operations can be conducted through the installation of safety methods, safeguarding of machinery and the education of workmen in the observance of established rules and regulations. Standards have been devised for the guidance of inspectors in engineering departments and schedule rating plans introduced which provided rewards for improved physical conditions and penalties for defects. It has been an up-hill struggle, largely designed to eradicate from the minds of management and men the contempt for danger due to familiarity with environment and to instil in its place a feeling of wholesome respect for industrial and traffic hazards.

Very early in the history of casualty insurance, it was discovered

that a physical examination and an appraisal of the risk were insufficient to determine the quality of the risk because of certain intangible elements in the management, which are described under the term *moral hazard.* The cautious underwriter will take a chance on a risk which is in a poor physical condition in the hope and expectation that it may be improved through sound advice given to an employer who is willing to correct defects. The same cautious underwriter is reluctant, however, to accept a risk which although satisfactory from the physical point of view, has the reputation of being a poor risk from the moral hazard standpoint. Right here I want to make a distinction between the type of risk where the *morale* of management and employees is of a low grade as distinguished from the risk that presents a moral hazard. The two expressions are apt to be confused. Adopted from a foreign language, the term *poor morale,* when applied to insurance, may be used to define a risk that lacks speed, zeal, precision and efficiency in its operations. But the moral hazard risk, in the eyes of the underwriter, is the illegitimate offspring of a nefarious union conceived in sin, born in iniquity and trained in a school where ignorance and indifference are the tutors, while carelessness and negligence comprise the curriculum. The State as well as reputable employers have given time and effort to eradicate this immoral incubus from their midst with a varying degree of success. In recent days particularly, considerable attention has been given by prosecuting officers and magistrates to the task of discovering and punishing the employer who falsifies his payroll and the men who abet in the presentation of fraudulent claims.

Prosecutions under the law serve the purpose of bringing to account men who are dishonest in professions and industry. But insofar as honest men and reputable institutions are concerned, certain stimuli of a different order are required to encourage accident prevention, or the maintenance of accurate records, or the avoidance of any act that may be interpreted as collusion with claimants. The system of experience rating, which has originated with Workmen's Compensation and has been adopted for other lines of casualty insurance, provides precisely that sort of stimulus. The temptation to get a good bargain is inherent in human nature. Anatole France goes even as far as to say that, "There are very honest people who do not think that they have had a

bargain unless they have cheated the merchant". Experience rating removes the temptation (if such exists with honest people) to understate payroll or to provide any assistance in the enforcement of an improper claim. Therein lies the social value of experience rating. Understatement or improper classification of payroll results in detriment to the assured; likewise the enforcement of an improper claim results in financial injury to the risk.

Under a proper system of education, there would be no occasion for marking any risk with a moral hazard label, except in special cases where tendencies towards criminal negligence and fraud are so outstanding as to become a matter of public knowledge. A campaign of education that would draw public attention to the fact that the increased insurance costs are directly traceable to this dishonest group would produce results superior to those obtained through means of criminal prosecution. It can be said without exaggeration—for if you agree with Talleyrand, "Everything which is exaggerated is insignificant"— that experience rating has served not only as an instrument for appraising the quality of the insurance risk, but has fulfilled its peculiar mission to encourage safety work, to promote the object of maintaining accurate time sheets and payroll records, and in general to establish a higher moral level for the underwriting of Compensation and Public Liability risks. "He who comes into Equity must come with clean hands", is a maxim that may well apply to candidates for experience rating.

III.

There is a new field of insurance that would seem to be badly in need of merit rating. I have in mind the subject of "unemployment insurance", now a part of our Social Security Act. There is, of course, a serious question in the minds of many students as to whether a system of unemployment reserves comes within the category of insurance. But whether it does or not, the spirit of equity would seem to demand a scientific plan whereby the industry or establishment that furnishes continuous permanent employment to its workers shall pay a lower rate than another industry or establishment where the workers are laid off at frequent intervals and compelled to draw on the unemployment reserves.

The Federal Statute (Title IX—Section 901) provides a rate of 1% on the employer's payroll for calendar year 1936, 2% for 1937 and 3% for 1938 and thereafter. Section 902 permits a deduction up to 90% of the Federal Tax for amounts paid into the State Unemployment Funds. A great deal of controversy has developed over the question as to the type of fund which shall be set up by the various states to hold their accumulated reserves, and the type of administration to be used in connection with such fund. Briefly stated, the field has been divided into two major types: (1) The "employer reserve fund" which calls for setting up a separate fund for each employer, to which fund all payments made by the employer are credited and from which all benefits due to unemployment in the particular establishment are charged. (2) The "pool reserve fund". This is a common fund comprising contributions from all employers. In all but nine of the states, the administrative provisions contemplate earmarking the contributions paid by each employer, as well as the benefits paid for his account, with the view of developing experience as a basis for reducing or even increasing his tax. The nine states which do not have any provision for earmarking the individual employer's reserve are as follows: Georgia, Maine, Maryland, Massachusetts, New York, North Carolina, Pennsylvania, Rhode Island and Virginia. In these nine states the subject is being studied for the purpose of developing a workable scheme.

Under the Federal law there must be three years' experience under the pool fund before any reduction in the tax is permissible for a particular industry or a particular employer. Furthermore, a number of states have provisions to the effect that no deductions in the contributions will be granted unless the earmarked employer's reserve fund is equal to 7½% of the payroll for the preceding year. With the exception of Wisconsin, which provides an employer's reserve fund pure and simple, all the other jurisdictions have what is known as the "pool reserve fund", modified in several states to give emphasis to the individual employer's account. While most of them are planning to grant credits or debits on the basis of experience, subject to definite maximum and minimum provisions, a scientific plan for equitable merit rating has not yet come to the front. There is an entire absence of industry classification, and there is considerable doubt as to which

type of reserve is preferable. The Wisconsin plan is open to the objection that an individual employer's reserve fund may become insolvent and therefore fail to provide the protection for which unemployment insurance has been designed. The advocates of the plan, however, argue that it possesses a distinct advantage by its tendency to reduce unemployment. It is claimed that each employer becomes directly responsible for his own status, and that as he stabilizes employment and builds up reserves he becomes eligible for a cut in the rate of his contribution. Conversely, if his experience record is unfavorable, his reserves will be depleted and then his rate is subject to an increase up to the maximum point. The advocates of the pool reserve plan rest their case upon the insurance principle of spreading the risk, claiming that a common fund offers greater protection and that no individual employer has it within his power to control the economic conditions under which labor may find full or partial employment.

From the foregoing brief description it becomes evident that the plan is in its infancy, undergoing growing-pains, and that it may take several years before we can form sound conclusions as to its social value and as to proper methods for modifying the rate of contribution as between industries and individual employers. For the present, it is sufficient to direct attention to a problem that is described as *social insurance*, operated under the ægis of the State with the aid of the Federal government. Watching its progress, it will be interesting to find whether it will really serve as the promised cushion in times of depression, when the nation suffers under the adversity of unemployment. Of all the political and economic problems which face this nation, this problem of unemployment is probably the most serious, the most critical, requiring far-sighted wisdom and a high degree of statesmanship for its solution.

IV.

The actuarial profession is responsible for the scientific foundation and character of insurance. There should be no conflict between science and ethics. But there are occasions when you are called upon to weigh ethical values when creating necessary formulæ for the application of statistical facts to a given problem

and then you are free to exercise judgment in determining methods. Good judgment is that rare quality of mind which may be described as *wisdom*. According to Coleridge, "Common sense in an uncommon degree is what the world calls wisdom". That a large measure of judgment is essential to apply in a spirit of equity, which regards *substance and not form*, may be illustrated by the following examples:

1. The present method in New York provides for establishing the rate level on the latest available policy year. Judgment enters into this decision, based on the fact that, in a State with such a large volume of experience, a single year rather than two or three years would be sufficient.

2. The use of loss ratio development factors, based on two consecutive policy years for each stage in the development of the latest year to an ultimate point, rests on judgment which may need to be modified when special circumstances force a change in policy as regards reserve requirements.

3. In determining pure premium relativity, the selection of the number of serious and non-serious cases used as a criterion for full State credibility is the result of judgment, and so are the provisions for partial credibility.

4. In experience rating, judgment enters into the structure of the rating formula and the degree of credibility to be allowed, as well as in the classification of payrolls and losses.

5. The rule that experience rating operates *in personam* and not *in rem*, as I have described in a paper published in the *Proceedings**, corresponds to a like principle in Equity and requires a judicial quality of mind for application to a given set of facts.

6. Current discussions on the "safe-driver plan" illustrates the extraordinary quality of judgment essential in building an equitable merit rating plan for private motor cars.

All of the points recited above could never be reduced to purely mechanical steps, for the entire statistical system is only good to the extent that the faculty of judgment enters into the process of its making. In the development of basic rates, as well as merit

* *Proceedings,* Vol. XI, page 211.

rating plans, it is imperative that judgment in the spirit of equity shall be exercised by the men in your profession in order that the results may be of practical value. This is clearly indicated in the profoundly scientific paper recently published by Francis S. Perryman entitled, "Experience Rating Plan Credibilities"*. Incidentally, that paper is a very good example of the tyranny practised by actuaries on algebraic notations.

V.

Justice to claimants under a casualty policy is a subject that does not yield readily to analysis. The Workmen's Compensation contract or the Public Liability contract deals with the rights of three parties, and in the case of a loss the interests of all three may run in different directions. Where the injury is caused through the negligence of one who stands in no contractual relation to the company, policyholder or claimant, the right of subrogation enforceable as against him further serves to complicate a difficult situation. Any approach to a statement of specific principles that should govern the settlement on equitable lines must be made with the greatest care and with the most prayerful consideration. Justice in the case involves a question of fairness to all parties in interest. A settlement which gives preference to the rights of any one of the three or four parties to the transaction would not spell *justice* in the true sense of the term.

A variety of motives comes into play. The duty to guard the interests of the carrier against an excessive award, a desire to protect the assured against a verdict that may exceed the policy limits, and the natural sympathy for a beneficiary in distress—all these and objects less worthy may influence the actions of the claim adjuster and the resulting settlement. I do not feel qualified to deal with this subject in great detail. This should be done by one who has given not only academic study to the matter of settlements under Workmen's Compensation and Public Liability policies, but who has had practical experience of long standing. My reference to this item is solely for the purpose of arousing interest. There may be one in our midst who possesses the

* *Proceedings,* Vol. XXIV, page 60.

qualities essential for an author competent to write a paper on the subject to be submitted at a future meeting of the Society.

VI.

Our code of ethics should include as one of its prominent features a section relating to fairness in competition. For example, I would deny the privilege to tag a competitor with a false label. It is not fair in competition to speak with scorn of the insurance group to which your competitor may belong, although such group has been authorized by law to do business in the state. I recall an occasion some years ago when I attended a convention of insurance agents in Richmond. The agenda for the day included the perennial topic "how to combat mutual insurance". The speaker was a highly respectable gentleman, an executive of an important insurance organization, but from his speech I gathered that he had a limited outlook on life. His horizon did not extend beyond his business, his family circle and his golf. Art, literature, music and world politics were non-existent for him. As a speaker he was very effective and he held the close attention of the agency group. At the conclusion of his speech he delivered a peroration, the final sentence of which still lingers in my memory. "In the final analysis", said he, "mutual insurance is socialism". The crowd went wild. They cheered and they applauded until the rafters of the convention hall echoed and re-echoed with their applause. Of course, he was wrong; mutual insurance is just as much a feature of our profit system as is stock insurance. It is true that we have from time to time adopted certain parts of the socialist program, but mutual insurance is decidedly not a part of it. It is one of the popular errors to assume that any form of cooperative enterprise may be justly tagged as coming within the definition of "socialism". Under the philosophy preached by the followers of Karl Marx, only instrumentalities operated by the state, as an arm of the state, can be truly classified in the socialist group. Neither stock nor mutual insurance can be so classified. Mutual insurance managers would reject with withering scorn the socialist label. Besides, they are good business men with distinct leanings towards the profit system, disdaining any form of collectivism. Very few men in the collectivist group possess

the business instinct, nor can they be taught to acquire it. According to Andrew Carnegie, "The business instinct can no more be instilled into men by teachers, than the homing instinct could be developed by feeding them on pigeon pie".

VII.

Our economic system has been able to exist and endure so long a time because of its flexibility to adjust itself from time to time to varying social conditions. Although priding itself on its ability to carry on small as well as large enterprises by individual effort, the system has yielded to *state socialism* when public opinion was ripe for the change. The tax collector, who was originally a private entrepreneur, has become a state officer. The water supply system has come under the control of the municipality. The Post Office has become a national, if not an international, business. Next in order may be the railroads, the telephones and other lines of communication which are already under public ownership in most European countries. The term "socialism," at one time a bugaboo, is no longer regarded with apprehension by the general public. The idea of an insurance organization managed by the state was the subject of ridicule twenty years ago. Today we find conservative business men subscribing to state insurance without compunction, while we watch the growth of the organization as a real competitor in the field of Workmen's Compensation. And, of course, our Social Insurance scheme with its old age pensions and unemployment insurance is socialism pure and simple. But we must take care that the insidious encroachment of state socialism on our economic system shall not bring in its trail serious changes in our political system as well. Vigilance on the part of the intelligent groups of society is therefore a prime requisite. The men who have faith in the system of private enterprise must be able to give good reasons in private and in public for such faith.

The reasons for favoring a free economic system are based on the following premises:

1. It corresponds more closely to human nature and to man's aspirations than any other system devised by social reformers. Neither the ethical abstractions of the religious cults, nor the

ideologies advanced by the disciples of Socialism or Fascism offer a satisfactory answer to our political and social problems. It is in human nature to abhor poverty, to despise humility, to seek satisfaction for injuries sustained, and to fear the loss of freedom through regimentation by means of planned economy. The free economic system takes the middle road, avoiding extremes, favoring individual initiative and yielding to state socialism where public interest may require the operation of enterprise through common effort. In this manner it fulfills our natural desire to accumulate possessions, to promote the ambitions of the average man as well as of the genius, who is at liberty to carry on his task *Ad majorem Dei gloriam.*

2. The element of competition, which is inherent in the profit system, is the master which drives man to do things in a better way than has been done by his rival in business; forces him to build a better shop, a taller building, to win a prize in a contest for safety work, to produce more goods, to employ more men, write a better book, produce a finer play, or even to deliver a Presidential Address more instructive and more entertaining than the one delivered at a previous meeting of the Society.

3. And finally, the free economic system in a democracy such as ours offers the attainment of an ideal highly prized in the Courts of Equity, the ideal of Equality:—equal opportunity in the economic and political life of the nation, and equal justice in our courts for all God's children without distinction of race, color or creed. Insurance—one of the most beneficent institutions devised by man—may well include in its code of ethics the principles of Equity, a most important tenant dwelling in the Temple of Justice, which rightfully bears the inscription carved in stone by human hands under Divine guidance—"The true administration of justice is the firmest pillar of good government".

SPECIAL FUNDS UNDER THE NEW YORK WORKMEN'S COMPENSATION LAW

BY

GRADY H. HIPP

The special funds created by the provisions of the New York Workmen's Compensation Law have attracted considerable attention during recent months.

There are three special funds into which compensation insurance carriers and self-insurers are required by law to make payments for every case of injury causing death in which there are no persons entitled to compensation; a fourth fund, commonly known as the Aggregate Trust Fund, into which the stock and mutual companies, but not the self-insurers or the State Insurance Fund, are required by law to pay the present values of all awards made on or after July 1, 1935 for death benefits and for total permanent disability resulting from the loss of both hands, or both arms, or both feet, or both legs, or both eyes, or of any two thereof, or for permanent partial disability resulting from the loss of an arm, leg, hand, foot or eye; and the Stock and Mutual Workmen's Compensation Security Funds.

The following is a list of the special funds under the New York Workmen's Compensation Law:

1. Second Injury (Special Disability) Fund, (Section 15-8).
2. Reopened Case Fund, (Section 25-a).
3. Vocational Rehabilitation Fund, (Section 15-9).
4. Aggregate Trust Fund, (Section 27).
5. Workmen's Compensation Security Funds, (Sections 60 to 73, inclusive).

Only a brief reference will be made in this paper to the Workmen's Compensation Security Funds which were created by the provisions of Chapter 255, Laws of 1935, constituting a new Article 5 of the New York Workmen's Compensation Law. The new Article 5 (Sections 60 to 73, inclusive) created two security funds known as the Stock Workmen's Compensation Security Fund and the Mutual Workmen's Compensation Security Fund.

The purpose of these funds is to assure to persons entitled thereto the compensation provided by law for employments insured in insolvent stock and mutual carriers. The stock and mutual companies are required to pay into the security funds 1% of the net premiums written during calendar year 1934 and each year thereafter until the maximum amounts are reached. When the aggregate amount of payments into the stock fund together with accumulated interest thereon, less all its known liabilities and estimated liabilities on pending cases, becomes equal to 5% of the New York Workmen's Compensation loss reserve of all stock carriers as of December 31st, next preceding, or becomes equal to $2,300,000:00, whichever amount is the greater, no further contributions to the stock fund shall be required to be made unless thereafter the fund shall be reduced below the maximum required amount. Whenever the mutual fund, less all its known liabilities and estimated liabilities on pending cases, shall exceed the sum of $700,000.00 or an amount equal to 5% of the New York Workmen's Compensation loss reserve of all mutual carriers as of December 31st, next preceding, whichever amount is the greater, distribution of such excess, subject to the advance approval of the Superintendent of Insurance, shall be made as repayments for successive fund years, commencing with the first fund year, to the mutual carriers in the proportion in which they respectively made contributions for such fund year, provided, however, that the Mutual Security Fund shall not be reduced below the maximum required amount. The Superintendent of Insurance is required to serve as administrator of each of the security funds without additional compensation. Administration expenses are payable from each of these funds. The Commissioner of Taxation and Finance is the custodian of each of these security funds, and disbursements from each fund are made by the Commissioner of Taxation and Finance upon vouchers signed by the Superintendent of Insurance or his deputy.

Complete annual reports have been available on the Aggregate Trust Fund from the beginning. However, during 1937, for the first time, reports covering the liabilities of the Second Injury and Reopened Case Funds became available.

The purpose of this paper is to summarize pertinent information with respect to the various special funds (other than the

Workmen's Compensation Security Funds) and to provoke comment on possible solutions of the problems involved.

The large deficits revealed in the reports covering the Second Injury and Reopened Case Funds are shown in the following summary:

SUMMARY OF FINANCIAL STATUS OF SPECIAL FUNDS (EXCLUDING SECURITY FUNDS)

	Statement as of	Assets	Liabilities	Surplus (or Deficit)
Second Injury Fund...	12/31/36	$ 992,167.30	$1,852,781.95	—$ 860,614.65
Reopened Case Fund...	12/31/36	201,702.88	2,785,099.00	— 2,583,396.12
Vocational Rehabilitation Fund.....	6/30/36	746,366.46	250,000.00	496,366.46
Aggregate Trust Fund.	12/31/37	5,794,568.16	5,837,863.47	— 43,295.31

The financial status of the various funds as indicated by the above summary has impressed upon all who are interested in the operations of the New York Workmen's Compensation Law the necessity for taking action to remedy the situation. Undoubtedly, some amendments to the Compensation Law will be necessary.

Table A contains a summary of the amounts for which carriers have been liable in each no dependency death case award during various periods:

TABLE A

COSTS TO CARRIERS OF EACH NO DEPENDENCY DEATH CASE AWARD

	7/1/14 to 6/1/16	6/1/16 to 5/13/20	5/13/20 to 7/1/22	7/1/22 to 5/21/23	5/21/23 to 4/24/33	4/24/33 to Date
Second Injury Fund (§ 15-8)	$ ..	$100	$ 100	$ 500	$ 500	$ 500
Reopened Case Fund (§ 25-a)	..	..	..	..	..	300
Vocational Rehabilitation Fund (§ 15-9).....	..	..	900	500	500	500
Funeral Expenses (§ 16-1)..	100*	100*	100*	100*	200*	200*
Totals.....	$100	$200	$1,100	$1,100	$1,200	$1,500

* Funeral expenses not to exceed this amount.

The contributions to the special funds and the financial condition of such funds are matters of great importance to the compensation insurance carriers and self-insurers. A discussion of the statutory provisions governing each special fund other than the Workmen's Compensation Security Funds and of the history and financial condition of each such fund therefore appears to be timely.

SECOND INJURY FUND

(Section 15, Subdivision 8 of the Compensation Law)

The Second Injury Fund was created by the provisions of Section 15, Subdivision 8 of the New York Workmen's Compensation Law. Out of this fund there is paid additional compensation to persons who, having already sustained the loss of one major member of the body, thereafter by accident lose another major member of the body. In such a case the employer (or his insurance carrier) is liable only for compensation to the injured employee for the member lost by the first accident while in his employ. But the workman is, after that member has been paid for by the employer (or his insurance carrier), entitled to payment of additional compensation as for permanent total disability out of this special fund, it being recognized that the higher disability is not the financial responsibility of the immediate employer but is the obligation of industry generally.

Subdivision 8 (formerly Subdivision 7) of Section 15 of the Compensation Law was added by Chapter 622, Laws of 1916 (effective June 1, 1916). The amount of the contribution by carriers and self-insurers was increased from $100 to $500 in each no dependency death case award by Chapter 615, Laws of 1922 (effective July 1, 1922) at which time the subdivision was also renumbered.

Subdivision 8 of Section 15 of the Compensation Law provides in part as follows:

> "If an employee who has previously incurred permanent partial disability through the loss of one hand, one arm, one foot, one leg, or one eye, incurs permanent total disability through the loss of another member or organ, he shall be paid, in addition to the compensation for permanent partial disability provided in this section and after the cessation of the payments for the prescribed period of weeks special additional compensation during the continuance of such total disability to the amount of sixty-six and two-thirds per centum of the average weekly wage earned by him at the time the total permanent disability was incurred."

Subdivision 8 also provides in part as follows:

> "The employer, or if insured, his insurance carrier, shall pay into such special fund for every case of injury causing death in which there are no persons entitled to compensation the sum of five hundred dollars."

The Second Injury Fund receives small amounts of additional income from the following sources:

1. Section 24-a of the Compensation Law provides that fees for licenses to representatives of claimants shall be paid into the Second Injury Fund.
2. Section 50, Subdivision 3-b, of the Compensation Law provides that fees for licenses of representatives of self-insurers shall be paid into the Second Injury Fund.
3. Section 52 of the Compensation Law provides that fines for failure to secure the payment of compensation in one of the ways authorized by law shall be paid into the Second Injury Fund.

Section 52 provides in part as follows:

> "Failure to secure the payment of compensation shall constitute a misdemeanor, punishable by a fine of not more than five hundred dollars or imprisonment for not more than one year, or both. Where the employer is a corporation, the president, secretary and treasurer thereof shall be liable for failure to secure the payment of compensation under this section.
>
> "All fines imposed under this chapter, except as herein otherwise provided, shall be paid directly and immediately by the officer collecting the same to the industrial commissioner for the benefit of the special fund created under subdivision eight of section fifteen of this chapter."

The Second Injury Fund is also entitled to receive one-half of the fines for failure to notify the Industrial Commissioner of the cessation of payments within sixteen days after the date on which compensation has been paid. See Section 25 of the Compensation Law which provides in part as follows:

> "Whenever for any reason compensation payments cease, the employer or his insurance carrier shall within sixteen days thereafter, send to the commissioner a notice on a form prescribed by the commissioner that such payment has been stopped, which notice shall contain the name of the injured employee or his principal dependent, the date of accident, the date to which compensation has been paid and the whole amount of compensation paid, and in case the employer or his insurance carrier fail so to notify the commissioner of the cessation of payments within sixteen days after the date on which compensation has been paid, the commissioner may, after a hearing, impose a penalty upon such employer or his insurance carrier in an amount in his discretion not exceeding

twenty-five dollars, one-half of which shall be paid into the special fund created under favor of numbered paragraph eight of section fifteen herein and one-half of which shall be paid into the state treasury* and be applicable to the expenses of the department."

However, it appears that the Second Injury Fund has not received any fines under the provisions of Section 25.

The Commissioner of Taxation and Finance of the State of New York is the custodian of the Second Injury Fund and disbursements from it are made on vouchers signed by the Industrial Commissioner of the State of New York.

A report on examination of the Second Injury (Special Disability) Fund was made by Examiner John D. Byrne of the State of New York Insurance Department to Industrial Commissioner Elmer F. Andrews under date of July 28, 1937.

This report on examination shows that in addition to the present values of cases payable as of December 31, 1936, the estimated present values of awards which may be made in the future as a result of accidents which occurred on or prior to December 31, 1936 amount to a considerable sum.

Calculation of Liabilities of Second Injury Fund

In calculating the present values of awards (in second injury cases) which had been made on or prior to December 31, 1936, the Insurance Department Examiner based his computations on the Survivorship Annuitants' Table of Mortality with interest at 3½% per annum.

In addition to the second injury cases on which awards had been made on or prior to December 31, 1936, there will, of course, be a number of awards made in the future in second injury cases as a result of accidents which occurred originally on or prior to December 31, 1936. The main difficulty in calculating the present values of second injury awards which will be made in the future on cases where the original injury occurred on or prior to December 31, 1936 is in estimating the number of such second injury awards which will be made in the future. The large majority of

* The functions of the State Treasurer have since been assigned by separate enactment to the Department of Taxation and Finance (State Departments Law, Chapter 343, Laws of 1926, § 131).

second injury awards have been made in cases where the original accidents occurred five years or less prior to the second injury awards as will be noted from Table B containing figures prepared by the Insurance Department Examiner and showing the number of second injury awards classified according to the time elapsed between the date of the original accident and the date of the second injury award.

TABLE B

Time Elapsed Between Original Accident and Second Injury Award	Number of Claims (Second Injury Awards)	Per Cent of Total
Less than 1 year.....	11	7.38
1 to 2 years.....	33	22.15
2 to 3 years.....	40	26.85
3 to 4 years.....	33	22.15
4 to 5 years.....	15	10.07
Over 5 years.....	17	11.40
	149	100.00

Table B covers all second injury awards made on or before December 31, 1936 in cases where the original accidents occurred during the years 1916 to 1936, inclusive.

The average time elapsed between the date of the original accident and the date of the final second injury award was found by the Insurance Department Examiner to be 3.025 years.

In cases involving original accidents which occurred during the ten year period 1922 to 1931, inclusive, second injury awards were made in 105 cases with a total second injury incurred cost of $1,429,681.23 or an average of $13,616.00 per second injury case. A sufficient time had elapsed for the second injury loss experience of the above period to be reasonably well matured. Using the above ten year period as the basis for his calculations, the Examiner estimated that the liability on second injury awards which have been made and which will be made in the future in cases involving accidents which originally occurred during the five year period 1932 to 1936, inclusive, will amount to one-half the second injury incurred cost of the above ten year period or $714,840.60. Deducting the amount ($84,344.22) of the eight second injury awards made on or prior to December 31, 1936 in cases involving accidents which originally occurred during the last five year period,

the Examiner obtained $630,496.38 (rounded off to $630,000.00) as the estimated amount of second injury awards which will be made in the future in cases involving original accidents of the five year period 1932 to 1936, inclusive. This amount may prove to be somewhat low for the reason that there will probably be a number of second injury awards made in the future in cases involving original accidents which occurred prior to the year 1932. However, the estimate appears to be a fairly reasonable one on the basis of information now available.

The Insurance Department Examiner developed the following test of his estimate of $630,000.00 to cover the liability for second injury awards which will be made in the future in cases involving original accidents occurring during the five year period 1932 to 1936, inclusive.

The total compensation losses incurred by all carriers (not including self-insurers) in New York State during the fourteen year period 1918 to 1931, inclusive, amounted to $442,075,000.00. (See Table IX, Part 1, New York Insurance Department Reports.) The second injury awards made on or before December 31, 1936 in cases involving original accidents which occurred during the above fourteen year period amounted to $1,858,086.77 or 0.42% of the compensation incurred losses. Applying the percentage, 0.42%, to the compensation losses incurred during the five year period 1932 to 1936, inclusive, the Examiner obtained $711,997.00 as the indicated amount of the second injury awards which have been made and which will be made in the future in cases involving accidents which originally occurred during the five year period 1932 to 1936, inclusive. Deducting the amount ($84,344.22) of the eight second injury awards made on or prior to December 31, 1936 in cases involving accidents which originally occurred during the last five year period, the Examiner obtained $627,652.77 which differs very little from the figure of $630,000.00 finally used by the Examiner as the estimated amount of second injury awards which will be made in the future in cases involving original accidents of the five year period 1932 to 1936, inclusive.

The above test would have been more significant if the figures for compensation losses of the self-insurers had been available and had been included in the calculation.

ASSETS AND LIABILITIES OF THE SECOND INJURY (SPECIAL DISABILITY) FUND AS OF DECEMBER 31, 1936

Assets as shown in the report of the Industrial Commissioner		$ 992,167.30
Liabilities as estimated in the report of the Insurance Department Examiner dated July 28, 1937 were as follows:		
Present value of second injury cases on which payments were being made December 31, 1936.	$1,160,278.37	
Present value of second injury cases payable after December 31, 1936 on which awards were made on or prior to that date...	62,503.58	
Estimated present value of awards which may be made in the future in cases involving original accidents which occurred on or prior to December 31, 1936.....	630,000.00	
Total Liabilities of the Second Injury Fund as of December 31, 1936		1,852,781.95
Deficiency of Second Injury Fund as of December 31, 1936		$ 860,614.65

A financial summary of the Second Injury Fund for the five years 1932 to 1936 is shown in Table G.

The amount which would have been accumulated in the Second Injury Fund according to the calculations of Associate Actuary Mark Kormes of the Compensation Insurance Rating Board of New York if a $500 contribution in each no dependency death case award had been in effect from July 1, 1914 up to December 31, 1936 is $1,895,397.00.

The average annual amount of awards paid into the Second Injury Fund during the five year period 1932 to 1936, inclusive, was $90,999.13 and the average annual amount of loss payments during the same period was $86,167.98.

It therefore appears that the present $500 contribution to the Second Injury Fund in each no dependency death case award probably is sufficient to cover the losses currently payable from the Second Injury Fund but not sufficient to reduce the deficit in this fund to any material extent.

REOPENED CASE FUND
(*Section 25-a of the Compensation Law*)

The Reopened Case Fund was created by the provisions of Section 25-a of the New York Workmen's Compensation Law. Out of this fund there is paid compensation to persons who, upon a reopening of a claim, have been found to be entitled to compensation, when such opening has taken place more than seven years after the happening of the accident and more than three years after the last payment of compensation by the employer or his insurance carrier.

Section 25-a of the Compensation Law was added by Chapter 384, Laws of 1933 (effective April 24, 1933).

Chapter 384, Laws of 1933, provided for the transfer from the Vocational Rehabilitation Fund to the Reopened Case Fund $200,000.00 (par value) of securities and $50,000.00 in cash.

Section 25-a provides that awards may be made against the Reopened Case Fund in the following types of cases:

> "* * * (1) after a lapse of seven years from the date of the injury or death and claim for compensation previously has been disallowed or claim has been otherwise disposed of without an award of compensation, or (2) after a lapse of seven years from the date of the injury or death and also a lapse of three years from the date of the last payment of compensation, provided, however, that where the case is disposed of by the payment of a lump sum the date of last payment for the purpose of this section shall be considered as the date to which the amount paid in the lump sum settlement would extend if the award had been made on the date the lump sum payment was approved at the maximum compensation rate employee's earnings would warrant, or (3) where death resulting from the injury shall occur after the time limited by the foregoing provisions of (1) or (2) shall have elapsed * * *."

Section 25-a also provides in part as follows:

> "The employer, or, if insured, his insurance carrier, shall pay into such fund for every case of injury causing death for which there are no persons entitled to compensation the sum of three hundred dollars except that where death shall occur subsequent to the periods limited by this section no payment into such special fund nor to the special funds provided by subdivisions eight and nine of section fifteen of this chapter shall be required."

The effective date of Section 25-a coincided with a change in Section 15, Subdivision 6-a, which authorizes the Industrial Board to reclassify a case at any time without regard to the date of accident. (See Chapter 384, Laws of 1933). Previous to this change cases could not be reclassified after three years had elapsed from the date of accident.

The Commissioner of Taxation and Finance is the custodian of the Reopened Case Fund and disbursements are made from it on vouchers signed by the Industrial Commissioner.

A report on examination of the Reopened Case Fund was made by Examiner John D. Byrne of the State Insurance Department to Industrial Commissioner Elmer F. Andrews under date of July 29, 1937.

This report on examination shows that in addition to the present values of the cases reopened up to and outstanding on December 31, 1936, the estimated present values of awards which may be made in the future on the following two types of cases amount to considerable sums:

(a) Cases which may be reopened in the future and on which at least seven years have elapsed between the accident date and December 31, 1936.

(b) Cases which may be reopened in the future and on which less than seven years have elapsed between the accident date and December 31, 1936.

Calculation of Liabilities of Reopened Case Fund

In calculating the present values of reopened cases outstanding as of December 31, 1936 on which awards had been made on or prior to December 31, 1936, the Insurance Department Examiner based his computations on the Survivorship Annuitants' Table of Mortality with interest at 3½% per annum.

In addition to the reopened cases on which awards had been made on or prior to December 31, 1936, there will, of course, be a number of awards made in the future in reopened cases arising out of accidents which occurred on or before December 31, 1936. The amount of the present values of the incurred costs on the latter cases was estimated by the Examiner by projecting the estimated incurred cost of all cases reopened from April 24, 1933, the date as of which Section 25-a became effective, to December 31, 1936.

Table C based on figures in the report of the Insurance Department Examiner shows the number of years elapsed between the year of accident and the year in which the case was reopened.

TABLE C

Years Elapsed Between Accident and Reopening	Number	Per Cent of Total	Amount	Per Cent of Total
7	27	10.22	$ 71,174.40	8.47
8	43	16.29	85,908.25	10.22
9	42	15.91	148,739.76	17.70
10	37	14.01	126,331.69	15.03
11	25	9.47	66,227.64	7.88
12	19	7.20	99,775.43	11.87
13	23	8.71	116,883.99	13.91
14	10	3.79	33,936.66	4.04
15	13	4.92	17,901.93	2.13
16	9	3.41	12,651.11	1.50
17	7	2.65	21,575.63	2.57
18	4	1.52	22,403.20	2.66
19	4	1.52	6,484.31	0.77
20	1	0.38	10,532.00	1.25
Total	264	100.00	$840,526.00	100.00

The cases shown in Table C were reopened from April 24, 1933 to December 31, 1936, a period of 3.69 years.

The average number of cases reopened per year and the average estimated cost thereof classified by the time elapsed since year of accident, are shown in Table D.

TABLE D

Years Elapsed Between Accident and Reopening	Average Number of Cases Reopened per Year	Average Amount of Reopenings per Year
7	7.3	$ 19,289.00
8	11.7	23,282.00
9	11.4	40,309.00
10	10.0	34,236.00
11	6.8	17,948.00
12	5.1	27,040.00
13	6.2	31,676.00
14	2.7	9,197.00
15	3.5	4,851.00
16	2.4	3,428.00
17	1.9	5,847.00
18	1.1	6,071.00
19	1.1	1,757.00
20	.3	2,854.00
Total	71.5	$227,785.00

In his projection calculation, the Examiner assumed that all claims against the Reopened Case Fund will be reported in from 7 to 20 years after the accident date. Further, he made provision for the following two classes of cases:

(a) Cases which may be reopened after December 31, 1936 arising out of accidents which occurred during the years 1917 to 1929, inclusive, or which occurred at least 7 years prior to December 31, 1936 but not more than 20 years prior to such date.

(b) Cases which may be reopened after December 31, 1936 as a result of accidents which occurred during the years 1930 to 1936, inclusive, or within 7 years prior to December 31, 1936.

Table E shows the Examiner's estimate of the probable number of cases to be reopened on the basis of a projection of the actual number of cases reopened up to December 31, 1936.

TABLE E

Number of Years After Accident	Actual Number (Average per Year)	Probable Number of Cases to be Reopened in the Current Year	Probable Number of Cases to be Reopened After the Current Year
7	7.3	11	61
8	11.7	10	51
9	11.4	9	42
10	10.0	8	34
11	6.8	7	27
12	5.1	6	21
13	6.2	5	16
14	2.7	4	12
15	3.5	3	9
16	2.4	3	6
17	1.9	2	4
18	1.1	2	2
19	1.1	1	1
20	.3	1	0
Total	71.5	72.0	286

Based upon the probable number of cases to be reopened as shown above, the Examiner estimated the number of cases to be reopened subsequent to December 31, 1936 arising out of accidents which had occurred up to that date as shown in Table F.

The average total incurred cost of the 264 compensable cases

reopened to December 31, 1936 was $3,183.00 per case. In his computation, the Examiner rounded out this average to $3,200.00.

TABLE F

Year of Accident	Years in Which Cases May be Reopened	Number of Years After Accident	Probable Number of Cases
1917	1937	20	1
1918	1937 - 1938	19 to 20	2
1919	1937 - 1939	18 to 20	4
1920	1937 - 1940	17 to 20	6
1921	1937 - 1941	16 to 20	9
1922	1937 - 1942	15 to 20	12
1923	1937 - 1943	14 to 20	16
1924	1937 - 1944	13 to 20	21
1925	1937 - 1945	12 to 20	27
1926	1937 - 1946	11 to 20	34
1927	1937 - 1947	10 to 20	42
1928	1937 - 1948	9 to 20	51
1929	1937 - 1949	8 to 20	61
		Total	286
1930	1937 - 1950	7 to 20	72
1931	1938 - 1951	7 to 20	72
1932	1939 - 1952	7 to 20	72
1933	1940 - 1953	7 to 20	72
1934	1941 - 1954	7 to 20	72
1935	1942 - 1955	7 to 20	72
1936	1943 - 1956	7 to 20	72
		Total	504
		Grand Total	790

The total projected incurred cost of the estimated number of cases (790) which will be reopened subsequent to December 31, 1936 on the basis of the average per case is $2,528,000.00 without discount for interest from December 31, 1936 to the dates of reopenings.

On the basis of the actual experience during the period April 24, 1933 to December 31, 1936, the medical incurred losses on non-compensable reopened cases amounted to approximately 0.7% of the total compensation incurred cost of compensable cases. Accordingly, in his calculation, the Examiner added a loading of 0.7% to cover medical payments on non-compensable cases which may be reopened after December 31, 1936. The Examiner's estimate of the total incurred cost of cases which may be reopened in

the future arising out of accidents occurring on or before December 31, 1936 was based on an average incurred cost of $3,200.00 (compensation and medical) plus a loading of 0.7% to cover medical payments on future non-compensable cases, and the total of the estimated losses of each year of reopening discounted at an interest rate of 3½% compounded annually, from December 31, 1936 to the year of reopening.

The estimated present values (also taking into consideration the 0.7% loading for medical payments on future non-compensable cases and above discount for interest) of the cases which may be reopened in the future and on which at least seven years have elapsed between the accident date and December 31, 1936 amounted to $837,537.00.

The estimated present values (also taking into consideration the 0.7% loading for medical payments on future non-compensable cases and above discount for interest) of the cases which may be reopened in the future and on which less than seven years have elapsed between the accident date and December 31, 1936 amounted to $1,289,064.00.

The Examiner's calculations appear to be reasonable on the basis of experience which is now available. However, future experience may substantially change the results. There is grave danger that the number of reopenings may increase as possible claimants become more claim conscious. The following table indicates the increase in the number of reopened cases each year since Section 25-a was enacted:

Year Reopened	Number of Compensable Reopenings	Amount of Compensable Reopenings
1933	20	$109,029.70
1934	63	175,117.99
1935	84	267,194.12
1936	97	289,184.19
Total	264	$840,526.00

In my opinion, the Insurance Department Examiner is to be commended for the excellent manner in which he has pioneered the way in estimating the liabilities of the Second Injury and Reopened Case Funds.

ASSETS AND LIABILITIES OF THE REOPENED CASE FUND AS OF DECEMBER 31, 1936

Assets as shown in the report of the Industrial Commissioner		$ 201,702.88
Liabilities as estimated in the report of the Insurance Department Examiner dated July 29, 1937 were as follows:		
Liabilities on reopened cases for which awards against the Reopened Case Fund have already been made or which are under consideration by the Industrial Board	$ 658,498.00	
Estimated present value of awards on claims which may be reopened, which have already occurred and on which at least seven years have elapsed between the accident date and December 31, 1936	837,537.00	
Estimated present value of awards on claims which may be reopened, which have already occurred and on which less than seven years have elapsed between the accident date and December 31, 1936	1,289,064.00	
Total Liabilities of the Reopened Case Fund as of December 31, 1936		2,785,099.00
Deficiency of Reopened Case Fund as of December 31, 1936		$2,583,396.12

A financial summary of the Reopened Case Fund for the four years 1933 to 1936 is shown in Table G.

The amount which would have been accumulated in the Reopened Case Fund according to the calculations of the Associate Actuary of the Compensation Insurance Rating Board of New York if a $300 contribution in each no dependency death case award had been in effect from July 1, 1914 up to December 31, 1936 is $745,849.00.

The average annual amount of awards paid into the Reopened Case Fund during the three year period 1934 to 1936, inclusive, was $33,100.00, and the average annual amount of loss payments during the same period was $62,623.61.

It therefore appears that the present $300 contribution to the Reopened Case Fund in each no dependency death case award is far from sufficient to cover even the losses currently payable from

the Reopened Case Fund. It appears further from the calculations of the Associate Actuary of the Compensation Insurance Rating Board of New York that a contribution of between $750 and $1,000 to the Reopened Case Fund in each no dependency death case award would be required to meet the losses currently payable from the Reopened Case Fund.

Vocational Rehabilitation Fund

(Section 15, Subdivision 9 of the Compensation Law)

The Vocational Rehabilitation Fund was created by the provisions of Section 15, Subdivision 9 of the New York Workmen's Compensation Law. Two classes of payments are made from this fund. The first class of payments is ordered by the Industrial Commissioner and is made as additional compensation to crippled workmen while they are undergoing rehabilitation training. These payments are limited to $10 per week and are intended to supplement the regular compensation payments while the trainee is obliged to be away from home undergoing vocational training.

The second class of payment made from this fund is for the administrative expenses of the Bureau of Rehabilitation of the New York State Education Department and the payments are ordered by the Commissioner of Education.

Subdivision 9 (formerly Subdivision 8) of Section 15 of the Compensation Law was added by Chapter 760, Laws of 1920 (effective May 13, 1920).

The contribution in each no dependency death case award to this fund was decreased from $900 to $500 by Chapter 615, Laws of 1922 (effective July 1, 1922), at which time the subdivision was also renumbered.

Subdivision 9 of Section 15 reads in part as follows:

> "An employee, who as a result of injury is or may be expected to be totally or partially incapacitated for a remunerative occupation and who, under the direction of the state department of education is being rendered fit, to engage in a remunerative occupation, shall receive additional compensation necessary for his rehabilitation, not more than ten dollars per week of which shall be expended for maintenance. Such expense and such of the administrative expenses of the state department of education as are properly assignable to the expense of rehabilitating employees entitled to compensa-

> tion as a result of injuries under this chapter, shall be paid out of a special fund created in the following manner: The employer, or if insured, his insurance carrier, shall pay into the vocational rehabilitation fund for every case of injury causing death, in which there are no persons entitled to compensation the sum of five hundred dollars."

The Commissioner of Taxation and Finance is the custodian of the Vocational Rehabilitation Fund. Disbursements from this fund for the additional compensation provided for by Section 15 are paid by the Commissioner of Taxation and Finance on vouchers signed by the Industrial Commissioner.

Disbursements from this fund for administrative expenses of the State Department of Education are paid by the Commissioner of Taxation and Finance upon vouchers signed by the Commissioner of Education.

As has been previously noted, $250,000.00 was transferred from the Vocational Rehabilitation Fund to the Reopened Case Fund under the provisions of Chapter 384, Laws of 1933.

Under the provisions of Subdivision 9 of Section 15 of the Compensation Law, $50,000.00 a year may be expended for the purpose of making studies of means and methods of eliminating hazards of dust and other occupational diseases commencing July 1, 1936 for a period of five years.

Chapter 888, Laws of 1936, which amended Subdivision 9 of Section 15, provides in part as follows:

> "There may be expended from such fund (Vocational Rehabilitation Fund) annually for a period of five years commencing July first, nineteen hundred thirty-six and ending June thirtieth, nineteen hundred forty-one an amount not to exceed fifty thousand dollars in any one year, for the purpose of making such studies as may in the judgment of the industrial commissioner be advisable, of means and methods of eliminating hazards to life and health from dusts and other occupational diseases, and disseminating information on the subject of control and prevention, provided however, that any information obtained in connection with such studies and investigation shall not be admissible as evidence in any action at law or in the adjudication of any claim arising under the workmen's compensation law."

Incidentally, it may be of interest to note that Chapter 889, Laws of 1936 provided an appropriation of $100,000.00 for the payment of expenses necessary to carry out the provisions of

Article 4-A of the Workmen's Compensation Law, and of Section 222-a of the Labor Law for the prevention of silicosis and other dust diseases. (See Special Bulletin No. 187 published by the Labor Department.)

An analysis of the receipts and disbursements of the Vocational Rehabilitation Fund for the nine fiscal years 1928 to 1936 inclusive, is contained in a report dated July 10, 1937 to State Comptroller, Morris S. Tremaine, by Mr. E. H. O'Connell, Assistant State Accounts Auditor.

Assets of the Vocational Rehabilitation Fund as of June 30, 1936 as shown by the report of Mr. E. H. O'Connell.	$746,366.46
Liabilities of Vocational Rehabilitation Fund as of June 30, 1936	250,000.00

It appears that the liabilities of the Vocational Rehabilitation Fund as of June 30, 1936 amounted to little or nothing aside from the $50,000.00 a year for five years for the study of dust and other occupational disease hazards.

A financial summary of the Vocational Rehabilitation Fund for the five year period ended June 30, 1936 is shown in Table G.

The administrative expenses (salaries) paid from the Vocational Rehabilitation Fund show marked increases since 1928, whereas the benefits to injured employees show a reduction since 1928. The following table briefly illustrates this point:

	Year Ended June 30th		
	1928	1932	1936
Personal Service (Salaries)	$19,219.54	$55,230.87	$96,508.06
New Equipment	$ 2,019.43	$ 2,307.07	$ 969.91
Rent	5,458.30	3,010.00	550.00
Communications	1,266.24	767.25	1,385.64
Printing	515.42	580.15	56.80
Administration Supplies	532.58	360.44	21.87
Miscellaneous	..	109.30	18.99
Maintenance of Compensation Trainees	18,363.00	14,605.13	26,563.24
Tuition—Educational Institutions	11,244.86	9,232.91	7,741.37
Tuition—Industrial and Commercial	1,122.30	226.62	323.51
Tuition—Tutorial	867.00	439.50	30.50
Tuition—Correspondence Schools	186.00	24.50	69.90
Instructional Supplies	1,702.65	1,418.15	1,138.97
Trainee Travel	159.47	157.23	141.21
Artificial Appliances	907.50	1,203.50	1,060.00
Travel—General	8,539.74	844.24	..
Total Maintenance & Operation	$53,157.49	$35,285.99	$40,071.91

The report of Mr. E. H. O'Connell on the Vocational Rehabilitation Fund contains the following statement:

> "Although the disbursements shown on Schedule No. 3 cover all the disbursements made from the insurance 'No Dependency Award Fund' it nevertheless only covers about 50% of the annual total disbursements made on behalf of the Vocational Rehabilitation as the Federal and State appropriations cover the other 50%."

An interesting pamphlet was published by the Rehabilitation Clinic, New York City, in 1936. The title of the pamphlet is "Vocational Rehabilitation and Workmen's Compensation" with the following subtitle: "A Study of 322 Final Adjustments in Non-Scheduled Awards in Workmen's Compensation, Usually Called Compromised Agreements setting forth the relationship between Vocational Rehabilitation and Workmen's Compensation as established by law and practiced in New York State," by Carl Norcross, Rehabilitation Division, New York State Education Department, with an introduction by R. M. Little, Director, Rehabilitation Division, New York State Education Department.

The payment of the administrative expenses of the Bureau of Rehabilitation of the State Education Department was not one of the original purposes of the law. (See Chapter 760, Laws of 1920.) These expenses were made a charge on the Vocational Rehabilitation Fund only in 1926, six years after the fund had been created. (See Chapter 261, Laws of 1926.)

The payment of such administrative expenses out of the Vocational Rehabilitation Fund was adversely criticized in 1927 by the Industrial Survey Commission, a joint New York State legislative committee to study the labor and compensation laws, which proposed to amend the law and return the fund to its original purpose.

The Industrial Survey Commission in its report (Legislative Document No. 69, 1927, pages 40-41) to the Legislature on February 15, 1927, said in part:

> "Under the provisions of subdivision 9 of section 15 of the Compensation Law, a fund is created by payments by an employer or his insurance carrier of $500 in each case of an injury resulting in death in which there is no person entitled to compensation, which fund shall be used as additional compensation in an amount not to exceed $10 a week for any

injured workman who is undergoing rehabilitation or vocational training under the direction of the State Department of Education.

"Through an amendment to this section there was inserted a provision that such of the administrative expenses of the State Department of Education as are properly assignable to the expense of rehabilitating employees entitled to compensation, shall be paid out of such special fund. The effect of the amendment of last year was to provide that employees of the State in the Department of Education may be paid directly out of this fund rather than out of the State Treasury through regular appropriations by the Legislature. Not alone does it seem to your Commission unsound to permit payments of salaries for State employees out of this fund and without their appearing in the annual budget of the State, but your Commission entertains grave doubt as to the constitutionality of such a provision. This special fund in the hands of the State Treasurer as custodian is not a fund belonging to the State. These moneys are not moneys of the State. It is a special fund of which the State Treasurer is merely the custodian, and it is created out of the insurance premiums drawn from industry and is held for the benefit of certain injured workers who are entitled to compensation. It seems to your Commission no more logical to pay the salaries of employees of the Department of Education who are engaged in the work of physically training these industrial cripples, than it would be to pay the salaries of referees or employees in the Department of Labor out of such fund.

"Your Commission therefore recommends that subdivision 9 of section 15 be restored to the form in which it existed prior to the amendment of last year."

TABLE G

FINANCIAL SUMMARY OF SECOND INJURY (SPECIAL DISABILITY), REOPENED CASE AND VOCATIONAL REHABILITATION FUNDS

(Principally from Annual Reports of Industrial Commissioner)

Year Ended Dec. 31st	*Income	**Disbursements	Assets	Liabilities	Surplus (or Deficit)
Second Injury (Special Disability) Fund:					
1936	$122,516.95	$97,967.58	$992,167.30	$1,852,781.95	$ —860,614.65
1935	121,508.87	96,260.13	970,592.56	***	***
1934	127,806.05	92,744.70	952,110.82	***	***
1933	129,547.76	81,896.64	926,101.54	***	***
1932	151,719.14	75,270.85	882,698.92	***	***
Reopened Case Fund:					
1936	$ 47,058.29	$99,433.51	$201,702.88	$2,785,099.00	$—2,583,396.12
1935	46,487.77	71,706.37	249,351.95	***	***
1934	34,856.41	17,930.96	274,353.93	***	***
1933	257,787.49	0.00	257,787.49	***	***

The 1933 income of Reopened Case Fund includes $250,000.00 received from the Vocational Rehabilitation Fund.

VOCATIONAL REHABILITATION FUND

(Principally from Report of Assistant State Accounts Auditor)

Year Ended June 30th	*Income	**Disbursements	Assets	Liabilities	Surplus (or deficit)
1936	$108,389.72	$136,579.97	$746,366.46	$250,000.00	$496,366.46
1935	115,829.82	129,032.89	***	***	***
1934	122,695.24	132,562.63	***	***	***
1933	131,199.72	93,796.58 (a)	***	***	***
1932	183,025.91	93,945.22	***	***	***

(a) Excludes $250,000.00 transferred to Reopened Case Fund.
* Excludes proceeds of bonds sold or redeemed.
** Excludes amounts paid for investments.
*** Figure is not now available.

Proposed Law Amendments Affecting the Second Injury, Reopened Case and Vocational Rehabilitation Funds

With reference to the Second Injury and Reopened Case Funds, it appears to be generally agreed at the present time that there is need for a concerted effort for common defense of claims against these special funds in view of the fact that at the present time most of the claims against these special funds probably are not properly defended. Since the financial motive for defending cases against these special funds is lacking, it appears that not many carriers make a proper defense of the cases, while others make only lukewarm efforts and some carriers make no efforts at all to defend cases against the funds. In fact there are cases where it is to the advantage of the carrier to favor an award against a special fund.

In view of this situation, steps have been taken looking towards the appointment of a common defender who would handle the cases against the Second Injury and Reopened Case Funds. The assessment for financing the work of the common defender would be pro-rated among the insurance carriers including self-insurers on the basis of the method now employed by the New York State Department of Labor in assessing the cost of administering the Workmen's Compensation Law.

At the last session of the New York State Legislature, a conference committee of the compensation insurance carriers proposed amendments to the Compensation Law which would:

(a) Reduce the contribution to the Vocational Rehabilitation Fund from $500 to $200 in each no dependency death case award;
(b) Combine the Second Injury and Reopened Case Funds and increase the combined contributions from $800 to $1,100;
(c) Provide for an examination of the combined funds at least once in five years by the Superintendent of Insurance.

The bill provided further that in each no dependency death case where the amount of the compensation awarded is less than $1,100, the employer, or if insured, his insurance carrier, shall pay into the combined Second Injury and Reopened Case Funds the difference between the amount of compensation awarded and the sum of $1,100. The bill also provided for the elimination of the requirement for the payment of administrative expenses out of the Vocational Rehabilitation Fund.

AGGREGATE TRUST FUND

(Section 27 of the Compensation Law)

The Aggregate Trust Fund was created by the provisions of Section 27 which was a part of the original Compensation Law effective July 1, 1914. This section provides that the Industrial Board may, in its discretion, at any time, compute and permit, or require to be paid into the Aggregate Trust Fund an amount equal to the present value of all unpaid death benefits or other compensation in cases in which awards are made for permanent total or permanent partial disability for a period of 104 weeks or more, for which liability exists, together with such additional sum as the Industrial Board may deem necessary for a proportionate payment of expenses of administrating the Aggregate Trust Fund.

Section 27 of the Compensation Law was amended by Chapter 255, Laws of 1935, so as to require that stock and mutual companies shall pay into the Aggregate Trust Fund the present value of all awards made on or after July 1, 1935 for death benefits and for total permanent disability resulting from the loss of both hands, or both arms, or both feet, or both legs, or both eyes, or of any two thereof, or for permanent partial disability resulting from the loss of an arm, leg, hand, foot or eye.

Section 27 provides that all computations shall be upon the basis of the Survivorship Annuitants' Table of Mortality, the Remarriage Tables of the Dutch Royal Insurance Institution and interest at 3½% per annum.

The law provides that the Aggregate Trust Fund shall be kept separate and apart from all other moneys of the State Insurance Fund and shall not be liable for any losses or expenses of administration of the State Insurance Fund other than the expenses involved in the administration of the Aggregate Trust Fund.

The law also provides that the State Insurance Fund shall not be charged with the losses or expenses of the Aggregate Trust Fund beyond the amount of such special fund.

In a recent court decision it has been held that the State Insurance Fund is simply the custodian of the funds paid into the Aggregate Trust Fund. (See decision of the State of New York Appellate Division, Third Department, In the Matter of the

Claim of Mr. John Pocoroba, dependent father, and Mrs. Josephine Pocoroba, dependent mother, for compensation under the Workmen's Compensation Law, on account of the death of Pauline Pocoroba, claimant, against State Insurance Fund, Aggregate Trust Fund, defendants, reported in the March 23, 1938 Workmen's Compensation Reports, Volume 22, No. 4).

The above decision contains the following statements:

> "The state fund has no control over the amounts of awards; as custodian, its only duty is to pay over from the funds in its hand the awards directed by the board to be paid.
>
> "Our conclusion is that in a proper case the board has power to order and direct payment from the state fund, irrespective of any objection to such procedure on the part of such fund."

The assets of the Aggregate Trust Fund are invested by the Industrial Commissioner with the approval of the Superintendent of Insurance in the same securities as provided for the investments of the State Insurance Fund. Section 93 of the Compensation Law provides that the assets of the State Insurance Fund may be invested by order of the Industrial Commissioner approved by the Superintendent of Insurance in securities in which a savings bank may invest the moneys deposited therein as provided in Subdivisions 1, 2, 3, 4, 5 and 6 of Section 239 of the New York Banking Law.

The administrative charge added to awards paid into the Aggregate Trust Fund is 3% of the commuted values of the benefits as provided in the following rule adopted by the Industrial Board on January 4, 1928:

> "23. Administrative Charge in Aggregate Trust Fund Computations.
>
> "RESOLVED, that in the commutation of any award under Section 27 of the Workmen's Compensation Law for payment into the Aggregate Trust Fund, the actuary shall add only three per cent of the present value for administrative expenses, this charge being deemed necessary and sufficient by the Industrial Board to cover the State Insurance Fund cost of administering the Aggregate Trust Fund."

The Aggregate Trust Fund always had a surplus until the year 1937. See Table H.

TABLE H

FINANCIAL SUMMARY (ON REVENUE BASIS) OF AGGREGATE TRUST FUND

Year Ended Dec. 31st	Income	Expenditures	Assets	Liabilities	Surplus (or Deficit)
1937	$3,014,090	$3,113,813	$5,794,568	$5,837,863	$—43,295
1936	2,796,207	2,803,634	3,370,115	3,313,687	56,428
1935	359,655	352,912	863,359	799,504	63,855
1934	60,404	54,178	570,531	513,419	57,112
1933	90,827	81,332	594,463	543,577	50,886
1932	90,424	81,363	568,243	526,851	41,392
1931	151,738	149,597	549,469	505,658	43,811

The small deficit ($43,295.31) in the Aggregate Trust Fund as of December 31, 1937 has resulted from the fact that the interest earned on the large amounts of funds which have been deposited in this special fund during the last two or three years has averaged less than the 3½% assumed in calculating the present values of awards. See Table I.

TABLE I

EXCESS (OR DEFICIENCY) IN INTEREST EARNINGS OF THE AGGREGATE TRUST FUND

Calendar Year	Interest Earned	Interest Required to Maintain Reserve	Excess Interest Earnings (Deficiency Indicated by Minus Sign)	Increase in Surplus (Decrease Indicated by Minus Sign)
1937	$109,347	$155,441	$—46,094	$—99,724
1936	49,497	69,864	—20,367	—7,427
1935	24,012	22,302	1,710	6,743
1934	24,608	17,955	6,653	6,227
1933	24,067	18,183	5,884	9,494
1932	23,479	17,495	5,984	—2,420
1931	22,086	15,482	6,604	1,132

It is quite possible that the deficiency in interest earnings on investments of the Aggregate Trust Fund may be offset in part at least in the future by favorable remarriage and mortality experience. If the investment situation should improve as respects interest yields on high grade investments, the deficiency in interest earnings might be gradually eliminated or turned into an excess of interest earnings over the amount of interest required to maintain reserve.

Inasmuch as the only sources of income of the Aggregate Trust Fund are the awards deposited by carriers and interest earnings, it is clearly evident that the deficit in the Aggregate Trust Fund can be overcome only by increasing the amount of the awards or by higher investment yields.

Several suggestions for amending Section 27 were made prior to the time when the deficit actually accrued and also prior to the time when Section 27 was amended in 1935 inasmuch as it was anticipated by the custodian of the Aggregate Trust Fund that the interest earnings would not equal the interest required to maintain reserve.

One of the suggestions which has been made is that the rate of interest assumed in calculating the present values of death and permanent disability benefits be reduced from 3½% to 3% or even 2½%. One of the principal difficulties with this suggestion is that it would require the calculation of an entirely new set of tables corresponding to the tables now printed in Special Bulletin No. 190 of the New York State Department of Labor. Furthermore, the investment situation possibly, though not likely, may change materially within the next several years.

Another suggestion which has been made is that a small loading be added to the awards paid into the Aggregate Trust Fund, such loading to be collected as long as may be necessary to insure the solvency of the Aggregate Trust Fund.

General Conclusions

The financial condition of the various special funds is a matter of serious concern to the compensation insurance carriers inasmuch as they are likely to be called upon for additional contributions to at least two of the special funds.

Second Injury Fund: Although the present $500 contribution to this fund in each no dependency death case award appears to be approximately sufficient to cover the current losses of this special fund, there is nevertheless an indicated deficit, amounting to $860,614.65 as of December 31, 1936, which must be taken into consideration.

Reopened Case Fund: The present contribution of $300 to the Reopened Case Fund in each no dependency death case award appears to be grossly insufficient to cover even the current losses of this special fund. In addition, there is an indicated deficit, amounting to $2,583,396.12 as of December 31, 1936, which must be taken into consideration.

The proposal made by a conference committee of the compensation insurance carriers to amend the Compensation Law so as to decrease the contribution to the Vocational Rehabilitation Fund in each no dependency death case award from $500 to $200 and to increase the combined contributions to the Second Injury and Reopened Case Funds in each no dependency death case award from $800 to $1,100 would no doubt improve the situation. A further improvement in the situation could be effected by better defense of claims against the Second Injury and Reopened Case Funds along the lines hereinabove discussed. While these proposals constitute a good beginning it is doubtful whether they will solve completely the problem created by deficits in the Second Injury and Reopened Case Funds. It is probable that additional steps will be required in the future.

Vocational Rehabilitation Fund: This fund is in a flourishing financial condition with assets of $746,366.46 as of June 30, 1936 and apparently no liabilities aside from the $50,000 a year for five years for the study of dust and other occupational diseases. The $500 contribution to the Vocational Rehabilitation Fund in each no dependency death case award appears to be far more than sufficient to cover the current needs of this special fund. In addition to the $250,000.00 which has been or will be transferred from the Vocational Rehabilitation Fund for the study of dust and other occupational diseases, $250,000.00 was transferred in 1933 from this special fund to the Reopened Case Fund. Even if the contribution to the Vocational Rehabilitation Fund in each no dependency death case award should be reduced to $200, it would still appear to be sufficient to meet the needs of this special fund under its present methods of operation.

The problems with respect to the Vocational Rehabilitation Fund are as follows:

(a) Should the work of rehabilitating injured employees be extended?

(b) Should the contributions to this special fund in each no dependency death case award be reduced?
(c) Should the surplus of this special fund be used for other purposes?

Aggregate Trust Fund: The interest earnings on investments of the Aggregate Trust Fund have been insufficient to equal the interest required to maintain reserve. This has resulted in a small deficit in the Aggregate Trust Fund as of December 31, 1937, whereas in each of the previous years the fund had a surplus. While this deficit has not yet assumed large proportions it would seem to be advisable to correct the situation before serious harm is done. This situation could be remedied easily by providing for a small additional loading on the awards paid into the Aggregate Trust Fund for as long as may be necessary to overcome the deficit.

It is hoped that the interest which has been aroused in the special funds under the New York Workmen's Compensation Law will result in measures which will improve the financial condition of these special funds.

GRADUATION OF AN AMERICAN REMARRIAGE TABLE FOR JOINT LIFE ANNUITIES

BY

EDWARD OLIFIERS

Messrs. Roeber and Marshall, in a paper entitled "An American Remarriage Table," printed in the *Proceedings*, Vol. XIX, p. 279, stated that a number of methods of graduating the average rates of the table referred to were tried including one of the two mentioned in my paper T.A.S., Vol. XXXI, p. 223, entitled "Graduation of Marriage and Remarriage Table by Mathematical Formulas." No mention was made, however, to the other formula used in the graduation of the Dutch remarriage table which is but one particular case of exponential curves which might be used for the graduation of similar tables.

The object of this paper is to draw attention:

(a) to the following exponential curves:

$$\text{Colog}\,(1-r'_x) = -\triangle log(1+\beta_1 s_1{}^x w^{x^2} g_1^{x^3}) \qquad (1)$$

$$\text{and Colog}\,(1-r'_x) = -\triangle log(1+\beta_1 s_1{}^x w^{x^2} v^{x^3}) \qquad (2)$$

and an application of these formulas to the graduation of the American remarriage probabilities which will establish values of joint life annuities, allowance for remarriage being made on one life.

(b) to the advantage of disposing of ungraduated rates of remarriage in addition to the probabilities of remarriage when, as is generally the case, the rates of mortality by another experience are to be used (see Appendix I).

Graduation of an American Remarriage Table Using Formula (1)

The values of β_1, s_1, w and g_1 of this formula were found from the ungraduated values of colog $(1-r'_x)$ (see column 1 of Appendix 2) which, summed from the bottom upwards, i.e., from the older to the younger ages, give:

$$\Sigma\,\text{colog}\,(1-r'_x) = \log\,(1+\beta_1 s_1{}^x w^{x^2} g_1^{x^3}) + C$$

(see column 2 of Appendix 2).

Equalling the logarithms of the antilog of these sums minus one (see column 3 of Appendix 2) to

$$\log \beta_1 + x \log s_1 + x^2 \log w + c^x \log g_1,$$

(where c^x has the values used in the graduation of the American Experience table), summing both members of these equalities for groups of ages 18-31, 32-45, 46-59, 60-73 and solving those equations, the following values were found for the constants $\log \beta_1 = 2.0254$, $\log s_1 = -.090730$, $\log w = .00072815$ and $\log g_1 = -.00078428$.

From these constants $\log (\beta_1 s_1^x w^{x^2} g_1^{c^x})$ were found by a continuous process, computing the third differences from

$$\log (-\Delta^3 f(x)) = x \log c + 3 \log (c - 1) + \log (-\log g_1)$$

(the latter being computed for all ages by a continuous addition of $\log c$), the second differences $2 \log w + c^x (c - 1)^2 \log g_1$ from the third differences and the first differences $\log s_1 + (2x + 1) \log w + c^x (c - 1) \log g_1$, from the second. The initial value of age 18 was computed, using the formula $\log (\beta_1 s_1^x w^{x^2} g_1^{c^x})$ as well as the checking values at ten years intervals of ages by a five decimal places logarithm table.

From formula (1) may be seen the other operations necessary to be performed to find r'_x, given in Appendix 3, column (3), as well as the deviations (ungraduated minus graduated values, giving weight to number of observations) and the accumulated deviations. In the first column of Appendix 3 are given the ungraduated remarriage probabilities. In the second column, the graduated probabilities obtained by the parabolic formula used by Messrs. Roeber and Marshall as well as the deviations and accumulated deviations. It may be seen that although the deviations for both the parabolic and exponential curves have the same signs for most ages, the accumulated deviations for the exponential curve show a tendency to be negative, having that sign from ages 51 onwards.

Diminishing the value of $\log \beta_1$, it is to be expected that the graduated probabilities will be decreased in greater degree at the younger ages than at older. To determine this decrement the differences were calculated between $\log (\beta_1 s_1^x w^{x^2} g_1^{c^x})$ and their corresponding ungraduated values given in Appendix 2, column 3 up to age 60. Twenty-five of those 43 differences proved to have

the positive sign and their mean was found to be .00638. The new graduated probabilities found by thus reducing $\log \beta_1$ are given in column 4 entitled "exponential graduation $\log \beta_1 = 2.01902$ together with the deviations and accumulated deviations. It may be seen that the effect of diminishing $\log \beta_1$ is to change the signs of the accumulated deviations showing now a tendency to be positive being although positive from ages 41 onwards. If now instead of deducting .00638 we deduct say two-thirds of this number (.00425), the correct values found by formula (1) for the probabilities as well as the deviations and their accumulation will be approximately equal to those found by a linear interpretation taking one-third of the values obtained using $\log \beta_1 = 2.0254$ and two-thirds of the values obtained using $\log \beta_1 = 2.01902$. It thus appears that the accumulated deviations will be negative for the groups of ages 21-27, 38-41 and 57-64, whereas by the parabolic curve the accumulated deviations are negative for the groups of ages 20-26, 38-47 and 51-59 as can be seen from Appendix 3.

An interesting feature of these exponential formulas is that a change in value of $\log \beta_1$ does not affect the signs of the deviations as much as the signs of the accumulated deviations.

Joint Life Annuities with Allowance for Remarriage

Using formula (1) above, the logarithm of the probability that a person of age x will be alive at the end of one year and will not have contracted remarriage during that year of age is,

$$\log p_x + \log (1 - r'_x) = \log p_x + \Delta \log (1 + \beta_1 s_1{}^x w^{x^2} g_1{}^{c^x}),$$

and thus $p_x \dfrac{1 + \beta_1 s_1{}^{x+1} w^{(x+1)^2} g_1{}^{c^{x+1}}}{1 + \beta_1 s_1{}^x w^{x^2} g_1{}^{c^x}}$ denotes the probability that a person of age x will be alive at the end of one year and will not have contracted remarriage during that year of age. The probability that a person of age x will be alive after t years and will not have remarried during that time is thus:

$${}_tp_x \frac{1 + \beta_1 s_1{}^{x+t} w^{(x+t)^2} g_1{}^{c^{x+t}}}{1 + \beta_1 s_1{}^x w^{x^2} g_1{}^{c^x}}$$

The probability that two persons of age x and y will be alive after t years and that x will not have remarried during that time is thus:

$$ {}_tp_{xy} \frac{1+\beta_1 s_1{}^{x+t} w^{(x+t)^2} g_1{}^{c^{x+t}}}{1+\beta_1 s_1{}^x w^{x^2} g_1{}^{c^x}} $$

Taking into account the element of interest we have the following formula for the value of an annuity payable during the joint life of x and y and until remarriage of x, when the mortality table follows Makeham's law:

$$ \frac{1}{1+\beta_1 s_1{}^x w^{x^2} g_1{}^{c^x}} \Sigma v^t {}_tp_{xy} + \frac{\beta_1 s_1{}^x w^{x^2} g_1{}^{c^x}}{1+\beta_1 s_1{}^x w^{x^2} g_1{}^{c^x}} \Sigma v^t {}_tp_{xy} s_1^t w^{2xt+t^2} g_1{}^{c^x\binom{t}{c-1}} $$

t varying from one to w. These limits have not been inserted hereafter, it being understood that they are implied.

Putting in the above expression

$$ \frac{1}{1+\beta_1 s_1{}^x w^{x^2} g_1{}^{c^x}} = \phi(x), \quad {}_tp_{xy} = s^{2t} g^{(c^x+c^y)\binom{t}{c-1}} $$

and $\log g_1 g = c^n \log g$, we have

$$ \phi(x) \Sigma v^t {}_tp_{xy} + (1-\phi(x)) \Sigma v^t (ss_1)^t s^t w^{2xt+t^2} g^{(c^{x+n}+c^y)\binom{t}{c-1}} \qquad (1a) $$

The value of the second factor of the first term of (1a) may be found from equal ages annuity tables. As far as the second factor of the second term of (1a) is concerned we may also find its value from equal ages annuity tables calculated at varying rates of interest. Indeed, expressing the second factor of the above expression in terms of equal ages determined by the formula $c^{x+n} + c^y = c^{z+n} + c^z$ and multiplying and dividing by w^{2zt}, we have,

$$ a_{zz}^{(r)} = \Sigma \left(\frac{w^{2(x-z)}}{1+\iota}\right)^t (ss_1)^t s^t w^{2zt+t^2} g^{c^z\binom{n}{c}+1)\binom{t}{c-1}} = \Sigma v^t {}_tp_{zz}^{(r)} = \Sigma \frac{D_{z+t}^{(r)}}{D_{zz}^{(r)}} $$

$$ = \Sigma \frac{D_{z+t}^{(r)}}{D_z^{(r)}} \frac{l_{z+t}}{l_z}, D_z^{(r)} = v^z l_z^{(r)}, v = \frac{1}{1+\iota'} = \frac{w^{2(x-z)}}{1+\iota} \text{ or } \iota' = \frac{1+\iota}{w^{2(x-z)}} - 1 \text{ and} $$

$$ l_z^{(r)} = k \beta_1 (ss_1)^z w^{z^2} (g_1 g)^{c^z} \qquad (1b) $$

Expressing formula (1a) in terms of equal ages annuity we have thus:

$$ \phi(x) a_{z_1 z_1} + (1-\phi(x)) a_{zz}^{(r)} $$

To find the values of the joint life annuities using formula (1b) one will need to tabulate the values of $\phi(x)$ and its complement and $a_{z_1 z_1}$ at a fixed rate of interest ι and $a_{zz}^{(r)}$ at the rates of interest $\iota' = \frac{1+\iota}{w^{2(x-z)}} - 1$, values of which must be tabulated as a function of $x - z$. Two uniform seniority tables must be given so as to find z_1 and z.

As an alternative to avoid the work to calculate $a_{zz}^{(r)}$ at the different rates of interest $\iota' = \frac{1+\iota}{w^{2(x-z)}} - 1$ one may expand $w^{2(x-z)t}$ in the second term below

$$\phi(x)\, a_{z_1 z_1} + (1-\phi(x))\, \Sigma \frac{D_{z+t}^{(r)}}{D_z^{(r)}} \frac{l_{z+t}}{l_z} w^{2(x-z)t}$$

putting $v = \frac{1}{1+\iota}$ in $D_z^{(r)} = v^z\, l_z^r$ we have thus

$$\phi(x) a_{z_1 z_1} + (1-\phi(x)) \left[a_{zz}^{(r)} + 2(x-z) \log w\, I a_{zz}^{(r)} + \frac{4(x-z)^2}{2!} \log^2 w\, I^2 a_{zz}^{(r)} \text{ etc.} \right] \quad (1c)$$

where $\log w$ must be calculated on Napieran basis

$$I a_{zz}^{(r)} = \Sigma t \frac{D_{z+t\ z+t}^{(r)}}{D_{zz}^{(r)}} = \frac{\int_{zz}^{(r)}}{D_{zz}^{(r)}} \; ; \; I^2 a_{zz}^{(r)} = \Sigma t^2 \frac{D_{z+t\ z+t}^{(r)}}{D_{zz}^{(r)}} = \frac{2\Sigma \int_{zz}^{(x)} - \int_{zz}^{(r)}}{D_{zz}^{(r)}}$$

and generally the expression for $I^{z+1} a_{zz}^{(r)}$ will be found in terms of

$$\Sigma^z \frac{\int_{zz}^{(r)}}{D_{zz}^{(r)}} \text{ since } \Sigma^z \int_{zz}^{(r)} = \Sigma \frac{t(t+1) \quad (t+x)}{\underline{|x+1}} D_{z+t\ z+t}^{(r)}$$

for example $I^3 a_{zz}^{(r)} = \dfrac{6\Sigma^2 \int_{zz}^{(r)} - 6\Sigma \int_{zz}^{(r)} + \int_{zz}^{(r)}}{D_{zz}^{(r)}}$

$$I^4 a_{zz}^{(r)} = \frac{24\Sigma^3 \int_{zz}^{(r)} - 36\Sigma^2 \int_{zz}^{(r)} + 14\Sigma \int_{zz}^{(r)} - \int_{zz}^{(r)}}{D_{zz}^{(r)}}$$

To find the values of the joint life annuities using formula (1c) one will need to tabulate besides the values of $\phi(x)$ and its complement, $a_{z_1 z_1}$ and $a_{zz}^{(r)}$ at a fixed rate of interest ι and two uniform seniority tables to find z_1 and z also $I a_{zz}^{(r)}$, $I^2 a_{zz}^{(r)}$, etc. and its coefficients as mentioned in (1c) values of which must be tabulated in a single entry table as a function of $x - z$.

Graduation Using Formula (2)

In formula (1) the factor $g_1 c^x$ is involved. The graduation of the American remarriage probabilities as explained above was made by giving to log c the same value as the one used in the American experience mortality table. The question arises whether this formula will suitably graduate that experience when the value of log c is changed to correspond to the one used in another mortality table graduated by Makeham's formula.

It is an observed fact that for most mortality tables graduated by Makeham's formula log c varies between .04 and .05 and one could, of course, find the graduated remarriage probabilities for the two extreme cases and thus see its influence on the other constants. A different process was, however, followed to obtain an indication as to whether log c has a great influence on the graduated remarriage probabilities. This process consists in substituting the factor $g_1 c^x$ for v^{x^3}. As a matter of fact, my first attempt to graduate the table referred to was to graduate applying the formula $\operatorname{colog}(1 - r'_x) = -\Delta \log (1 + \beta_1 s_1^x w^{x^2})$. The values of the constants were found by proceeding as mentioned above for formula (1) by solving three equations for the groups of ages 18-32, 33-47, 48-62 with the following results

$\log \beta_1 = 1.71895$, $\log s_1 = -.069167$ and $\log w = .00034775$.

The graduated probabilities gave values at ages 18-22 which were too low and otherwise did not bring out some of the features of the trend followed by the first and second differences of the ungraduated values of $\log [\log^{-1} \Sigma \operatorname{colog}(1 - r'_x) - 1]$ given in Appendix 2. We may see indeed that the tendency of the second differences is to decrease changing its sign from positive for the younger ages to negative for the older ages and thus give the shape to the first differences which are negatives throughout but go on increasing to a maximum. Formula (2) was, therefore, tested. The values of the constants were determined from four equations for groups of ages 18-28, 29-39, 40-50, 51-61 with the following results.

$\log \beta_1 = 2.260707$	$\log w = .0015529$
$\log s_1 = -.11511$	$\log v = -.0000099088.$

The graduated rates thus found were too great for the ages 18-22 and otherwise it was noted that the mean of the graduated proba-

bilities found by the two graduations were nearer to the ungraduated for most ages. Therefore the mean of the constants above found were used in formula (2), i.e., $\log \beta_1 = 1.989828$, $\log s_1 = -.0921385$, $\log w = .00095032$ and $\log v = -.0000049544$. These graduated probabilities were found from the values of $\log (\beta_1 s_1^x w^{x^2} v^{x^3})$ by computing the latter expressions by a continuous process, the third differences being equal to $6 \log v$, the second differences being equal to $2 \log w + 6 (x + 1) \log v$ and the first differences to $\log s_1 + (2x + 1) \log w + (3x^2 + 3x + 1) \log v$. The initial values for age 18 were computed with a five decimal place logarithm table, as were also the checking values, at intervals of ten years of age.

In the fifth column of Appendix 3 entitled $\log \beta_1 = 1.989828$ (formula 2) the graduated probabilities are given as well as the deviations and accumulated deviations. It may be seen that the accumulated deviations have a clear tendency to be positive. This tendency will be counteracted by increasing the value of $\log \beta_1$, this causing the graduated rates to become greater all through the table, more so, however, at the younger ages than at the older. To determine this increment the differences between $\log (\beta_1 s_1^x w^{x^2} v^{x^3})$ and their corresponding ungraduated values given in Appendix 2, column 3 up to age 60 were calculated and the mean of the negative differences (25 out of 43 proved to have that sign) was found to be .00697. The new graduated probabilities thus found are given in the sixth column of Appendix 3, in the column entitled exponential graduation $\log \beta_1 = 1.996798$ formula 2 as well as the deviations and accumulated deviations. It may be seen that the effect of increasing $\log \beta_1$ is to give to the accumulated deviations a tendency to be negative, as one would expect. By adding a fraction of .00697 we will obtain probabilities, deviations and their accumulations lying between those found, being approximately those found by a linear interpolation.

Joint Life Annuities with Allowance for Remarriage

Using formula (2) above, the logarithm of the probability that a person of age x will be alive at the end of one year and will not have contracted remarriage during that year of age is:

$$\log p_x + \log (1 - r'_x) = \log p_x + \Delta \log (1 + \beta_1 s_1^x w^{x^2} v^{x^3})$$

and thus $p_x \frac{1+\beta_1 s_1^{x+1} w^{(x+1)^2} v^{(x+1)^3}}{1+\beta_1 s_1^x w^{x^2} v^{x^3}}$ denotes the probability that a person of age x will be alive at the end of one year and will not have contracted remarriage during that year of age. The probability that a person of age x will be alive after t years and will have remarried during that time is thus:

$$ {}_tp_x \frac{1+\beta_1 s_1^{x+t} w^{(x+t)^2} v^{(x+t)^3}}{1+\beta_1 s_1^x w^{x^2} v^{x^3}} $$

The probability that two persons of age x and y will be alive after t years and that x will not have remarried during that time is thus:

$$ {}_tp_{xy} \frac{1+\beta_1 s_1^{x+t} w^{(x+t)^2} v^{(x+t)^3}}{1+\beta_1 s_1^x w^{x^2} v^{x^3}} $$

Taking into account the element of interest we have the following formula for the value of an annuity payable during the joint life of x and y and until remarriage of x, when the mortality table follows Makeham's law, t varying from 1 to the limit of the table

$$ \frac{1}{1+\beta_1 s_1^x w^{x^2} v^{x^3}} \Sigma v^t {}_tp_{xy} + \frac{\beta_1 s_1^x w^{x^2} v^{x^3}}{1+\beta_1 s_1^x w^{x^2} v^{x^3}} \Sigma v^t {}_tp_{xy} $$

$$ s_1^t w^{2xt+t^2} v^{3xt^2+3x^2t+t^3} $$

putting in the above expression

$$ \frac{1}{1+\beta_1 s_1^x w^{x^2} v^{x^3}} = \phi(x) \text{ and } {}_tp_{xy} = s^{2t} g^{(c^x+c^y)(c^t-1)} $$

$$ \text{we have } \phi(x) \Sigma v^t s^{2t} g^{(c^x+c^y)(c^t-1)} $$

$$ +(1-\phi(x)) \Sigma v^t (s s_1)^t s^t w^{2xt+t^2} v^{3xt^2+3x^2t+t^3} g^{(c^x+c^y)(c^t-1)} \quad (2a) $$

The value of the second factor of the first term of (2a) may be found from equal ages annuity tables since it has been assumed that the mortality table follows Makeham's law. As to the second factor of the second term of (2a) is concerned we may also find its value from equal ages annuity tables calculated at

varying rates of interest. Indeed, putting in (2a) $c^x + c^y = 2c^w$ and multiplying and dividing by $w^{2zt}\, v^{3zt^2+3z^2t}$, we have

$$\phi(x)\, a_{zz} + (1-\phi(x))\, \Sigma \frac{D^{(r)}_{z+t}}{D^{(r)}_z} \frac{l_{z+t}}{l_z}\, v^{3(x-z)t^2} \quad \ldots\ldots\ldots\ldots \quad (2b)$$

$$D^{(r)}_z = v^z\, l^{(r)}_z,\ v = \frac{1}{1+\iota} = \frac{w^{2(x-z)}\, v^{3(x^2-z^2)}}{1+\iota},\quad l^{(r)}_z = K\beta_1 (ss_1)^z w^{z^2}\, v^{z^3} g^{cz}$$

Expanding $v^{3(x-z)t^2}$ we have

$$\Sigma \frac{D^{(r)}_{z+t}}{D^{(r)}_z} \cdot \frac{l_{z+t}}{l_z} v^{3(x-z)t^2} = a^{(r)}_{zz} + 3(x-z)\log v\, I^2 a^{(r)}_{zz} + \frac{q(x-z)^2}{2!} (\log v)^2\, I^4 a^{(r)}_{zz} + \text{etc.}$$

log v being taken on Napierian basis.

To find the values of joint life annuities using formula (2b) one will need to tabulate the value of $\phi(x)$ and its complement, a_{zz} at a fixed rate i and $a^{(r)}_{zz}$, $I^2 a^{(r)}_{zz}$, $I^4 a^{(r)}_{zz}$ etc., at various rates of interest found from the formula $\iota' = \dfrac{1+\iota}{w^{2(x-z)}\, v^{3(x^2-z^2)}} - 1$

to be tabulated in a double entry in terms of x and z.

As an alternative, to avoid the work of having to tabulate the functions referred to at different rates of interest, instead of including the factor $w^{2(x-z)t}\, v^{3(x^2-z^2)t}$ in the interest factor v^t, we may expand it, so that (2b) becomes

$$\phi(x)\, a_{zz} + (1-\phi(x))\, \Sigma \frac{D^{(r)}_{z+t}}{D^{(r)}_z} \frac{l_{z+t}}{l_z}\, w^{2(x-z)t}\, v^{3(x-z)t^2+3(x^2-z^2)t}$$

$$D^{(r)}_z = v^z\, l^{(r)}_z,\ v = \frac{1}{1+\iota}$$

$$= \phi(x) a_{zz} + (1-\phi(x))[a^{(r)}_{zz} + {}_1K_{zz}\, I a^{(r)}_{zz} + \frac{{}_2K_{zz}}{2!} I^2 a^{(r)}_{zz} + \frac{{}_3K_{zz}}{3!} I^3 a^{(r)}_{zz} \quad (2c)$$

putting $f(x,z) = 2\log w + 3(x+z)\log v$, the logarithms being taken on Napierian basis

$${}_1K_{zz} = (x-z)\, f(x,z)$$

$$\frac{{}_2K_{zz}}{2!} = \frac{(x-z)^2}{2!}\{(f(x,z))^2 + 6(x-z)\log v\}$$

$$\frac{{}_3K_{zz}}{3!} = \frac{(x-z)^3}{3!}\{(f(x,z))^3 + 18(x-z)^2 \log v\, f(x,z)\}$$

and so on, values of which must be tabulated in a double entry table in terms of x and z.

In conclusion I wish to point out that it is not contended that the values obtained for the constants in formulas (1) and (2) would not be improved upon by giving weight to the observations. The method of finding their values above explained is simple and gave a good enough graduation to satisfy one of the objects of this paper as above mentioned.

It is also noteworthy that by the exponential formulas above mentioned the remarriage factor may be neglected from a certain age onwards as $\phi(x)$ approaches to one.

Appendix 1

To find the values of annuities with allowance for remarriage one has often to use the rates of mortality by one experience and either the rate of remarriage by another experience denoted by r_x or the probability of remarriage by another experience denoted by r'_x. Messrs. Roeber and Marshall in their paper, page 296 give the formula for the adjustments to be made in the rates of mortality. When joint life annuity values have to be found, the rates of mortality may be graduated by a mathematical formula whose property permits their values to be easily found from equal ages annuities as is the case for Makeham's formula or otherwise. It is, therefore, advisable, if possible, to avoid those adjustments. In my paper (T.A.S., Vol. XXXI, p. 223) is given the formula used for graduating the remarriage experience when dependent probabilities and when independent probabilities are dealt with. What was meant by dependent and independent probabilities may be expressed by the symbols used in Messrs. Roeber and Marshall's paper by colog $(p'_x - r'_x)$ — colog p'_x for dependent probabilities of death and remarriage and colog $(1-r_x)$ for independent probabilities (r_x is a notation I now use to denote rate of remarriage), q_x denoting the rate of mortality.

It is shown, hereafter, that for practical purpose one may express the relation between l'_{x+1} and l'_x in terms of factors of q_x and r_x and also of factors of q_x and r'_x. Be it first noted that the relation between r_x, the rate, and r'_x, the probability of remarriage, is:

$$r_x = \frac{m'_x}{l'_x - \frac{d'_x}{2}} = \frac{r'_x}{1 - \frac{q'_x}{2}}$$

In this relation the deaths unmarried are given half a year of exposure, as half a year of exposure was given to the number remarrying at age x in Messrs. Roeber and Marshall's paper in the relation:

$$q_x = \frac{d'_x}{l'_x - \frac{m'_x}{2}} = \frac{q'_x}{1 - \frac{r'_x}{2}}$$

By expressing in $l'_{x+1} = l'_x - m'_x - d'_x$, m'_x and d'_x in terms of $a|q_x\, l'_x$ and $r_x\, l'_x$ and of $(b)\,|q_x\, l'_x$ and $r'_x\, l'_x$ we have:

(a) using the relations $q_x = \dfrac{d'_x}{l'_x - \dfrac{m'_x}{2}}$ and $r_x = \dfrac{m'_x}{l'_x - \dfrac{d'_x}{2}}$ the following equalities hold:

$$l'_{x+1} = l'_x - m'_x - d'_x = l'_x \left[1 - \frac{r_x\left(1-\frac{q_x}{2}\right)}{1-\frac{r_x\, q_x}{4}} - \frac{q_x\left(1-\frac{r_x}{2}\right)}{1-\frac{r_x\, q_x}{4}} \right]$$

$$= l'_x \frac{(1-r_x)(1-q_x) - \frac{q_x\, r_x}{4}}{1-\frac{q_x\, r_x}{4}}$$

Thus $l'_{x+1} = l'_x - m'_x - d'_x$ is smaller than $l'_x\,(1-q_x)\,(1-r_x)$ by

$$l'_x \frac{q_x\, r_x}{4} \frac{1-(1-r_x)(1-q_x)}{1-\frac{q_x\, r_x}{4}}$$

(b) using the relations $q_x = \dfrac{d'_x}{l'_x - \dfrac{m'_x}{2}}$ and $r'_x = \dfrac{m'_x}{l'_x}$ the following equalities hold:

$$l'_{x+1} = l'_x - m'_x - d'_x = l'_x \left[1 - r'_x - q_x\left(1-\frac{r'_x}{2}\right) \right]$$

$$= l'_x \left[(1-q_x)(1-r'_x) - \frac{1}{2} q_x\, r'_x \right]$$

Thus $l'_{x+1} = l'_x - m'_x - d'_x$ is smaller than $l'_x\,(1-q_x)(1-r'_x)$ by $\dfrac{l'_x}{2}\, q_x\, r'_x$

It may thus be seen that to express the relation between l'_{x+1} and l'_x in terms of factors of q_x and r_x is so much nearer to the exact relation than by expressing that relations in terms of factors of q_x and r'_x. For age 18 $\dfrac{q_x\, r'_x}{2}$ is equal to .0004588 whilst $\dfrac{q_x\, r_x}{2} \dfrac{1-(1-r_x)(1-q_x)}{1-\frac{q_x\, r_x}{4}}$ is equal to .00002861 q_{18} being the rate by the American Experience table. For older age those values will be smaller.

APPENDIX 2

Age	(1) $colog\ (1-r_x^r)$	(2) $\Sigma\ colog\ (1-r_x^r)$	(3) $log\ (log^{-1}(x)-1)$	(4) Δ	(5) Δ^2	(6) Δ^3
18	.05443	.71292	0.61943	−.06859	.00410	.00183
19	.04949	.65849	0.55084	−.06447	.00593	−.00337
20	.04340	.60900	0.48635	−.05856	.00256	−.00058
21	.04005	.56560	0.42779	−.05600	.00198	−.00039
22	.03720	.52555	0.37179	−.05402	.00159	−.00242
23	.03470	.48835	0.31777	−.05243	−.00083	−.00256
24	.03376	.45365	0.26534	−.05326	−.00339	.00412
25	.03423	.41989	0.21208	−.05665	.00073	−.00127
26	.03203	.38566	0.15543	−.05592	−.00054	.00148
27	.03054	.35363	0.09951	−.05646	.00094	.00160
27	.02826	.32309	0.04305	−.05552	.00254	.00514
29	.02530	.29483	$\bar{1}$.98753	−.05298	.00768	−.00865
30	.02036	.26953	$\bar{1}$.93455	−.04530	−.00097	.00111
31	.01959	.24917	$\bar{1}$.88925	−.04627	.00014	.00188
32	.01836	.22958	$\bar{1}$.84298	−.04613	.00202	−.00096
33	.01646	.21122	$\bar{1}$.79685	−.04411	.00106	−.00419
34	.01507	.19476	$\bar{1}$.75274	−.04305	−.00313	.00832
35	.01511	.17969	$\bar{1}$.70969	−.04618	.00519	−.00182
36	.01251	.16458	$\bar{1}$.66351	−.04099	.00337	.00129
37	.01077	.15207	$\bar{1}$.62252	−.03762	.00466	−.00737
38	.00891	.14130	$\bar{1}$.58490	−.03296	−.00271	−.00048
39	.00908	.13239	$\bar{1}$.55194	−.03567	−.00319	.00302
40	.00931	.12331	$\bar{1}$.51627	−.03886	−.00017	−.00159
41	.00869	.11400	$\bar{1}$.47741	−.03903	−.00176	.00328
42	.00846	.10531	$\bar{1}$.43838	−.04079	.00152	−.00126
43	.00758	.09685	$\bar{1}$.39759	−.03927	.00026	.00635
44	.00700	.08927	$\bar{1}$.35832	−.03901	.00661	−.01046
45	.00542	.08227	$\bar{1}$.31931	−.03240	−.00385	.00003
46	.00568	.07685	$\bar{1}$.28691	−.03625	−.00382	.00590
47	.00581	.07117	$\bar{1}$.25066	−.04007	.00208	.00224
48	.00511	.06536	$\bar{1}$.21059	−.03799	.00432	−.00543
49	.00423	.06025	$\bar{1}$.17260	−.03367	−.00111	.00911
50	.00406	.05602	$\bar{1}$.13893	−.03478	.00800	−.01015
51	.00292	.05196	$\bar{1}$.10415	−.02678	−.00215	.00259
52	.00301	.04904	$\bar{1}$.07737	−.02893	.00044	−.00647
53	.00279	.04603	$\bar{1}$.04844	−.02849	−.00603	.01033
54	.00314	.04324	$\bar{1}$.01995	−.03452	.00430	−.01336
55	.00261	.04010	$\bar{2}$.98543	−.03022	−.00906	.01322
56	.00309	.03749	$\bar{2}$.95521	−.03928	.00416	−.00849
57	.00257	.03440	$\bar{2}$.91593	−.03512	−.00433	−.00240
58	.00270	.03183	$\bar{2}$.88081	−.03945	−.00673	.00436
59	.00283	.02913	$\bar{2}$.84136	−.04618	−.00237	.00930
60	.00270	.02630	$\bar{2}$.79518	−.04855	.00693	−.02588
61	.00213	.02360	$\bar{2}$.74663	−.04162	−.01895	.02054
62	.00274	.02147	$\bar{2}$.70501	−.06057	.00159	−.01352
63	.00231	.01873	$\bar{2}$.64444	−.05898	−.01193	−.00196
64	.00244	.01642	$\bar{2}$.58546	−.07091	−.01389	−.02143
65	.00244	.01398	$\bar{2}$.51455	−.08480	−.03532	.02479
66	.00279	.01154	$\bar{2}$.42975	−.12012	−.01053	−.01249
67	.00226	.00875	$\bar{2}$.30963	−.13065	−.02302	.05447
68	.00192	.00649	$\bar{2}$.17898	−.15367	.03145	.00722
69	.00109	.00457	$\bar{2}$.02531	−.12222	.03867	−.08446
70	.00061	.00348	$\bar{3}$.90309	−.08355	−.04579	−.05267
71	.00074	.00287	$\bar{3}$.81954	−.12934	−.09846	
72	.00087	.00213	$\bar{3}$.69020	−.22780		
73	.00126	.00126	$\bar{3}$.46240			

APPENDIX 3

(dev = ACTUAL MARRIAGES MINUS EXPECTED REMARRIAGES)

Age	(1) Ungrad. Remarriage Probab.	(2) Parabolic Graduation	Dev	Acc Dev	(3) Exp. Grad. (form 1) $\log \beta_1 =$ 2.0254	Dev	Acc Dev	(4) Exp. Grad. (form 1) $\log \beta_1 =$ 2.01902	Dev	Acc Dev	(5) Exp. Grad. (form 2) $\log \beta_1 =$ 1.989828	Dev	Acc Dev	(6) Exp. Grad. (form 2) $\log \beta_1 =$ 1.996798	Dev	Acc Dev
18	.1178	.1128	6.1	6.1	.1113	8.0	8.0	.1109	8.5	8.5	.1069	13.4	13.4	.1073	12.9	12.9
19	.1077	.1060	3.0	9.1	.1058	3.3	11.3	.1054	4.0	12.5	.1017	10.4	23.8	.1021	9.7	22.6
20	.0951	.0995	− 9.8	− 0.7	.1002	−11.4	− .1	.0999	−10.8	1.7	.0964	− 2.9	20.9	.0969	− 4.1	18.5
21	.0881	.0932	−13.7	−14.4	.0946	−17.5	−17.6	.0943	−16.7	−15.0	.0913	− 8.6	12.3	.0917	− 9.7	8.8
22	.0821	.0872	−16.3	−30.7	.0891	−22.4	−40.0	.0887	−21.1	−36.1	.0861	−12.8	− .5	.0865	−14.1	− 5.3
23	.0768	.0816	−17.4	−48.1	.0835	−24.3	−64.3	.0831	−22.8	−58.9	.0810	−15.2	−15.7	.0814	−16.7	−22.0
24	.0748	.0762	− 5.5	−53.6	.0781	−13.0	−77.3	.0777	−11.5	−70.4	.0759	− 4.4	−20.1	.0764	− 6.4	−28.4
25	.0758	.0710	19.6	−34.0	.0728	12.2	−65.1	.0724	13.8	−56.6	.0710	19.6	− .5	.0715	17.5	−10.9
26	.0711	.0661	21.9	−12.1	.0676	15.3	−49.8	.0672	17.1	−39.5	.0663	21.1	20.6	.0667	19.2	8.3
27	.0679	.0615	28.5	16.4	.0627	23.1	−26.7	.0622	25.2	−14.3	.0617	27.6	48.2	.0622	25.3	33.6
28	.0630	.0571	27.6	44.0	.0579	23.8	− 2.9	.0575	25.6	11.3	.0573	26.6	74.8	.0577	24.7	58.3
29	.0566	.0530	16.8	60.8	.0534	14.9	12.0	.0530	16.8	28.1	.0531	16.3	91.1	.0535	14.4	72.7
30	.0458	.0490	−16.0	44.8	.0490	−16.0	− 4.0	.0487	−14.5	13.6	.0491	−16.5	74.6	.0495	−18.5	54.2
31	.0441	.0453	− 6.0	38.8	.0451	− 5.1	− 9.1	.0447	− 3.1	10.5	.0454	− 6.5	68.1	.0458	− 8.1	46.1
32	.0414	.0419	− 2.5	36.3	.0414	0	− 9.1	.0410	2.0	12.5	.0418	− 2.1	66.0	.0422	− 4.1	42.0
33	.0372	.0386	− 7.2	29.1	.0378	− 3.1	−12.2	.0375	− 1.6	10.9	.0385	− 6.7	59.3	.0389	− 8.8	33.2
34	.0341	.0355	− 7.2	21.9	.0347	− 3.1	−15.3	.0343	− 1.1	9.8	.0355	− 7.2	52.1	.0357	− 8.2	25.0
35	.0342	.0327	7.5	29.4	.0316	12.9	− 2.4	.0313	14.4	24.2	.0326	8.0	60.1	.0330	5.9	30.9
36	.0284	.0300	− 8.3	21.1	.0289	− 2.6	− 5.0	.0286	− 1.1	23.1	.0299	− 7.8	52.3	.0302	− 9.3	21.6
37	.0245	.0275	−15.1	6.0	.0264	− 9.6	−14.6	.0262	− 8.6	14.5	.0275	−15.1	37.2	.0277	−16.2	5.4
38	.0203	.0252	−25.3	−19.3	.0242	−20.2	−34.8	.0238	−18.1	− 3.6	.0251	−24.9	12.3	.0255	−26.9	−21.5
39	.0207	.0231	−12.4	−31.7	.0221	− 7.3	−42.1	.0219	− 6.2	− 9.8	.0231	−12.4	− .1	.0234	−14.0	−35.5
40	.0212	.0211	0.5	−31.2	.0203	4.6	−37.5	.0200	6.2	− 3.6	.0212	0.0	− .1	.0215	− 1.6	−37.1
41	.0198	.0193	2.4	−28.8	.0185	6.3	−31.2	.0184	6.8	3.2	.0195	1.4	1.3	.0197	.4	−36.7
42	.0193	.0176	8.2	−20.6	.0171	10.6	−20.6	.0168	12.0	15.2	.0178	7.2	8.5	.0181	5.7	−31.0
43	.0173	.0161	5.4	−15.2	.0157	7.2	−13.4	.0155	8.1	23.3	.0164	4.1	12.6	.0166	3.1	−27.9
44	.0160	.0147	5.6	− 9.6	.0144	6.8	− 6.6	.0143	7.2	30.5	.0150	4.3	16.9	.0152	3.4	−24.5
45	.0124	.0134	− 4.0	−13.6	.0134	− 4.0	−10.6	.0132	− 3.2	27.3	.0138	− 5.5	11.4	.0140	− 6.4	−30.9

APPENDIX 3—(Continued)

(dev = ACTUAL REMARRIAGES MINUS EXPECTED REMARRIAGES)

Age	(1) Ungrad. Remarriage Probab.	(2) Parabolic Graduation	Dev	Acc Dev	(3) Exp. Grad. (form 1) $\log \beta_1 =$ 2.0254	Dev	Acc Dev	(4) Exp. Grad. (form 1) $\log \beta_1 =$ 2.01902	Dev	Acc Dev	(5) Exp. Grad. (form 2) $\log \beta_1 =$ 1.989828	Dev	Acc Dev	(6) Exp Grad. (form 2) $\log \beta_1 =$ 1.996798	Dev	Acc Dev
46	.0130	.0123	2.7	−10.9	.0124	2.3	− 8.3	.0122	3.1	30.4	.0127	1.2	12.6	.0129	.3	−30.6
47	.0133	.0113	7.8	− 3.1	.0115	7.0	− 1.3	.0114	7.4	37.8	.0117	6.2	18.8	.0119	5.4	−25.2
48	.0117	.0104	5.1	2.0	.0108	3.4	2.1	.0106	4.2	42.0	.0107	3.8	22.6	.0109	3.0	−22.2
49	.0097	.0095	0.8	2.8	.0100	− 1.2	.9	.0099	− .8	41.2	.0099	− .8	21.8	.0100	− 1.2	−23.4
50	.0093	.0088	2.0	4.8	.0095	− 0.9	0.	.0094	− .5	40.7	.0091	.8	22.6	.0093	− .1	−23.5
51	.0067	.0082	− 5.9	− 1.1	.0090	− 9.0	− 9.0	.0088	− 8.3	32.4	.0085	− 7.0	15.6	.0086	− 7.5	−31.0
52	.0069	.0077	− 3.0	− 4.1	.0085	− 6.1	−15.1	.0084	− 5.7	26.7	.0078	− 3.4	12.2	.0079	− 3.8	−34.8
53	.0064	.0072	− 2.8	− 6.9	.0081	− 5.9	−21.0	.0080	− 5.6	21.1	.0072	− 2.8	9.4	.0073	− 3.2	−38.0
54	.0072	.0068	1.3	− 5.6	.0077	− 1.8	−22.8	.0076	− 1.4	19.7	.0066	1.9	11.3	.0068	1.3	−36.7
55	.0060	.0065	− 1.6	− 7.2	.0075	− 4.8	−27.6	.0073	− 4.2	15.5	.0062	− .7	10.6	.0062	− .7	−37.4
56	.0071	.0062	2.5	− 4.7	.0071	0.	−27.6	.0071	.0	15.5	.0057	3.9	14.5	.0058	3.6	−33.8
57	.0059	.0059	0.	− 4.7	.0069	− 2.6	−30.2	.0068	− 2.4	13.1	.0053	1.5	16.0	.0054	1.2	−32.6
58	.0062	.0057	1.3	− 3.4	.0066	− 1.1	−31.3	.0065	− .9	12.2	.0049	3.3	19.3	.0050	3.0	−29.6
59	.0065	.0056	2.1	− 1.3	.0064	0.2	−31.1	.0062	.7	12.9	.0046	4.4	23.7	.0046	4.4	−25.2
60	.0062	.0055	1.5	.2	.0062	0.	−31.1	.0061	.2	13.1	.0042	4.1	27.8	.0043	3.9	−21.3
61	.0049	.0053	− 0.8	− .6	.0059	− 2.0	−33.1	.0058	− 1.8	11.3	.0040	1.8	29.6	.0040	1.8	−19.5
62	.0063	.0052	2.1	1.5	.0055	2.5	−30.6	.0055	2.5	13.8	.0037	5.0	34.6	.0038	4.7	−14.8
63	.0053	.0051	0.3	1.8	.0053	0.	−30.6	.0053	0.	13.8	.0035	2.7	37.3	.0035	2.7	−12.1
64	.0056	.0051	0.8	2.6	.0050	0.9	−29.7	.0049	1.0	14.8	.0032	3.5	40.8	.0033	3.3	− 8.8
65	.0056	.0050	0.8	3.4	.0046	1.3	−28.4	.0046	1.3	16.1	.0030	3.3	44.1	.0031	3.1	− 5.7
66	.0064	.0049	1.7	5.1	.0042	2.5	−25.9	.0042	2.5	18.6	.0028	4.0	48.1	.0029	3.9	− 1.8
67	.0052	.0047	0.5	5.6	.0038	1.3	−24.6	.0037	1.4	20.0	.0026	2.5	50.6	.0027	2.4	.6
68	.0044	.0046	− 0.1	5.5	.0033	1.0	−23.6	.0033	1.0	21.0	.0025	1.7	52.3	.0025	1.7	2.3
69	.0025	.0044	− 1.1	4.4	.0029	− 0.3	−23.9	.0028	− .2	20.8	.0023	.1	52.4	.0023	.1	2.4
70	.0014	.0041	− 1.9	2.5	.0024	− 0.7	−24.6	.0024	− .7	20.1	.0021	− .5	51.9	.0022	− .6	1.8
71	.0017	.0039	− 1.3	1.2	.0020	− 0.2	−24.8	.0020	− .2	19.9	.0020	− .2	51.7	.0021	− .3	1.5
72	.0020	.0035	0.7	1.9	.0016	.2	−24.6	.0015	.3	20.2	.0019	.1	51.8	.0019	.1	1.6
73	.0029	.0031														

THE RETROSPECTIVE RATING PLAN FOR WORKMEN'S COMPENSATION RISKS

BY

SYDNEY D. PINNEY

Surprising as it may seem to many, the idea of applying the retrospective rating principle to workmen's compensation risks dates back to the early history of workmen's compensation insurance. In the initial stages of development of rating technique there was considerable argument as to whether experience rating should apply on a prospective or retrospective basis. Thus, we find that in 1916, twenty years prior to the adoption of the Retrospective Rating Plan for application to compensation risks in Massachusetts, this subject was receiving the attention of our Society.* Many of the points which have been argued pro and con during the recent past were brought to light in these earlier discussions. Whereas the idea of incorporating the retrospective rating feature in the Experience Rating Plan was abandoned in favor of prospective rating, it was early recognized that there was considerable merit in this approach to the problem of establishing a more equitable premium for the individual large risk, where the exposure is sufficient to permit the absorption to a large degree of chance deviations in the experience.

Certain observations which were made during those early discussions of experience rating in 1916 are of interest. In commenting upon the distinction between prospective and retrospective rating, Mr. Woodward stated, "The actual result to the policyholder is quite different under the two systems, since under the prospective system the percentage of credit or debit derived from past experience is applied to a future premium. Since the payroll of the employer may fluctuate materially from period to period, especially in the case of contracting risks, it is obviously impossible

* See *Proceedings,* Vol. II, page 347, "Should the Compensation Premium Reflect the Experience of the Individual Risk", by Winfield W. Greene, and page 356, "The Experience Rating of Workmen's Compensation Risks", by Joseph H. Woodward.

Also see Vol. III, pages 54-75—Discussions by Messrs. Downey, Fellows, Senior, Michelbacher, Mowbray, Fondiller, Greene and Woodward.

to obtain results under a prospective system which are free from discrimination." Also, he observed, "In choosing between a prospective and retrospective plan, the language of the policy contract should be given careful consideration, and if a retrospective plan is to be adopted, it should be made certain that the debits will be legally collectible. Since the premium has to be adjusted at the end of the policy term for payroll audit, the retrospective system has the advantage of bringing the adjustment for experience generally coincident in time with the adjustment for payroll audit".

In citing objections to the retrospective rating idea Mr. Greene stated, "The very fairness of the modified plan would make it most unpopular. The experience of most employers affected by the new plan will undoubtedly exhibit a material fluctuation in compensation cost from one insurance period to another. . . . As far as the employer is concerned, the real demand for experience rating up to this time has arisen from a desire to get insurance at better than average cost. It is true that the new plan will permit the employer with a consistently favorable experience to still realize his ambitions in this regard. The employer whose experience is unfavorable will, on the other hand, find the cost of his insurance increased; and in my opinion, he will complain to such good effect that the carriers and supervising authorities alike will be most happy to discontinue the experience plan altogether".

Mr. Downey made the following observations: "It appears very doubtful whether any form of experience rating will make insurance attractive to an employer whose exposure is broad enough to give a dependable pure premium. No carrier can hope to serve such an employer as cheaply as he can serve himself. He has no motive to insure unless it be against catastrophe and experience rating is surely not applicable to catastrophes". Also, he stated, "If, then, the policy contains a definite agreement for experience rating and if the experience adjustment is made a part of the final settlement after audit, there would seem to be no special difficulty about collecting such increases as may fall due. . . . It (retrospective rating) offers the best possible incentive to accident prevention, for it starts each policy year with a clean slate and makes that year's rate to depend upon the experience actually realized therein. . . . Furthermore, accident experience, whether as a whole or in any particular establishment, fluc-

tuates with recurrent cycles of depression and prosperity. A cumulative prospective plan, accordingly, will yield premium decreases in a boom year following upon a period of depression and premium increases in a dull year following flush times—which is to say that such a plan will decrease premium income when losses are abnormally high and increase it when losses are abnormally low. A retrospective plan, on the contrary, will always reflect current experience, thereby introducing a much needed element of elasticity into premium income".

Mr. Fellows, under the caption "A Possible Alternative for Experience Rating", wrote the following: "As the handling of any commodity in wholesale quantities will permit of closer buying and selling, likewise we might advance the theory that some encouragement could be reasonably offered the large employer to insure by grading the expense loading of the rate in his case by the amount of payroll exposure or the total premium represented in his risk. It must be conceded that it costs no more to actually write a policy on a large risk than on a small one, likewise little, if any more, to keep the necessary office records of the risk (this would not apply so literally to claim, inspection or auditing expense). In some states commissions to brokers and agents are graded according to the size of the premium and it seems consistent that this item of saving in acquisition cost, as well as of the other detailed office administration expense, might reasonably be reflected in an individual rating".

Mr. Michelbacher stated, "Personally, I know of no experience rating plan which has attempted to apply this method (retrospective rating) to the rating of compensation risks. The reason for this is obvious. The general rule is that, to be effective, merit rates must be available to the agent when he solicits the business. This is particularly true of rates produced by the application of a plan which may either increase or decrease manual rates. . . . If the plan provides for credits only, there can be no argument against the retrospective method. But the fact that the manual contains average rates, which measure the cost of accidents for the average risk in the classification, renders it impossible at the present time to produce a workable plan based entirely upon credits".

The foregoing quotations have been selected in order to give a

general idea of previous discussions of this subject. With these earlier discussions forming a background we will now proceed with the development of the Retrospective Rating Plan for Workmen's Compensation Risks as it is now constituted.

As employers have become more familiar with the details of workmen's compensation insurance, particularly as respects the technique of claim settlement and accident prevention, there has been an increasing demand on the part of the larger risks for a reduction in the cost of insurance. Many employers have become self-insurers simply because they felt the insurance premium was too high in relation to the sum of incurred losses plus the cost of claim settlement and accident prevention. In addition to those employers who have already become self-insurers there are numerous other potential self-insurers as is evidenced by the shifting of risks from one carrier to another in the hope of securing a lower insurance cost. Undoubtedly, the depression period of 1930-1932 and the more recent business recession have brought into sharper focus the cost of compensation insurance along with all other costs.

As a result of this demand for bringing the insurance premium closer to the actual costs of the policy period, considerable thought has recently been given to modifying the Experience Rating Plan to make it more responsive to the trend of risk experience. However, it was early recognized that no plan of prospective rating can produce rates which will exactly fit the experience of the period covered by the policy to which such rates apply. Prospective rating determines rates for a given policy period by using the average experience of one or more preceding policy years. Therefore, it is evident that the rates thus produced reflect average conditions which obtained in the past. It will be merely coincidence if the experience of the period to which such rates are to be applied conforms exactly to the average of the past experience period.

Retrospective rating, on the other hand, utilizes the experience of the policy period and adjusts the premium for that period to reflect such experience. In other words, retrospective rating determines the premium for the risk after the loss experience for the policy period has been developed.

The principle of retrospective rating is suited to a line of insur-

ance such as workmen's compensation where accident frequency and accident severity may be measured within reasonable limits of expectancy, taking into consideration the industrial classification and the size of the individual risk. It is obvious that retrospective rating could be applied only to a limited extent in connection with a line of insurance where accident frequency and accident severity fluctuate greatly from one risk to another such as, for example, in the case of fire insurance. The size of the risk as measured in terms of units of exposure extended at average rates has an important bearing on this point.

There are various possible methods of applying the retrospective rating principle to the individual compensation risk. Stated generally, such variations depend upon the extent to which the actual incurred losses of the policy period are modified before inclusion in the rating formula and the manner in which the loading for expenses is applied. The plan which is described and discussed in this paper is the result of considerable study and experimentation to develop a method which would meet theoretical requirements and which would be regarded as practical by underwriters, producers and employers. The fundamental principle that the premium for the policy period should be proportionate to the incurred losses for such period was the foundation upon which the plan was constructed. Secondly, it was recognized that there should be some restriction placed upon the actual incurred losses in order to compensate for chance deviations in the risk experience. The third major consideration was that the provision for expenses should be incorporated in the plan on an equitable basis.

Outline of Plan

The Retrospective Rating Plan for Workmen's Compensation Risks was first approved for use in Massachusetts, effective May 1, 1936. At the present time (May 1, 1938) the Plan has become effective in twenty-five jurisdictions,* and consideration of the Plan by the supervising authorities is still pending in nine juris-

* Plan effective in Alabama, Connecticut, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Montana, Nebraska, New Mexico, New York, North Carolina, Oklahoma, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Alaska and District of Columbia.

dictions.† The Plan has been disapproved in seven states,—Colorado, Michigan, Minnesota, New Hampshire, Pennsylvania, Utah and Wisconsin.

The Plan issued by the National Council on Compensation Insurance applies in all jurisdictions with the exception of Massachusetts and New York—for which separate plans have been promulgated. As will be explained hereafter, the plans effective in Massachusetts and New York differ in certain details from the National Council Plan but the underlying principles and method of retrospective rating are in general accord with the National Council Plan. Furthermore, certain states subject to the National Council Plan require slight variations from the standard procedure which also will be explained later.

The Plan is relatively simple in principle and its method of application may be explained to an assured in an understandable manner. A brief outline of the essentials of the Plan will be given, followed by a more detailed explanation of the various elements involved.

1. The risk is initially written at the approved rates applicable in the jurisdiction in which its operations are located, the risk premium based upon such rates being referred to as the standard premium.
2. Subsequent to termination of the policy period, the risk premium is adjusted, within minimum and maximum limitations, by the retrospective rating formula on the basis of the earned standard premium and the actual incurred losses of the risk for the policy period.
3. The retrospective rating formula provides for the determination of two elements:
   (a) The basic premium which is expressed as a percentage of the standard premium and is designed to cover expenses that are independent of the risk loss experience and also includes an insurance charge covering the net cost due to introduction of the minimum and maximum premium limitations.
   (b) The losses incurred by the risk during the policy period plus the loading for claim expenses and taxes in connection therewith.

   The sum of these two elements is the adjusted retrospective premium subject to the specified minimum and maximum limitations.

† Consideration pending in Arizona, California, Georgia, Louisiana, Missouri, New Jersey, Texas, Virginia and Hawaii.

4. The basic premium, minimum premium and maximum premium for the risk are determined by reference to a table of rating values in which the percentages representing such values vary by size of risk.
5. The Plan is limited in application to risks which are expected to produce a standard premium of at least $5,000 during the policy period.
6. The application of the Plan is optional with the assured but must be elected at the inception of the policy period.
7. The Plan is superimposed upon the standard rating procedure and, regardless of whether the assured elects the retrospective rating basis of premium adjustment, the risk will continue to be subject to experience rating and/or schedule rating.
8. The Plan is applied on an interstate basis and the experience of the risk for all states subject to the Plan may be combined in determining the retrospective premium adjustment.
9. For a risk subject to retrospective rating commissions to producers are determined by application of the regular rates of commission to the minimum retrospective premium.
10. A preliminary determination of the retrospective premium is made not earlier than six months subsequent to the normal termination date of the policy period. Further premium adjustments are provided for at annual intervals subsequent to the preliminary determination, the third such premium adjustment being considered as final, unless exceptional treatment is indicated, in which case further adjustment may be permitted.
11. Special rules covering advance premium requirements, procedure in the event of cancelation, verification of risk data and risks involving multiple policies with varying expiration dates are included in the Plan.

Definition of Risk

The following definition of the term "Risk" is quoted from the Retrospective Rating Plan issued by the National Council on Compensation Insurance.

> The term "Risk" as used in this Plan shall mean and include the entire operations of any one assured which are covered by a single insurance carrier, subject to the following conditions:

(a) Although the Plan is applicable upon an interstate basis, it shall be optional with the assured, subject to acceptance by the Insurance Carrier, to elect or reject the Plan for any individual state, provided all of his operations (covered by one insurance policy) in such state are entirely included or excluded.

(b) For the purpose of this Plan, "Assured" shall mean
  (1) A single legal entity.
  (2) Two or more legal entities which are eligible for combination under the Rules of the Experience Rating Plan of the National Council on Compensation Insurance.

Further amplification of certain points in the above definition appears desirable. As respects the option which may be exercised by the assured to elect or reject the Plan for any individual state, it is to be understood that this applies only to states where the Plan is in effect on a basis which permits interstate combination of experience. The parenthetical clause "covered by one insurance policy" is intended to permit a further optional segregation within an individual state between operations which are to be subject to retrospective rating and those which are not. If an assured conducts two distinct enterprises insured under separate policies by the same carrier he may elect retrospective rating for one of such enterprises and not for the other. The qualifying clause "subject to acceptance by the insurance carrier" simply refers to the customary prerogative of the carrier to decline to underwrite the risk under any circumstances or any plan. This clause is not intended to give the carrier the right to refuse the benefit of the plan to a properly qualified risk which is acceptable to the carrier on the standard premium basis. In view of the apparent misunderstanding which seems to have arisen as to the intent of this clause, it could very well be eliminated from the above definition without in any way affecting the rights of the insurance carrier.

Treatment of Losses

As respects the treatment of losses, serious consideration was given to the question as to whether there should be a modification of the cost of individual claims, particularly as respects fatal

claims and those involving permanent or long term disabilities. A possible modification would be to substitute an average claim value for the actual claim cost, following a procedure similar to that utilized in the Experience Rating Plan. In the determination of average rates by the prospective rating method, the use of average values may be logically explained to an assured, but it was felt that, under the retrospective rating method, there would be considerable difficulty in this respect. Presumably, an employer would not object to the use of an average value in substitution for the actual claim cost if the actual cost exceeded the average value, but the situation might be quite different if the reverse condition obtained.

Another method of modifying actual claim cost would be to impose a maximum monetary limit on the amount of each claim to be included in the rating formula. Under such a procedure it would be necessary to set up an insurance charge to cover the average amount of losses eliminated from the rating formula by virtue of such limitation. This charge would vary in amount, becoming greater as the individual loss limit was reduced. Furthermore, due to the variations in the schedules of compensation benefits in effect in the various states, it is apparent that the use of any fixed claim limit would call for varying insurance charges by state. Conversely, the establishment of a fixed insurance charge would call for varying claim limitations by state. Moreover, if the limitation on claim cost were fixed at such a point as to require a fairly substantial insurance charge, it is evident that the retrospective premium might not follow the indications of the actual risk experience closely enough to permit a satisfactory explanation to the assured in many instances.

Since the retrospective premium calculation is designed to reflect the actual cost of claims incurred during the policy period it was decided that there should be as little modification of actual incurred losses as possible. Accordingly, losses have been included in the retrospective rating formula on an aggregate basis, using the actual incurred cost of individual claims but with the aggregate amount subject to minimum and maximum limitations for the individual risk. Consequently, the retrospective premium produced by the rating formula will be subject to minimum and maximum premium limitations. The loss provision underlying the

minimum retrospective premium serves as a limit on the extent to which unusually favorable risk experience will be reflected in the retrospective premium computation, and the loss provision underlying the maximum retrospective premium sets up a limit on the extent to which unfavorable risk experience will influence the result.

Insurance Charges

The establishment of such minimum and maximum loss limitations requires an insurance charge to reflect the net cost of losses which on the average are eliminated from the rating process. It is evident that the losses eliminated by the maximum loss limitation may be offset in varying degree by the reserve for losses provided by the minimum loss limitation, the net effect being dependent upon the points at which the minimum and maximum limits are established. For example, if the minimum loss limitation is pitched at such a low level that very few, if any, risks may be expected to produce a loss ratio below such minimum limitation, there would be no accumulation of reserves to offset the losses in excess of the maximum limitation. On the other hand, if the maximum limitation were placed at such a high level that there would be relatively few excess losses, the reserve produced by the minimum limitation might more than offset such excess losses.

The computation of the insurance charges has been based upon statistical data showing the ratio to total losses of losses in excess of specified loss ratios per risk. The experience of individual risks was compiled according to premium size groups for several of the more important compensation states. It was found that for similar size groups there was a remarkable consistency by state in the relation to total losses of losses in excess of the specified loss ratios. The method of computing the insurance charges is explained in detail in the attached Appendix.

Such insurance charges have been computed as percentages of the standard premium for the risk. Standard premium is defined as the premium produced by extending the units of exposure at the authorized rates established for the risk by the rating organization having jurisdiction. Such authorized rates are referred to as the standard rates for the risk and may be either manual rates,

or manual rates adjusted by schedule or experience rating as provided for in the standard rating procedure.

There is a definite correlation between the size of the risk, as measured by the standard premium, and the amount of the insurance charge. As a general rule, it may be stated that, for any given maximum loss ratio limitation, the proportion of total losses in excess of such loss ratio will decrease as the size of the risk increases and, conversely, will increase as the size of the risk decreases. Also, for any given minimum loss ratio limitation, the proportion of total losses represented by the reserve for losses, as measured by the difference between such minimum loss ratio limitation and the average loss ratio for risks producing loss ratios below such limit, will decrease as the size of the risk increases and, conversely, will increase as the size of the risk decreases.

Since the insurance charge takes into consideration the combined effect of the minimum and maximum loss limitations, it is important that, for any given combination of minimum and maximum loss limitations, the proportion of losses represented by the reserve for losses provided by the minimum loss limitation increases or decreases in the same direction as the proportion of losses eliminated by the maximum loss limitation. For any given size of risk the insurance charge may be reduced by increasing the minimum premium, or the maximum premium, or both; and, conversely, it may be increased by the reverse process. It is possible to establish minimum and maximum premium limits for any size of risk and to compute the insurance charge corresponding to such limits. However, it is evident that as the risk becomes smaller in size it becomes increasingly difficult to hold the insurance charge to a reasonably low amount without increasing the minimum and maximum premium limitations beyond the point at which there would be any incentive for the risk to avail itself of the retrospective rating method of premium determination.

Plan Applies to Risks of $5,000 Premium and Over

As a result of such considerations it was determined that the plan should apply only to risks producing for the policy period at least a $5,000 standard premium. The determination as to whether the risk is of sufficient size to qualify for retrospective rating is made in advance at the outset of the policy period. Therefore,

in connection with borderline cases the plan is made available provided that the standard premium to be developed by the risk is expected to be at least $5,000 and provided that the total audited standard premium of the risk, applicable to the latest year of the experience period, is at least $5,000 or the audited standard premium applicable to the first nine months of the current rating period is at least $4,000. However, it is further provided that if any risk, which does not meet the foregoing eligibility requirements, is expected to develop a standard premium of at least $5,000, a complete statement of facts supporting the request for approval of application of the Retrospective Rating Plan must be submitted to the rating organization having jurisdiction.

A risk which is written under the Plan for a given policy period will not be disqualified for such period if upon audit it produces an earned standard premium of less than $5,000. In such a case, the Plan provides that the rating values for a standard premium of $5,000 shall apply.

Range of Minimum and Maximum Premiums

Even for a $5,000 standard premium risk it was necessary to establish comparatively high minimum and maximum retrospective premiums in order to keep the insurance charge to a reasonably low amount. For this size risk the minimum retrospective premium was established at 75% of the standard premium and the maximum retrospective premium at 175%. Minimum premiums grade downward from 75% for a $5,000 risk to 50% for risks producing a standard premium of $75,000 or more. Maximum premiums grade downward from 175% for a $5,000 risk to 125% for risks producing a standard premium of $150,000 or more.

Provision for Expenses

The procedure followed in providing for expenses takes into consideration the manner in which such expenses are incurred. Certain expenses are logically assessed on the basis of the size of the risk as measured by the application of average rates to the units of payroll, whereas other expenses are more properly assessed in proportion to the actual incurred losses developed by the risk. Under the first classification come such expenses as

Home Office Administration, Inspection and Payroll Audit, whereas under the second should be included Claim Adjustment expense.

Acquisition cost is customarily assessed as a percentage of the insurance premium. Under the Retrospective Rating Plan the provision for acquisition cost was determined by applying the standard acquisition allowance to the minimum retrospective premium. This was considered justifiable on the grounds that the minimum premium, in effect, represents the real insurance premium for the risk. Retrospective premium charges above the minimum premium, up to the maximum premium, may be regarded as the employer's contribution for losses incurred in excess of the minimum loss provision. Justification for treating acquisition cost on this basis is further supported by analogy to the basis of acquisition allowance in connection with compensation policies written on an ex-medical basis and policies covering other lines of insurance written on a deductible loss basis. In each instance acquisition cost is not loaded on the losses which are assessed directly against the assured.

The loading for taxes follows the usual procedure of applying such loading to each element of the final risk premium.

Basic Premium

As a result of this approach to the problem of expense loading, those expense items which primarily are related to the size of the risk are included in the so-called basic premium which is expressed as a percentage of the standard premium. The insurance charge covering the net cost of losses eliminated on the average by the minimum and maximum limitations is also included in the basic premium.

Therefore, the basic premium includes the following items:

(a) Provision for general administration, inspection and payroll audit expenses.
(b) Provision for acquisition cost based upon the minimum premium.
(c) The insurance charge required by the net effect of the minimum and maximum premium limitations.
(d) A loading on the foregoing items to cover the payment of taxes.

As will be explained hereafter, it was necessary to set up uniform basic premium charges by size of risk for all states, although the various expense items included in the basic premium vary by state. Due to this requirement, there is a residual amount available in the basic premium in certain states which has been used for partial claim adjustment expenses. Furthermore, in order to produce uniform basic premium charges in all states there is also available a small balance for contingencies in most of the basic premium charges, particularly those established for risks in the lower premium brackets. The details underlying the computation of the basic premium charges are given in the attached Appendix.

The range of minimum and maximum premiums established for risks of various sizes requires insurance charges which, in combination with the expense items, determine basic premium charges which amount to 30% of standard premium for risks in the group from $5,000 to $25,000, and grade downward to 22.5% for risks producing a standard premium of $150,000 or more.

Loss Conversion Factors

Provision for claim adjustment expense is included in the loss conversion factor which applies as a multiplier to the incurred losses of the risk, and is based upon the provision for this item as specified in the expense loading underlying standard rates for the individual state. In certain cases, as previously explained, a portion of the claim expense has been included in the basic premium charge, thereby reducing the amount necessary for inclusion in the loss conversion factor. The insurance charge incorporated in the basic premium also includes a loading for claim adjustment expense on the losses covered by such insurance charge. In every case the combination of the amount included in the loss conversion factor plus the amount included in the basic premium is equivalent to the full provision for claim expense specified in the standard expense loading for the individual state. The loss conversion factor also includes the loading for taxes in accordance with the requirements of the individual state.

Insofar as consistent with the determination of other elements in the rating formula, the loss conversion factors have been com-

puted so as to take into consideration the practical requirement that the rating formula shall reproduce the standard premium if the risk loss ratio is equal to the standard permissible loss ratio for the state. Since the basic premium charge is at its maximum value of 30% for risks in the premium group $5,000 to $25,000, the first approximation of the indicated loss conversion factor is computed by dividing the remaining 70% by the standard permissible loss ratio for the state. For example, if the state permissible loss ratio is 62.5%, the indicated loss conversion factor is .70 divided by .625, which equals 1.12. Since the basic premium charge grades downward from 30% for risks above $25,000, it is evident that the loss conversion factor computed in this manner will produce a more favorable result premiumwise for risks above the $25,000 point. The use of this first approximation of the loss conversion factor as the final factor is possible in a number of states due to the margin available in the basic premium charges to absorb a portion of the claim adjustment expense. In certain other states, however, it has been necessary to increase this first approximation of the loss conversion factor in order to meet the necessary expense loading requirements. The details explaining the calculation of the loss conversion factors are covered in the attached Appendix.

Due to variations by state in the provision for claim adjustment expense and tax requirements, as well as in the permissible loss ratio, the resultant loss conversion factors also vary by state. The range in these factors is from 1.09, computed for Pennsylvania, to 1.25 for Tennessee, with the factors for the other states falling between these two values.

Tables of Rating Values

The basic premium, minimum premium and maximum premium charges have been set up as percentages of standard premium in a table of rating values which shows the corresponding charges for given standard premium amounts. The values which apply in the majority of states are given in Table 1. This table has been modified for certain states as will be discussed hereafter. There are shown in Table 2 the loss conversion factors which apply in the various states where the plan is now in effect, as well as the

corresponding factors for the remaining states where the plan has not yet been approved.

Optional Basis of Application

A distinctive feature of the Retrospective Rating Plan is the optional basis of application. At the inception of the policy period the assured is permitted to elect whether the premium for his risk shall be computed on the prospective basis at rates determined in advance and which are not subject to further adjustment, or whether the premium shall be subject to retrospective adjustment under the Plan. On the prospective basis, the losses incurred during the policy period will have no effect upon the premium for such period, whereas, on the retrospective basis, the losses incurred during the policy period are the governing factor in the premium computation.

The insurance carrier provides full coverage to the assured under either method of premium determination. However, the retrospective rating method determines the ultimate insurance cost on a basis which is closely analogous to the method followed in connection with forms of coverage where a portion of the losses are borne directly by the employer, such as in the case of ex-medical coverage and various forms of deductible and excess coverage. Such being the case, it is reasonable that the assured shall have the privilege of determining, at the outset of the policy period, which method of premium computation shall apply in his case, similar to the optional basis which applies in connection with such alternative forms of coverage.

The various elements included in the retrospective rating formula have been determined on a basis which will produce adequate and equitable premiums on the average and, in addition, will produce premiums for individual risks which more closely reflect the actual experience of the policy period. However, as is the case with any innovation, there will undoubtedly be certain employers who, for reasons such as unfamiliarity with the workings of the plan, innate conservatism, or satisfaction with existing insurance rating procedure, will prefer to elect a continuance of the application of prospective rates in computing the insurance premium. It is felt that it would be premature, at this stage of development,

to advocate compulsory application of the retrospective rating principle to every risk of sufficient size to qualify for treatment under the Plan.

Retention of Experience and Schedule Rating

As pointed out by Mr. Michelbacher in the early discussions of retrospective rating, it is necessary to have rates available to the producer when he solicits the business. Such rates quoted at the outset of the policy period should represent the closest estimate of the expected cost of the insurance for the ensuing policy period. Prospective rates determined by the Experience Rating Plan or by the Schedule Rating Plan in conjunction with the Experience Rating Plan meet this requirement. Under the retrospective rating procedure the prospective rates serve to determine the average premium level for the risk from which the retrospective rating adjustment will be made.

It is evident that the basic, minimum and maximum retrospective premiums must be related to some such premium representing the average hazard of the risk. The standard premium could be determined on the basis of manual rates rather than experience or schedule adjusted rates but, since such adjusted rates represent a closer approximation to the expected insurance cost, the use of these is to be preferred. Furthermore, the statistics used in the determination of the insurance charges have been based upon loss ratio experience compiled on the basis of adjusted rates rather than on the basis of manual rates. Another important consideration is that the provision for expenses included in the basic premium is expressed as a percentage of the standard premium. In view of the optional basis of application of retrospective rating, it is logical that the expenses which are related to the size of the risk should be based upon the same premium which would apply if the risk were to be written under the prospective rating method.

Furthermore, due to the optional feature, there must be available at the outset of the policy period the prospective experience or schedule adjusted rates which will govern in the event the assured does not elect the retrospective rating method of premium computation. Therefore, even though retrospective rating

is elected by the risk for a given policy period, the application of experience and schedule rating will also continue in effect for the purpose of determining prospective rates for application to future policy periods.

During the course of discussions relative to the Retrospective Rating Plan, question has been raised as to the reasonableness of superimposing the Plan upon experience adjusted rates. It has been contended that a risk producing unfavorable experience during a given year will not only be penalized for such experience under the Retrospective Rating Plan, but also, due to the inclusion of this experience in experience rating will again be penalized for the same losses. However, it is evident that if the risk continues to be subject to retrospective premium adjustment the occurrence of unfavorable experience will have but slight effect upon the retrospective premium for any policy year other than the one during which the loss was incurred. On the other hand, if the risk elects to discontinue the application of retrospective rating, it is logical that the prospective rates required for the renewal policy shall be based upon the average indications of the past experience. The logic of this is supported by analogy to the procedure followed in determining insurance rates for a risk which has previously been self-insured. In such a case, even though the previous losses have been paid in full by the risk, such losses are again taken into consideration in determining the proper average insurance rates to be charged for the future coverage. The risk is not paying twice for the same losses since there are actually two different periods of coverage involved.

Interstate Combination of Experience

The retrospective premium adjustment is computed on the basis of the combined experience for the risk as a whole, subject however to the provision that only such risk experience for a single policy period covered by the same carrier in states where the Plan is effective shall be so combined. The initial rates at which the risk is written in the individual states are established by recognized rating organizations in accordance with the standard rating procedure. The retrospective premium adjustment, therefore, is computed on the basis of the standard premium so determined and

upon the losses incurred under the policy, or policies, to which the standard premium applies. The premium adjustment, as computed and promulgated by the rating organization having jurisdiction, will be applied as an average modification to the standard premium for each individual state. Through this process a uniform method of premium determination will prevail from the time the coverage is written to the final computation of the retrospective premium.

Such interstate combination of experience is another feature in which the retrospective rating procedure differs from the prospective rating method. In the case of retrospective rating, the risk experience covered by a single carrier is used and the retrospective premium adjustment is purely an accounting process based upon known facts. This is materially different from interstate rating under the Experience Rating Plan, where it was often necessary to combine the experience under policies with varying expiration dates issued by different carriers and, furthermore, the adjusted rates for the individual states might produce premiums which would be inequitable, not only as respects the individual insurance carriers but also for the risk as a whole. The combination of experience under the Retrospective Rating Plan enables the insurance carrier to compute the proper premium charge for the entire operations of the assured on a practical and equitable basis.

The interstate combination of experience in determining the adjusted premium for the risk is a distinct advantage of the Retrospective Rating Plan. This is consistent with customary underwriting practice since an insurance carrier takes into consideration the total experience of a risk irrespective of state lines in determining whether or not the risk is acceptable. It is recognized that the argument for interstate rating could be applied with equal logic as respects the determination of rates on a prospective basis but the rating difficulties referred to above have made such a procedure impractical.

The application of the Plan on an interstate basis explains the necessity for setting up, insofar as possible, uniform rating values for the various states. For this reason, the basic premium, minimum premium and maximum premium charges, expressed as percentages of standard premium, have been established at the same values for specified amounts of standard premium for all states

with the exception of a slight variation in the basic premium charges established for New York which will be discussed hereafter. The establishment of these rating values on a uniform basis for all states permits application of such values to the standard premium of the risk, regardless of whether the standard premium is produced by the operations in a single state or in several states combined. The loss conversion factors vary by state but this does not introduce any practical difficulty since the losses are readily segregated by state and, after application of the respective state loss conversion factors, may be added together in producing the retrospective premium for the risk as a whole.

Rating Procedure

Expressed as a formula, the retrospective premium is determined as follows:

Basic Premium + Losses × Loss Conversion Factor = Retrospective Premium, subject to the Specified Minimum and Maximum Premiums.

The application of this formula in practice is accomplished in a relatively simple manner as respects the majority of risks which may be subject to the Plan. In connection with risks written on an ex-medical basis, the procedure is somewhat more complicated but not particularly difficult to understand.

It will be noted that the retrospective rating process does not determine adjusted rates since the retrospective premium may be computed directly by modifying the standard premium. It is apparent, however, that the same result could be obtained by applying the retrospective rating modification to the prospective rates initially applied in writing the policy or policies. Rates are but a means to the end of producing the risk premium and since the retrospective premium can be computed without the intermediate step of determining rates, this step is omitted. This comment is made in order to clarify the point that the Plan is properly designated as a rating plan.

The various steps in the rating procedure are summarized below in the order in which they are performed:

Risks Not Written on Ex-medical Basis

(1) The standard premium for the risk is determined on the basis of audited payrolls for the rating period extended at authorized standard rates.
(2) The basic premium, minimum premium and maximum premium are determined by reference to the table of rating values which shows the ratio of each such premium to the standard premium for the risk.
(3) The losses incurred by the risk during the rating period are determined. Actual incurred losses are used without limit and are shown separately for each state.
(4) The incurred losses are converted to a premium level by application of the appropriate loss conversion factors to the losses of each state.
(5) The converted losses are added to the basic premium.
(6) The sum thus produced is the retrospective premium subject to limitation by the minimum and maximum premiums previously determined.

Risks Written on Ex-medical Basis

(1) The standard premium for the risk is determined on the basis of ex-medical coverage and also for statutory medical coverage.
    (a) The ex-medical standard premium is determined on the basis of audited payrolls for the rating period extended at authorized ex-medical standard rates.
    (b) The statutory medical standard premium is determined by dividing the ex-medical standard premium by the complement of the ex-medical discount for the governing classification as determined at the inception of the policy period.
(2) The basic premium, minimum premium and maximum premium ratios are determined from the table of rating values upon the basis of the statutory medical standard premium.
(3) The basic premium is determined by application of the basic premium ratio to the statutory medical standard premium.
(4) The minimum and maximum premiums are determined by application of the minimum and maximum premium ratios respectively to the ex-medical standard premium.
(5) The losses incurred under ex-medical coverage during the rating period are determined. Actual incurred losses are used without limit and are shown separately for each state.

(6) The loss conversion factors for the respective states are adjusted to compensate for any deficiency in the expense loading resulting from application of the ex-medical discounts. Such adjusted loss conversion factors are obtained from the rating organization having jurisdiction. (The method of computation is outlined in detail in the attached Appendix.)
(7) The incurred losses are converted to a premium level by application of the adjusted loss conversion factors.
(8) The converted losses are added to the basic premium.
(9) The sum thus produced is the retrospective premium subject to limitation by the minimum and maximum premiums previously determined.

It should be understood that application of retrospective rating on an ex-medical basis is permitted only in states where risks may legally be written on an ex-medical basis. In the case of a risk involving operations in several states, the risk may be written on an ex-medical basis in certain states and on a statutory medical coverage basis in other states. In such a case the basic, minimum and maximum premiums are determined on the basis of the combined standard premiums for the risk as a whole, using the appropriate standard premium for the ex-medical portion of the risk in accordance with the procedure outlined above.

An example of the rating procedure is shown in Exhibit A.

Special Underwriting and Administrative Procedure

Rating Date

Since the Retrospective Rating Plan is designed for application to the experience of a risk for the normal twelve months policy period, it is necessary to provide for the establishment of a common experience period in the event the risk is covered by more than one policy with different expiration dates. In order to accomplish this it is provided that, if all the operations of the risk which are to be subject to the Plan are not included under a single policy, there shall be determined a rating date upon which the application of the Plan shall become effective. Such date shall be fixed by the rating organization having jurisdiction with due consideration to the effective dates of the several policies involved.

The Plan shall operate for the twelve months immediately fol-

lowing the rating date. All subject policies effective prior to the rating date shall be canceled as of such date and rewritten for the twelve month period. All subject policies effective subsequent to the rating date shall be written to expire concurrently with, or canceled as of the termination of, the retrospective rating endorsement.

Advance Premium Requirements

It was early recognized that the retrospective rating procedure must protect the interests of the insurance carrier by providing for the collection of premium in excess of the standard premium in the event the risk produces an unfavorable experience during the policy period. The retrospective premium endorsement specifies that additional premium shall be paid by the assured if the retrospective premium computation, made subsequent to the termination of the policy period, indicates the need of such additional premium. However, as a further safeguard it also provides for the payment of premium in addition to the standard premium during the term of the policy period. In the case of risks of unquestionable financial stability it can be argued that the collection of such additional premium during the policy period should not be required but, rather than leave this to the judgment of the carrier in individual cases, it was felt that a uniform procedure should apply to all risks subject to the Plan.

In setting up such advance premium requirements, however, it was also recognized that consideration should be given to the possibility that upon renewal under the Retrospective Rating Plan of a risk which had previously been subject to the Plan there might be a substantial amount of premium in excess of the standard premium which ultimately would be refunded in whole or in part to the assured. In such an event it would be difficult to justify an additional premium surcharge above the standard premium in connection with the renewal policy.

The advance premium requirements as recently amended for application in New York clearly indicate the intent of the rules which apply in other jurisdictions and are as follows:

> In addition to each payment of the deposit or audited standard premium, the assured shall pay to the insurance carrier a percentage of such standard premium which shall be

termed the retrospective premium surcharge. Such surcharge percentage shall be as follows:

(a) On a risk with a total estimated standard premium of $25,000 or less, one-half of the difference between the maximum retrospective premium percentage (as shown in column (3) of the table of rating values) and 100%.

(b) On a risk with a total estimated standard premium of more than $25,000 one-quarter of the difference between the maximum retrospective premium percentage (as shown in column (3) of the table of rating values) and 100%, unless the application of such percentage to the total estimated standard premium produces a retrospective premium surcharge of less than $5,000, in which case the surcharge percentage shall be that percentage of the total estimated standard premium which produces $5,000.

Upon the renewal under this Plan by the same insurance carrier of a policy subject to the Plan, if satisfactory evidence is provided by the insurance carrier that on the basis of actual incurred losses the retrospective premium surcharge received under the expiring policy is more than sufficient to cover the amount by which the indicated retrospective premium exceeds the standard premium, the Board may authorize the carrier to credit against the retrospective premium surcharge requirements of the renewal policy an amount not exceeding the unimpaired portion of the surcharge on the expiring policy. No such credit may be applied to any portion of the standard premium.

The Board shall have authority to ascertain if appropriate deposit premiums and surcharges have been billed to and paid by the assured.

Cancelation

It is also necessary to set up rules of procedure governing cancelation by the assured in order to prevent a possible adverse selection against the insurance carrier. For example, if an assured experienced heavy losses in the early part of the policy period and if the maximum retrospective premium were to be computed by application of the tabular maximum percentage indicated by the standard premium for such incomplete policy period, it might be to the advantage of the assured to cancel his policy and thereby reduce the premium in excess of the standard premium. Conversely, if the risk produced an unusually favorable

experience during the early part of the policy period and if the minimum retrospective premium were to be computed by applying the tabular minimum percentage indicated by the standard premium for such incomplete policy period, the assured might consider it to his advantage to cancel his policy and thereby earn the indicated premium reduction.

In order to preclude such possibilities, the following procedure has been established to apply in the event of cancelation by the assured:

1. The basic premium shall be determined by applying the appropriate tabular percentage to the short rate earned standard premium.
2. The minimum retrospective premium shall be equal to the short rate earned standard premium.
3. The maximum retrospective premium shall be determined by applying the appropriate tabular percentage to the standard premium extended on a pro rata basis for the full twelve months of the rating period.
4. The retrospective premium for the risk shall then be computed on the basis of these basic, minimum and maximum premiums.

It will be seen that the effect of this special procedure is to set up a minimum premium which is the same as the premium which would have been paid by the assured if the risk had been written on the standard prospective rating basis. Also, the maximum premium is based upon the estimated standard premium for the full twelve month period. Consequently, there is no advantage to the assured to effect cancelation in mid-term on account of either favorable or unfavorable loss developments.

For similar reasons, it is necessary to protect the assured against possible cancelation by the insurance carrier. This has been accomplished by providing that, in the event of cancelation by the insurance carrier, the retrospective premium shall be determined on the basis of the rating values indicated by the earned pro rata standard premium for the period the policy is in force.

The cancelation procedure has been amplified to cover the situation where the cancelation, either by the assured or the carrier, involves only a portion of the risk but the underlying principles governing the canceled portion of the risk are in accord with the above outlined procedure.

Dates of Premium Computation

The retrospective premium is determined subsequent to termination of the policy period based upon the losses incurred by the risk during such period. It is necessary to permit sufficient time to elapse after termination of the policy period in order to provide for the complete inclusion of all losses and for estimating the incurred cost of claims which have not been finally settled. Also, there must be time allowed for complete reporting of audited payrolls and the determination of the standard premium based thereon. For these reasons, therefore, the first computation of the retrospective premium is not made until six months after termination of the twelve month policy period. As provided for in the published Plan, the determination of the retrospective premium is based upon losses valued as of a date not earlier than eighteen months, nor later than twenty months, subsequent to the effective date of application of the Plan to the risk. Further premium adjustments are provided for at two twelve month intervals thereafter. The third adjustment is considered to be final unless further adjustments are approved by the rating organization having jurisdiction. The provision for such further adjustments beyond the third adjustment is included for the purpose of covering exceptional cases where there may be outstanding claims of an indeterminate nature.

Reporting and Verification of Risk Data

It is intended that the retrospective premium computation shall be based upon the same experience which is reported by the carrier for standard rate making purposes. Such data submitted under the Unit Statistical Plan shall be subject to verification by the rating organization in the state where the operations are located provided that, in the case of interstate risks, copies of such data shall be furnished by the carrier to all organizations cooperating in the administration of the Plan for the individual risk. In connection with multiple policy risks involving policies written for a short term or canceled so as to terminate concurrently with the retrospective rating period, separate unit statistical data for such policies shall be furnished the rating organization having jurisdiction.

Any such data for states where there is no regulation of Work-

men's Compensation rates by supervising authorities used in connection with a rating involving a state under the administrative jurisdiction of the National Council on Compensation Insurance shall be subject to the review and approval of the National Council which may verify by inspection, audit or otherwise the operations and experience rates of the risk.

Promulgation of Retrospective Premium

After the experience data have been received and verified by the rating organization having jurisdiction, the retrospective premium adjustment shall be promulgated to the insurance carrier by the rating organization having jurisdiction. Such promulgation shall be made from the first, second and third reportings of data, the third promulgation to be final unless further adjustments are approved by such rating organization.

State Exceptions

In certain states the Plan as outlined in the foregoing pages has been modified to meet special conditions. A brief resume of the more important of such exceptions is given below.

Kansas

In order to make the Plan available to risks with standard premium below $5,000 the eligibility requirements have been amended to permit application of the Plan to risks with standard premium of $1,000 or more and the table of rating values has been extended downward to a standard premium of $1,000. The additional rating values so included are given in the following tabulation.

Standard Premium	Percentages of Standard Premium		
	Basic Premium	Minimum Retrospective Premium	Maximum Retrospective Premium
	(1)	(2)	(3)
$1,000	30.0%	87.0%	195.0%
1,500	30.0	84.5	191.0
2,000	30.0	82.0	187.0
2,500	30.0	80.5	184.0
3,000	30.0	79.0	181.0
3,500	30.0	78.0	179.5
4,000	30.0	77.0	178.0
4,500	30.0	76.0	176.5

Maine

Due to the fact that compensation premiums for Maine operations are subject to a 10% discount applicable to such premium in excess of $2,000, it is necessary to specify that the standard premium for the risk shall be determined by the application of the standard rates to the payrolls for the risk before application of such 10% discount. Furthermore, in view of the graded rates of commission which apply in Maine, the provision for acquisition cost included in the basic premium for risks subject to retrospective rating is the same as that which applies to risks not subject to retrospective rating.

Maryland

In order to properly provide for the assessment covering the expenses of the Maryland Industrial Accident Commission, the $.06 loading included in the standard rates is deducted in determining the standard premium and, in lieu thereof, a flat charge of $.051 per $100 of payroll is added to the retrospective premium based upon such modified standard premium.*

Massachusetts

The Retrospective Rating Plan approved in Massachusetts provides for application on a per policy basis rather than upon a risk basis. This distinction, however, does not cause any difficulty in applying the Plan since interstate retrospective rating is not permitted under the Plan in effect at present in Massachusetts. Also, the standard premium subject to retrospective rating is computed by applying the standard rates to the payrolls of the risk but without applying the 11.4% discount which the Massachusetts manual specifies shall apply to the policy premium in excess of $5,000 for risks not written on a retrospective rating basis.

New York

Under the New York Compensation Act it is possible for the cost of individual serious claims to reach substantial amounts. Consequently, it was deemed advisable to place a limitation of $10,000 on the combined indemnity and medical cost of each indi-

* These loadings are subject to revision from time to time. Effective May 31, 1938, loadings revised to $.05 and $.041 respectively.

vidual claim before inclusion in the actual incurred losses of the risk. In connection with risks written on an ex-medical basis, a corresponding limitation of $8,000 is applied to the indemnity cost of each individual claim. The introduction of such limits requires an additional insurance charge in connection with risks in the higher premium brackets. For risks in the lower groups, the maximum retrospective premium limitation will in itself eliminate the effect of excess cost of individual claims. The additional insurance charges are reflected in slightly higher basic premium ratios for risks above $25,000 standard premium. The modified basic premium ratios for New York are shown below in comparison with the standard table values for a number of premium intervals.

Standard Premium	Basic Premium Percentages of Standard Premium	
	New York Table	Standard Table
	(1)	(2)
$ 30,000	29.7%	29.5%
35,000	29.4	29.0
40,000	29.1	28.5
50,000	28.3	27.5
60,000	27.5	26.5
75,000	26.0	25.0
100,000	25.5	24.0
125,000	24.5	23.0
150,000	24.0	22.5

For a New York risk with operations in other states subject to retrospective rating and where the standard premium based upon the combined interstate operations is in excess of $25,000, the basic premium is determined as follows:

(1) The standard premium based upon the combined interstate operations is used in entering the respective tables of rating values for the purpose of determining the basic premium ratios applicable to New York and to the other states respectively.

(2) The New York basic premium ratio is applied to the New York portion of the standard premium and the basic premium ratio for the other states is applied to the standard premium of such states.

(3) The two partial basic premiums determined under (2) above are added together to give the basic premium for the risk as a whole.

Special treatment is accorded New York risks involving an exposure to silicosis and other dust disease hazards for which a specific occupational disease rate is charged. The standard premium is determined on the basis of standard rates excluding the specific New York occupational disease rates. Losses due to silicosis or other dust diseases compensated under Article 4-A of the New York Compensation Act and arising under classifications for which a specific occupational disease rate is charged are excluded from the incurred losses of the risk. The retrospective premium is computed on the basis of such standard premium and incurred losses, and the total adjusted premium for the risk is determined as the sum of the retrospective premium and the specific occupational disease premium for the rating period.

Accounting and Statistical Requirements

Payment of Commissions

Under the Retrospective Rating Plan, commissions are paid at the regular rates of commission applied to the minimum retrospective premium. During the policy period the commissions are based on the estimated minimum premium as indicated by the advance estimated standard premium. At termination of the policy period the actual minimum premium based upon the audited standard premium is computed and commissions adjusted accordingly. In the case of a policy written on an interim audit basis the minimum premium percentage of standard premium as estimated at the beginning of the policy period is applied to the deposit standard premium and to each interim audit of standard premium and the commission is paid on the indicated minimum premium portions of such standard premiums. When the final periodic audit is made, the adjustment of the minimum premium for the entire policy period is taken into consideration and the commission is paid on the basis of such adjusted minimum premium.

For example, let us assume that at the inception of the policy period the estimated standard premium is $25,000, which would indicate a minimum premium percentage of 60%. If the policy were written on an annual basis the commission would be paid

on the basis of the indicated minimum premium of $15,000. At final audit the risk is found to produce an earned standard premium of $30,000, for which the minimum premium is 59%, or $17,700. The producer in such a case is entitled to additional commission on the additional $2,700 of minimum premium.

If the policy in this example had been written on a monthly audit basis, commissions would have been paid on 60% of the deposit standard premium and on 60% of each interim audit standard premium, up to but not including the final interim audit. Let us assume that the sum of the deposit standard premium and the interim audit standard premiums, prior to the final interim audit, produced a standard premium of $29,000. Commissions would have been paid on 60% of this amount, or on $17,400. When the final interim audit is made the earned standard premium for the complete policy period is indicated to be $30,000, for which the minimum premium percentage is 59%, thereby indicating that commission should be paid on $17,700. In this case the producer is entitled to additional commission on the $300 indicated as the difference between the adjusted minimum premium for the risk and the estimated minimum premium on which commission had already been paid.

It will be noted that final computation and adjustment of the amount of commissions may be accomplished as soon as the audited standard premium for the risk has been determined without waiting for the computation of the adjusted retrospective premium.

Compilation of Experience on Standard Premium Basis

Internal company experience records and experience reported to rate making organizations should be compiled on a basis which will eliminate or at least segregate the effect of retrospective premium charges or credits. Accordingly, it is desirable in setting up Home Office statistical procedure to provide for the segregation of such charges and credits in order that the premiums may be corrected to a standard premium basis. This may be readily accomplished by designating such premium items under a special code.

In the reporting of unit statistical data and Schedule Z experience to the National Council on Compensation Insurance and to

independent rating organizations, it is provided that the risk premium shall be shown on a standard premium basis. For each state involved in the retrospective rating of a risk, the carrier is required to file with the National Council or the rating organization having jurisdiction a unit statistical report showing the risk experience. Experience for risks written under the Retrospective Rating Plan shall be included in the Schedule Z experience in states where Schedule Z is still required regardless of the fact that a unit plan report is also required for these risks. In reporting such experience in Schedule Z, differences between the standard premium and the retrospective premium shall be reported under Classification Code No. 0045 with the proper designation as to whether such differences represent charges or credits.

In addition to the individual unit statistical reports, the carrier is also required to file with the National Council a summary for each risk written under the Retrospective Rating Plan, showing the states involved in the agreement, the serial card number of the unit report for each state involved, the total losses incurred for each state and the development of the retrospective premium. A special report form has been designed for this purpose and also provides for assignment of the retrospective premium to the individual states in proportion to the standard premium developed.

In reporting loss ratio data by state to the National Council it is required to show the entire premium for the state, including the premium for risks subject to retrospective rating, on two bases. One total includes the premium for risks subject to retrospective rating on a standard premium basis excluding any retrospective premium adjustments or surcharges. The second total includes the actual earned premium as produced by the application of the Retrospective Rating Plan to those risks which are so rated. Premiums for risks which are not subject to retrospective rating shall be included on the actual earned premium basis in both totals.*

The purpose of requiring the reporting of experience on a standard premium basis is to permit the determination of compensation manual rates in accordance with the established rate making

* As respects Maine and Massachusetts risks subject to premium discounts, premiums are included on standard basis (without discount) in first tabulation and on discounted basis in second.

procedure. By utilizing the standard premium basis of compilation in company offices there is eliminated from internal company records the distortion in loss ratio results which might obtain if the premiums were compiled without eliminating the effect of retrospective premium adjustments or surcharges.

Modification of Unearned Premium Reserves

As previously explained herein, the Plan requires an advance premium surcharge in addition to the standard premium during the policy period. Since in many cases this surcharge premium will be returned in whole or in part to the assured and, furthermore, in many cases there will be additional premium refunds representing retrospective rating credits, it appears desirable to modify the procedure followed in computing the unearned premium reserve for risks subject to retrospective rating. Although it is possible that all premium in excess of the minimum premium would be returned in every case, this is not very probable. It seems that a reasonable modification would be to provide that, in addition to the unearned premium reserve determined in the usual manner, there should be added to such reserve an amount equal to the sum of the earned portion, on the same basis, of the advance premium surcharges on risks retrospectively rated. It is evident that, since the customary unearned premium computation would apply to the total premium including such advance premium surcharges, the effect of this procedure is to consider the entire amount represented by such advance premium surcharges as unearned premium. This modification should be continued in effect up to the date on which the preliminary retrospective rating premium adjustment is made, since at such time the advance premium surcharge will either be eliminated entirely or such portion as is retained will represent an actual earned premium.

Modification of Dividend Basis of Participating Carriers

In certain states the premium basis on which dividends are paid by mutual companies has been modified to reflect the fact that the adjusted retrospective premium does not permit the same margin for dividends as contained in the risk premium developed by the standard rating procedure.

In Massachusetts the retrospective rating premium applicable to policies written by mutual companies is modified by the addition thereto of 10% of the amount by which the retrospective premium exceeds $5,000. For example, if the application of the Plan produced an adjusted retrospective premium of $25,000, this would be modified by the addition thereto of $2,000, producing a gross retrospective premium of $27,000. Dividends would then be payable on the basis of such adjusted gross retrospective premium.

In New York the modification applicable to risks written on a retrospective rating basis by mutual companies provides that the amounts of premium which shall determine rights and obligations with respect to contingent liability and dividends shall be computed as follows: From the total retrospective premium shall be deducted the difference between said total retrospective premium and the minimum retrospective premium less the amount included in such difference derived from the loss conversion factors. Expressed in other words, the premium upon which dividends are payable is equal to the sum of the minimum retrospective premium and the expense loading on losses underlying the retrospective premium in excess of such minimum premium. The effect of this modification is that the dividend rate expressed as a percentage of the total retrospective premium decreases as the retrospective premium increases above the minimum. On the basis of a dividend rate of 20%, it will be found that starting with a dividend of 20% payable if the risk earns the minimum retrospective premium the dividend rate decreases to approximately 10% if the risk earns the maximum retrospective premium.

There may be other states where similar modification in the dividend basis of mutual companies has been made effective but official recognition of such modification is not included in the published rules of the Retrospective Rating Plan applicable in such other states.

In this connection it is interesting to note the modifications which have been made by the New York State Fund in the rating values of the Plan applicable to New York. Such modifications have been made in recognition of the lower expenses under which the State Fund operates with particular reference to the fact that the State Fund does not pay commissions to agents or brokers.

The rating values have been modified as follows:

(1) The basic premiums have been reduced by 50% thereby producing a range of basic premiums which grade downward from 15% for a $5,000 risk to 12% for a $150,000 risk.
(2) The loss conversion factor has been reduced from 1.18 to 1.14.
(3) The minimum and maximum premiums have been reduced in varying amounts with the result that the minimum premiums grade downward from 59% for a $5,000 risk to 37% for a $150,000 risk and the maximum premiums grade downward from 156% for a $5,000 risk to 110% for a $150,000 risk.

Legal Aspects

It probably can be stated without much danger of contradiction that no proposal relative to the rating of compensation risks has aroused more controversy as to its legal implications than has the Retrospective Rating Plan. For various reasons, depending upon the specific provisions in the respective state compensation laws, it has been contended that the Plan is discriminatory and in violation of the legal rating requirements. The term "discrimination" is used in the sense of unfair discrimination and implies that one class of risks, namely, those subject to the Plan are receiving benefits denied to other risks which are not subject to the Plan. At one time or another practically every element in the Plan has been attacked as being of a discriminatory nature. The Plan has been criticised in this respect because it applies only to large risks, because its application is on an optional basis, because of the inclusion of losses on an actual basis subject to a maximum aggregate limitation, because of the method of providing for expenses, particularly acquisition expense, and because of its application on an interstate basis. Furthermore, it has been claimed that application of the Plan will tend to nullify the effectiveness of supervision by authorized rating organizations. Finally, as a general condemnation, it has been claimed that the Plan is contrary to public policy. The various objections to the Plan have been ably expressed in briefs filed by its opponents in practically every state where approval by supervisory authorities was a necessary prerequisite to application of the Plan in such state Arguments in support of the Plan and in answer to such objections have like-

wise been filed in the various states. Without attempting to review the arguments pro and con, in detail, which would enlarge the scope of this paper to a very considerable degree, it seems sufficient to remark that there seems to be a lack of unanimity among state supervisory authorities as to the seriousness of the objections to the Plan. As measured by the results to date, however, the weight of opinion appears to be in favor of approving the Plan.

The following quotation from the decision rendered by Superintendent Pink of New York in approving the principles underlying the Plan, in the opinion of the writer, may be taken as indicative of the attitude of supervisory authorities in other states which have approved the Plan:

> "When new insurance principles are proposed for the purpose of meeting the requirements of the insuring public the New York Insurance Department believes that they should receive the sanction of supervisory officials if they are not clearly against public policy and the law. New ideas should not be considered from a narrow, technical viewpoint but should be encouraged by a broad-gauged outlook on the part of public officials whose duty is to pass upon them."

This appears to be a reasonable approach to the question as to whether the Plan conforms to the legal requirements in the individual state. As time passes the actual use of the Plan in practice will clearly demonstrate whether in effect it unfairly discriminates between risks. In view of the purpose for which the Plan has been designed, namely, to meet more adequately the requirements of large compensation risks in an equitable and reasonable manner, it would seem desirable that the Plan be given a fair trial over a sufficient period to demonstrate the validity of the claims made by its proponents. If after such a period it is found that the Plan is objectionable, the supervisory authorities can either order its withdrawal or such modification as will remove the demonstrated objectionable features.

Influence of Plan in Reduction of Losses

The Retrospective Rating Plan focuses the attention of the employer upon the cost of compensation accidents. By so doing, the Plan should have a wholesome effect in promoting increased

interest on the part of the employer in accident prevention and safety measures. The result should be an improvement in the loss experience of the risk which will not only reduce the cost of insurance but also be of direct benefit to the employees of the assured. Such problems as accident control and malingering must be met and solved if the employer is to derive the maximum benefit from this method of premium determination.

The insurance carrier likewise has an increased responsibility to the assured in connection with any risk written on this basis. In addition to promoting accident prevention, the insurance carrier must continue to settle all legitimate claims equitably in compliance with the provisions of the Compensation Act applicable thereto. Certainly, no insurance carrier worthy of the name will resort to sharp practices in claim settlement, or condone such expedients as discrimination by the employer against employees with dependents, for the purpose of reducing actual or potential claims. In other words, losses must be reduced through legitimate means of improving accident prevention and safety measures rather than by discriminating against certain employees or by sharp practices in claim settlement. If the insurance carrier fails in its responsibility to the employer and his employees, the Retrospective Rating Plan will soon fall into disrepute.

The Plan provides a means of measuring the effectiveness of accident prevention and control of claim costs during the policy period. Although the Plan has been in effect for a relatively short period, the experience of one large insurance carrier in connection with risks written on the retrospective basis has demonstrated the effectiveness of the Plan in this respect. Risks which previously had produced an unfavorable loss experience have been converted to a favorable loss ratio basis and risks with a favorable past experience record have shown a further improvement. In this connection the comments of Commissioner Mortensen of Wisconsin in an address delivered at the annual meeting of the National Association of Insurance Commissioners, June 22, 1937, are pertinent:

> "It is a commendable objective for the promoters of the Retrospective Rating Plan to inaugurate and introduce into the present rate-making structure an element which will tend to create an incentive for improvement in working conditions and curtail accidents among industrial workers. If it can

> successfully be demonstrated that the Plan will save lives and prevent injuries, many of the objections raised against it will pale into insignificance. Any project should be fostered which will produce such benefits to workmen and society in general."

It is confidently believed that, as time elapses and more experience becomes available, the Plan will adequately demonstrate its value as a positive factor in reducing the frequency and cost of occupational accidents.

Insurance Against Surcharges under the Retrospective Rating Plan

A concomitant development in connection with the introduction of the Retrospective Rating Plan is the practice of certain risks to procure insurance against the possibility of the retrospective rating procedure developing a surcharge in excess of the standard premium. This insurance is usually provided for by means of a premium reimbursement contract whereby the policyholder is reimbursed to the extent of the premium actually developed in excess of the standard premium. In certain cases the contract provides for reimbursement if the retrospective premium exceeds the standard premium less the insurance charge for such reimbursement coverage. At the present time most of such reimbursement contracts are written through Lloyds Underwriters although in recent months at least one domestic excess insurer has indicated its willingness to write such coverage.

In effect, insurance against surcharges is equivalent to a modification of the basic, minimum and maximum retrospective premiums applicable to the individual risk. For risks falling between the minimum and standard premiums, the total cost to the assured will be the retrospective premium plus the amount charged for such insurance against surcharges. The maximum cost to the assured will be either the standard premium plus the charge for such insurance, or the standard premium itself, depending on the scope of such reimbursement coverage. Such reduction in the effective range of the retrospective premium may have a tendency to restrict the effectiveness of retrospective rating as an incentive to accident prevention. However, due largely to the low premium charges for such surcharge premium reimbursement coverage, the

advantage to the assured in eliminating the possibility of a substantial surcharge premium while at the same time increasing the basic and minimum premiums by a relatively small amount appears to outweigh other considerations.

It is evident that the proper insurance charges for eliminating the retrospective surcharge premium, either in whole or in part, should be based upon the statistical data underlying the insurance charges incorporated in the Retrospective Rating Plan as previously explained. By following such a procedure, the premium charges for such elimination or modification of the retrospective premium surcharge will, in all probability, be higher than those which have been quoted up to the present time. The New York Compensation Insurance Rating Board has recently directed its attention to the development of rates for such coverage proceeding on the basis that this coverage would be afforded by means of an endorsement supplementing the retrospective rating endorsement applicable to the individual risk. The rates as developed by the New York Rating Board are based upon the statistical data underlying the net insurance charges in the New York Retrospective Rating Plan plus a loading for acquisition, claim expense and taxes only. The rates so developed provide for full coverage against retrospective premium surcharges in excess of the standard premium. It is interesting to note that even on the basis of the low expense loading included in such rates these rates are at least 100% higher than the rates at which this type of coverage has been offered up to the present time. This disparity in rates may be explained as being due, either to a lack of knowledge as to the underlying statistical data on the part of those who have previously offered this coverage, or to their belief that the risks to whom such coverage may be afforded will produce results more favorable than the average.

If experience in the underwriting of risks on a retrospective rating basis indicates that there is a substantial demand for this type of coverage, it would seem desirable to establish a series of modifications of the rating values in the Plan itself. This could be accomplished by reducing the maximum premium limitations accompanied by appropriate increases either in the basic premiums, or in the minimum premiums, or in both such elements. It is felt, however, that until the Plan has been in actual operation

for a somewhat longer period it would be desirable to avoid introducing further modifications.

Supplementary Rating Plan

As previously stated in this paper, there are various possible methods of applying the retrospective rating principle to the individual compensation risk, the variations being dependent upon the extent to which the actual incurred losses of the policy period are modified before inclusion in the rating formula and the manner in which the loading for expenses is applied. As an example of such a variation, the Supplementary Rating Plan proposed by the mutual companies may be cited.

This particular method has been suggested by the mutual companies as a means of eliminating certain features which they claim are objectionable in connection with the Retrospective Rating Plan described herein. A brief outline of the essential features of the Supplementary Rating Plan is as follows:

1. The reflection of loss experience of the risk is restricted to a portion of the losses only,—this portion being the so-called "normal" losses for the risk. The determination of such "normal" losses follows the definition incorporated in the Experience Rating Plan and includes losses up to a maximum limit per claim equal to fifty (50) weeks indemnity at the maximum rate of compensation payable in the individual state plus a limit of $100 medical. In the case of New York, the only state in which the Supplementary Rating Plan has actually been filed for approval, a further alternative is provided which permits, in connection with risks which develop a standard premium of $25,000 or more, the inclusion of actual losses up to a limit of $5,000 combined indemnity and medical on a single claim. Catastrophe losses arising out of an accident in which two or more employees are injured are to be included at not more than twice the maximum ratable loss limit per claim.
2. As in the case of the Retrospective Rating Plan, the Supplementary Rating Plan is superimposed upon the Experience Rating Plan, provides for determination of the standard premium by the application of standard rates to the audited payrolls of the risk, applies to risks producing standard premium of at least $5,000, and contemplates the adjustment of risk premium at six months and eighteen months subse-

quent to the normal termination of the policy period with the period for adjustment subject to further extension by agreement between the assured and the insurance carrier subject to approval of the supervisory rating organization. The plan is rather indefinite as to whether it is applicable on an interstate basis but, according to the procedure outlined for the determination of the final premium under the plan filed in New York it would appear that interstate rating is contemplated.

3. There are no specified minimum premium limits by size of risk but the maximum premium is fixed at 125% of the standard premium for all risks.

4. A portion of the standard premium, referred to as the "partial premium", is set aside to provide for the average losses in excess of the ratable loss limit per accident, plus a charge for limiting the final premium to the specified maximum of 125% of the standard premium, and plus a portion of the total expense loading contained in the standard premium.

   (a) The portion set aside to provide for losses in excess of the ratable losses, together with the approved expense loading on that portion of the premium, is equal to the ratio of excess adjusted losses to total adjusted losses for the risk. This excess ratio is determined by reference to the experience rating calculation underlying the experience adjusted rates for the risk. In the case of risks where the ratable losses are determined on the basis of the $5,000 limit per claim the risk excess ratio is adjusted to reflect the application of such limit rather than the "normal" loss limit per claim.

   (b) The charge for limitation of the premium to the specified maximum is based upon the standard premium and contains the standard expense loading percentage. In the case of New York, this charge is 2% of standard premium for risks where the ratable losses are the "normal" losses and 2.5% for risks where the ratable losses are subject to the $5,000 limit per claim.

   (c) The balance of the partial premium is equal to 20% of that portion of the standard premium necessary to provide for the expected ratable losses. The portion of the expenses represented by this 20% includes the approved loadings for home office administration, inspection and payroll audit and part of the claim adjustment expense, as respects ratable losses, all such items being loaded for acquisition and taxes. Due to the fact that the provision for these expense items varies by state,

the breakdown of this 20% fixed expense item likewise will vary for each state. For example, in the case of Connecticut, the distribution would be as follows: administration, inspection and audit,—9.2%; claim adjustment,—6.8%; acquisition and taxes,—4.0%; whereas, in the case of New York, the distribution is: administration, inspection and audit,—11.3%; claim adjustment,—5.0%; acquisition and taxes,—3.7%.

The partial premium for the risk is determined by applying, to the standard premium, the partial premium ratio obtained from a table of such ratios based upon the risk excess ratio and the maximum ratable loss. In the event there are no losses, the partial premium becomes the minimum premium for the risk.

5. The ratable losses of the risk are converted to a premium basis by means of a loss conversion factor (for each state) which applies the balance of the expense loading not included in the fixed partial premium. The loss conversion factor varies by state due to differences in acquisition and tax requirements and in the proportion of the claim expense loading which has been included in the fixed partial premium. For example, in the case of Connecticut, the factor would be 1.28 whereas for New York it is 1.338.
6. The actual losses of the risk, within the ratable limit for each case, are determined and converted to a premium basis by the loss conversion factors.
7. The sum of such converted losses and the partial premium is the adjusted premium for the risk subject to the maximum premium of 125% of standard premium.

An advantage to the assured under the Supplementary Rating Plan is that individual serious claims will be limited by the ratable loss limit in the determination of the adjusted risk premium. However, it is evident that the lower the point at which this limit per claim is established the greater will be the fixed charge for such limitation. Furthermore, it is evident that if the fixed portion of the premium, which is not subject to adjustment regardless of the loss experience of the risk, is of substantial amount, the effective range of premium modifications under retrospective rating will be materially reduced. This factor has been recognized by permitting the use of a $5,000 limit per claim in connection with risks which produce a standard premium of $25,000 or more.

As previously explained, the Retrospective Rating Plan establishes a limitation on losses in the aggregate by means of the specified maximum premiums. In New York, where the possibility of a high cost claim is greater than in other states, the Retrospective Rating Plan establishes a further limit of $10,000 per claim. This method of loss limitation permits a greater degree of responsiveness to the actual experience of the individual risk than is permitted under the Supplementary Rating Plan. It is quite possible for a risk developing a favorable loss ratio experience in the aggregate to produce a penalty charge under the Supplementary Rating Plan and, conversely, a risk with an overall unfavorable loss ratio may produce a premium credit. Although such results may be explained theoretically to the assured, it is felt that from a practical standpoint any retrospective rating procedure should reflect as closely as possible the actual over-all experience of the risk. Furthermore, it is evident that the expense loading included under the Supplementary Rating Plan is greater than that under the Retrospective Rating Plan since the provision for acquisition cost is included on the basis of the total adjusted premium, whereas under the Retrospective Rating Plan the acquisition cost is based upon the minimum retrospective premium only. In recognition of this, the stock companies have filed with the New York Insurance Department an amendment to the Supplementary Rating Plan to provide for acquisition cost on the same basis as under the Retrospective Rating Plan.

Results under the Retrospective Rating Plan

Premature as it obviously is to analyze the results of actual application of the Retrospective Rating Plan, certain preliminary observations may prove of interest. The Plan has not been in effect long enough to permit the development of an adequate representative volume of experience on risks with completed policy periods. However, the experience to date of one large insurance carrier indicates that the results obtained under the Plan appear to be equitable and reasonable.

The following tabulation shows the results for every risk written by this carrier under the Plan and for which the policy period has been completed.

Risk Number	Standard Premium	Incurred Losses	Loss Ratio	Retrospective Premium	Premium Credit (−) or Charge (+)	
					Amount	Percent
1	$ 1,510*	$ 806	53.4%	$ 1,355	$— 155	—10.3%
2	3,914*	47	1.2	2,936	— 978	—25.0
3	4,863	2,030	41.7	3,733	— 1,130	—23.2
4	5,349	1,652	30.9	4,012	— 1,337	—25.0
5	5,567*	1,280	23.0	4,147	— 1,420	—25.5
6	6,182	1,415	22.9	4,574	— 1,608	—26.0
7	7,793	560	7.2	5,650	— 2,143	—27.5
8	7,840	1,923	24.5	5,684	— 2,156	—27.5
9	8,050	4,360	54.2	7,298	— 752	— 9.3
10	8,082	3,178	39.3	6,079	— 2,003	—24.8
11	8,386	979	11.7	6,038	— 2,348	—28.0
12	12,415	2,931	23.6	8,443	— 3,972	—32.0
13	13,912	7,363	52.9	12,641	— 1,271	— 9.1
14	14,689	10,944	74.5	16,992	+ 2,303	+15.7
15	17,567	5,613	32.0	11,725	— 5,842	—33.3
16	20,668	10,038	48.6	17,443	— 3,225	—15.6
17	40,303	16,884	41.9	30,903	— 9,400	—23.3
18	55,082	24,226	44.0	42,732	— 12,350	—22.4
19	66,232	23,197	35.0	43,201	— 23,031	—34.8
20	71,323	32,539	45.6	55,607	— 15,716	—22.0
21	81,660	23,496	28.8	46,579	— 35,081	—43.0
22	91,996	33,389	36.3	60,844	— 31,152	—33.9
Total	$553,383	$208,850	37.7%	$398,616	$—154,767	—28.0%

*Canceled risks.

It will be observed that of the twenty-two completed risks written on this basis, involving a total standard premium in excess of half a million dollars, there was but one debit rated risk, the standard premium for which was less than $15,000. Total premium credits amounted to $157,070 as compared with the single additional premium charge of $2,303. This group represented a fair cross-section of the larger risks, the premium distribution by industrial groups being as follows: Manufacturing—56.5%, Contracting—18.9% and All Other—24.6%.

It is interesting to note that for this group of risks the total of the individual minimum retrospective premiums amounted to $311,273 which is 56.2% of the total standard premium for the group. Applying the standard acquisition allowance of 17.5% to this average minimum premium ratio indicates that the average acquisition allowance in terms of standard premium amounted to 9.84%. If this were the only factor which had been taken into consideration the average premium reduction for the group would have amounted to approximately 7.9%. In other words, this

experience indicates that less than one-third of the total premium reduction of 28% was accounted for by the fact that the acquisition allowance under the Retrospective Rating Plan is determined on the basis of the minimum retrospective premium.

This particular group of risks includes only those risks which were written during the first few months in which the Plan became operative in certain states. The total volume of compensation business written at the present time by this carrier under the Plan has increased considerably in recent months as the Plan has become available in additional states. It is estimated that, as respects the business of this carrier, approximately 50% of the premium volume for risks of sufficient size to qualify under the Plan in the states where the Plan is now in effect has been written on the retrospective basis.

As previously stated, the Retrospective Rating Plan is now in effect in twenty-five jurisdictions. The total compensation written premiums of all carriers for these jurisdictions amounted to 53.8% of the countrywide written premiums for calendar year 1936 (excluding monopolistic state funds). It is estimated that approximately 30% of the premium volume in these jurisdictions represents the proportion for risks producing an annual standard premium of $5,000 or more. Consequently, it is estimated that the Plan at the present time may be applied to risks representing approximately 16% of the total countrywide compensation premium volume of all carriers.

A further observation, based upon the experience of the insurance carrier referred to above, indicates that approximately 75% of the number and premium volume of risks with an annual standard premium of $5,000 or more will produce premium credits under the Retrospective Rating Plan. This observation is based upon the actual past experience records of risks in this group without taking into consideration possible further improvement in the loss ratio experience resulting from increased interest in accident prevention and control under the Retrospective Rating Plan. Furthermore, this estimate was based upon risk loss ratios which had been adjusted to the basis of a permissible loss ratio of 60% for the business as a whole.

The number of risks which have availed themselves of this new method of premium adjustment is increasing. It is interesting

to note that risks which previously have been self-insured are included among this number. The optional basis of application has removed any pressure upon employers to become subject to the Plan but, undoubtedly, there will be many who will make such election when there become available the actual results produced for risks which have already been written on this basis.

Future Modifications of the Plan

As additional experience is developed under the actual application of the Plan, modifications in the retrospective rating procedure will undoubtedly be indicated. Without attempting to predict the extent of such modifications, it might be in order to comment briefly upon certain items which, in the opinion of the writer, should be given consideration.

The Plan has been criticised to some extent on the ground that the minimum and maximum premiums are too high, particularly for risks in the lower premium brackets. This criticism should be analyzed on the basis of more recent experience compiled for all risks with premium of $5,000 or more, and with due consideration of the results produced under the Plan. If the range of minimum and maximum premiums can be reduced on a sound actuarial basis, this should be done.

In this connection, consideration should also be given to the possibility of establishing a variation in the range of minimum and maximum premiums according to the type of risk. Such variations should be based upon statistical data compiled on the basis of broad industrial groups, such as Manufacturing, Contracting and All Other.

In order to meet the demand for coverage against retrospective premium surcharges, it would appear desirable to investigate the possibility of setting up a series of charges to cover specified modifications in the maximum premium. Such charges could be added to the basic premium only without modifying the minimum premium.

Since, under the Retrospective Rating Plan, the attention of the assured is focused not only on the cost of accidents but also on the underlying expense provisions in the retrospective premium, it is felt that a careful study should be made to determine whether

certain expense items, such as home office administration, inspection and payroll audit, should be modified to reflect more closely the actual expense involved in connection with risks in the higher premium groups. This modification in the expense element has been recognized in Maine and Massachusetts and should be carefully investigated to determine the propriety of its application in other states.

The Retrospective Rating Plan constitutes a direct approach to the problem of meeting the requirements of the larger compensation risks. Whether it will fulfill the purpose for which it was designed will be determined by the results produced by its application in actual practice over a reasonable period. All constructive criticisms of the Plan should receive prompt and thorough consideration by the supervisory authorities in the various states, by rate making organizations and by company representatives, including producers, underwriters and actuaries. Objectionable features should be eliminated and such improvements as are indicated should be made.

The ultimate objective should be to produce as perfect a retrospective rating plan as possible, whereby the compensation premium for risks which qualify thereunder will be determined on a reasonable and equitable basis, both from the standpoint of the assured and the insurance carrier, and which also will create an additional and effective stimulus for accident prevention and control.

TABLE 1

RATING VALUES*

Standard Premium (See Footnote)	Percentages of Standard Premium (1) Basic Premium	(2) Minimum Retrospective Premium	(3) Maximum Retrospective Premium	Standard Premium (See Footnote)	Percentages of Standard Premium (1) Basic Premium	(2) Minimum Retrospective Premium	(3) Maximum Retrospective Premium
$ 5,000	30.0%	75.0%	175.0%	$ 32,500	29.3%	58.5%	138.5%
5,500	30.0	74.5	174.0	35,000	29.0	58.0	138.0
6,000	30.0	74.0	173.0	37,500	28.8	57.5	137.5
6,500	30.0	73.5	172.0	40,000	28.5	57.0	137.0
7,000	30.0	73.0	171.0	42,500	28.3	56.5	136.5
7,500	30.0	72.5	170.0	45,000	28.0	56.0	136.0
8,000	30.0	72.0	169.0	47,500	27.8	55.5	135.5
8,500	30.0	71.5	168.0	50,000	27.5	55.0	135.0
9,000	30.0	71.0	167.0	52,500	27.3	54.5	134.5
9,500	30.0	70.5	166.0	55,000	27.0	54.0	134.0
10,000	30.0	70.0	165.0	57,500	26.8	53.5	133.5
10,500	30.0	69.5	164.0	60,000	26.5	53.0	133.0
11,000	30.0	69.0	163.0	62,500	26.3	52.5	132.5
11,500	30.0	68.5	162.0	65,000	26.0	52.0	132.0
12,000	30.0	68.0	161.0	67,500	25.8	51.5	131.5
12,500	30.0	67.5	160.0	70,000	25.5	51.0	131.0
13,000	30.0	67.0	159.0	72,500	25.3	50.5	130.5
13,500	30.0	66.5	158.0	75,000	25.0	50.0	130.0
14,000	30.0	66.0	157.0	80,000	24.8	50.0	129.6
14,500	30.0	65.5	156.0	85,000	24.6	50.0	129.2
15,000	30.0	65.0	155.0	90,000	24.4	50.0	128.8
16,000	30.0	64.5	153.0	95,000	24.2	50.0	128.4
17,000	30.0	64.0	151.0	100,000	24.0	50.0	128.0
18,000	30.0	63.5	149.0	105,000	23.8	50.0	127.6
19,000	30.0	63.0	147.0	110,000	23.6	50.0	127.2
20,000	30.0	62.5	145.0	115,000	23.4	50.0	126.8
21,000	30.0	62.0	144.0	120,000	23.2	50.0	126.4
22,000	30.0	61.5	143.0	125,000	23.0	50.0	126.0
23,000	30.0	61.0	142.0	130,000	22.9	50.0	125.8
24,000	30.0	60.5	141.0	135,000	22.8	50.0	125.6
25,000	30.0	60.0	140.0	140,000	22.7	50.0	125.4
27,500	29.8	59.5	139.5	145,000	22.6	50.0	125.2
30,000	29.5	59.0	139.0	150,000 & Over	22.5	50.0	125.0

NOTE: * See modifications applicable in Kansas and New York.

If the earned standard premium for the Policy lies between any two of the figures in the Standard Premium column, the percentages shall apply on the basis of the next lower standard premium in the table, provided, however, that if the earned standard premium of the Policy is less than $5,000, the percentages for a standard premium of $5,000 shall apply.

TABLE 2

LOSS CONVERSION FACTORS

(a) *States in which Plan is in effect:*

State	Factor	State	Factor
Alabama	1.21	Massachusetts	1.15
Alaska	1.18	Montana	1.12
Connecticut	1.12	Nebraska	1.12
District of Columbia	1.11	New Mexico	1.12
Florida	1.20	New York	1.18
Idaho	1.14	North Carolina	1.18
Illinois	1.12	Oklahoma	1.12
Indiana	1.12	Rhode Island	1.12
Iowa	1.13	South Carolina	1.24
Kansas	1.19	South Dakota	1.19
Kentucky	1.12	Tennessee	1.25
Maine	1.10	Vermont	1.12
Maryland	1.12		

(b) *States in which Plan has not yet been approved*

(For reference purposes only):

State	Factor	State	Factor
Arizona	1.18	Missouri	1.18
California	1.19	New Hampshire	1.18
Colorado	1.16	New Jersey	1.16
Delaware	1.12	Pennsylvania	1.09
Georgia	1.22	Texas	1.23
Hawaii	1.13	Utah	1.18
Louisiana	1.13	Virginia	1.19
Michigan	1.18	Wisconsin	1.13
Minnesota	1.16		

EXHIBIT A

EXAMPLE OF CALCULATION OF RETROSPECTIVE PREMIUM

(1) Standard Premium (Based on Audited Payrolls):

Illinois	$10,000	
Indiana	12,500	
Iowa	2,500	
		$25,000

(2) Basic Premium Ratio (Col. 1, Table of Rating Values) .300

(3) Basic Premium ((1) × (2)) 7,500

(4) Minimum Premium Ratio (Col. 2, Table of Rating Values) .600

(5) Minimum Premium ((1) × (4)) 15,000

(6) Maximum Premium Ratio (Col. 3, Table of Rating Values) 1.400

(7) Maximum Premium ((1) × (6)) 35,000

State	(8) Actual Incurred Losses	(9) State Loss Factor	(10) Converted Losses (8) × (9)
Illinois	$ 5,000	1.12	$ 5,600
Indiana	4,000	1.12	4,480
Iowa	1,000	1.13	1,130
Total	$10,000		$11,210

(11) Indicated Retrospective Premium = (3) + Total of Col. (10) 18,710

(12) Earned Retrospective Premium for Risk:

(a) Equals (11), if (11) is between (5) and (7) 18,710

(b) Equals (5), if (11) is less than (5). ———(Minimum)

(c) Equals (7), if (11) is greater than (7). ———(Maximum)

(13) Ratio: Earned Retro. Prem. to Standard Prem. .7484
((12) ÷ (1))

(14) Earned Retrospective Premium by State
((1) × (13))

Illinois $10,000 × .7484 = $7,484
Indiana 12,500 × .7484 = 9,355
Iowa 2,500 × .7484 = 1,871

APPENDIX

An outline of the fundamentals underlying the computation of various elements in the Retrospective Rating Plan is presented in this Appendix. For more detailed information reference should be made to various memoranda issued by the National Council on Compensation Insurance and the National Bureau of Casualty and Surety Underwriters.

It will be apparent from the following explanation that there is an interdependent relationship existing between the various rating values of the Plan. The insurance charge incorporated in the basic premium depends upon the specific minimum and maximum loss limitations applicable to each given premium size. The minimum and maximum loss limitations are determined as the result of dividing the difference between the basic premium ratio and the minimum or maximum premium ratio by the state loss conversion factor. Consequently, a variation in any one of these elements will have an effect upon the insurance charge. Furthermore, it will be noted that the state loss conversion factor is dependent not only upon the standard loadings for claim adjustment expense and taxes, but also upon the amount included in the basic premium for expense items.

INSURANCE CHARGES

The insurance charge incorporated in the basic premium reflects the net cost of losses which, on the average, are eliminated from the retrospective rating process. The losses eliminated by the maximum loss limitation are offset by the reserve for losses provided by the minimum loss limitation, the net effect being dependent upon the points at which the minimum and maximum limits are established. In order to determine such insurance charges, therefore, it was first necessary to compile the experience of individual risks to show the ratio to total losses of losses in excess of specified loss ratios per risk. Such experience compilations were made for various premium size groups for several states following in general the method used by Mr. Dorweiler in a previous compilation along these lines.* Since we are primarily interested with the indications of such experience on risks of

* See *Proceedings*, Volume XX, pages 1-26, "Policy Limits in Casualty Insurance", by Paul Dorweiler.

$5,000 premium size and over, it is evident that the volume of available experience is limited for most states. However, the New York experience, compiled for policy years 1932 and 1933 combined, was considered of sufficient volume to furnish reliable indications for most premium size groups. This experience was compared with similar data compiled for Massachusetts, policy years 1930-1933 combined. Also, comparisons were made with a similar tabulation made by Mr. Dorweiler based on the experience of a large insurance carrier for several states and policy years combined and with tabulations made by another large insurance carrier for New Jersey and Pennsylvania, policy years 1930-1932 combined. It was found that the indicated ratios of excess losses to total losses were remarkably consistent for corresponding premium size groups. The results of these tabulations for New York and Massachusetts are shown in Tables A-1 and A-2 appended hereto.

On the basis of the New York indications a table of excess pure premium ratios for application in all states was constructed by the National Bureau of Casualty and Surety Underwriters, the values therein being graduated by calculating the differences between the successive values of the table (both between successive loss ratios for the same premium size and between successive premium sizes for the same loss ratio), and then graduating these differences. The table was then extended to higher premium sizes by extending the differencing process with due regard to the necessary minimum values of the excess pure premium ratios. For example, the excess pure premium ratio for a 45% loss ratio cannot be less than 25% for, otherwise, the average loss ratio on risks having a loss ratio of 45% or less would be in excess of 45%, an obvious impossibility. This table of excess pure premium ratios is shown as Table A-3.

Also, on the basis of the graduated table of excess pure premium ratios, a chart was prepared, graphically presenting by a series of distinct curves, for selected premium sizes, the variation in the excess pure premium ratios corresponding to the variation in the risk loss ratio limitation above which the excess losses are measured. The excess pure premium ratios read from this chart, which is also appended hereto, are used in the calculation of the insurance charges for all states.

For the purpose of illustrating the variation in the net insurance charges (excluding expense loading) for various combinations of minimum and maximum loss limitations, Tables A-4 and A-5 have been prepared showing such results for risks with standard premium of $5,000, $25,000 and $100,000 respectively. The results shown in Table A-5 demonstrate that for a given size risk the net insurance charge increases as the minimum or maximum loss limitation is lowered and, conversely, decreases as the minimum or maximum loss limitation is raised. Furthermore, as a general rule, the net insurance charge for a given combination of minimum and maximum loss limitations decreases as the premium size increases.

It is to be understood that Tables A-4 and A-5 are presented for illustrative purposes only, since the insurance charges calculated for incorporation in the basic premiums for each state are based upon the specific minimum and maximum loss limitations indicated for the various premium sizes for such state and, furthermore, include the same loading for expenses, excluding taxes, as applies to losses included in the retrospective rating premium calculation.

Table A-6 has been prepared to show the calculation of the insurance charges for Connecticut and Tennessee. A brief explanation of the computation of the insurance charge for a Connecticut risk with standard premium of $25,000 follows:

1. The underlying maximum and minimum loss limitations are first determined. The maximum loss limitation, shown in Column (2) of Table A-6, expressed as a ratio to standard premium, is derived by dividing the difference between the basic premium ratio of 30% and the maximum premium ratio of 140% by the loss conversion factor of 1.12. This is found to be equal to $\frac{1.40 - .30}{1.12} = .982$. Similarly, the minimum loss limitation shown in Column (5) is determined from the minimum premium ratio and is equal to $\frac{.60 - .30}{1.12} = .268$.

2. Reference to the chart of excess pure premium ratios shows that for a $25,000 risk the excess pure premium ratio corresponding to a 98.2% loss ratio limitation is .108, shown in Column (3). Expressed in terms of the risk premium this becomes equal to $.108 \times .60 = .065$, shown in Column (4).

3. Similarly, for a 26.8% loss ratio limitation the excess pure premium ratio is .588, shown in Column (6). Therefore, the ratio to total losses of losses falling below the 26.8% loss ratio limitation equals 1.000 – .588 = .412, shown in Column (7). Related to premium, the losses falling below the minimum loss ratio limitation will, therefore, be equal to .412 × .60 = .247, shown in Column (8). The indicated reserve for losses due to the specified minimum loss limitation is equal to .268 – .247 = .021 of the risk premium and is shown in Column (9).
4. The net insurance charge in this case is .044 of the risk premium, being the difference between the charge of .065 for losses in excess of the maximum loss limitation and .021, the reserve for losses due to the minimum loss limitation.
5. The final step in the calculation is to apply to the net insurance charge the loss conversion factor exclusive of the tax loading. The loading for taxes is excluded in the calculation of the insurance charge since taxes are provided for on the basis of the total basic premium of which the insurance charge forms a part. In the case of Connecticut, where the loss conversion factor is 1.12 and the tax loading is 2.5%, the factor applicable to the net insurance charge is equal to 1.12 × .975 = 1.092. Applying this factor to the net insurance charge of .044 produces the insurance charge of .048, shown in Column (11).

In the case of New York it was necessary to allow for the additional insurance charges required by the limit of $10,000 per claim. Accordingly, the following increments were added to the excess pure premium ratios corresponding to the maximum aggregate loss limitations at the various premium sizes:

Standard Premium	Excess Pure Premium Ratio Increment
$ 5,000	.000
10,000	.004
15,000	.005
20,000	.006
25,000	.007
50,000	.015
75,000	.017
100,000	.019
150,000	.020

These increments were determined on the basis of the New York experience by size of risk, by comparing the excess pure premium

ratios produced by losses modified by the $10,000 limit per claim with the corresponding excess pure premium ratios determined on the basis of unmodified losses. As respects the smaller risks, it is evident that the $10,000 claim limit will have no effect since the maximum aggregate loss limit per risk will become effective before the $10,000 claim limit is reached. As the risk increases in size, however, the $10,000 claim limit has an increasing effect until ultimately it will require an additional charge equal to the full value of the ratio of losses in excess of such limit to total losses, as indicated by the total experience of all risks compiled by size of claim.

Minimum and Maximum Premiums

In formulating the retrospective rating procedure, due consideration was given to its practical aspects as well as to the underlying theory. Since the Plan was designed for application to the entire experience of a risk on an interstate basis, it was deemed advisable to establish a uniform range of minimum and maximum premiums for the various premium sizes for all states in order to facilitate the interstate rating procedure. The selection of the particular range of minimum and maximum premium ratios incorporated in the Plan was made after careful study of the insurance charges indicated by various combinations of minimum and maximum loss limitations and with due regard for the desirability of producing a logical graduation of such values for various premium sizes.

Basic Premiums

As previously outlined, the basic premium which is expressed as a percentage of the standard premium includes the following items:

(a) Provision for general administration, inspection and payroll audit expenses.
(b) Provision for acquisition cost based upon the minimum premium.
(c) The insurance charge required by the net effect of the minimum and maximum premium limitations.
(d) A loading on the foregoing items to cover the payment of taxes.

The basic premium charges vary by size of risk due primarily to the variation in the provision for acquisition cost and in the insurance charge. However, it was considered desirable to maintain a uniform range of basic premium charges for all states for the same reason given for establishing a uniform range of minimum and maximum premiums. The provision for general administration, inspection and payroll audit expenses is based upon the standard loadings included in the rates for the individual state. There is no graduation of such expenses based upon the premium size with the exception of two states, Maine and Massachusetts, where such graduation is incorporated in the rating procedure applicable to the operations of all risks in the state, whether written on a retrospective basis or otherwise. The provision for acquisition cost is determined by applying the standard acquisition allowance to the minimum retrospective premium. The insurance charge is determined as previously explained. The loading for taxes is determined by applying the standard state tax loading to the total basic premium.

In maintaining a uniform range of basic premiums for all states, it was found that in certain cases there was an additional amount available in the basic premium which could be assigned to cover a part of the claim adjustment expense. In other cases, however, it was found that this margin was not available, but, on the contrary, the basic premium charges, particularly for the higher premium sizes, were not quite sufficient to cover the full expenses of general administration, inspection and payroll audit. Accordingly, the loss conversion factor was modified either downward to reflect the fact that part of the claim adjustment expense had been included in the basic premium, or upward to provide for the additional amount necessary for other company expenses. Furthermore, it developed that by maintaining a uniform range of basic premium charges in all states, there were available varying residual amounts for contingencies, such amounts being greater percentage-wise for the smaller premium sizes and decreasing to approach zero for the largest premium size.

Loss Conversion Factors

The determination of the component parts of the basic premium charges for each state is closely related to the calculation of the

state loss conversion factor, as will be evident from the foregoing explanation. The underlying principle is that the provision for expenses included in the basic premium and in the loss conversion factor shall be equivalent to the total standard expense loading for the state, after making due allowance for the modification in the provision for acquisition cost being based upon the minimum retrospective premium.

In determining the loss conversion factor for each state a preliminary calculation was made on the basis that for a risk with standard premium of $25,000 or less the retrospective premium will equal the standard premium when the risk loss ratio is equal to the standard permissible loss ratio for the state. Since the basic premium ratio for a risk with standard premium of $25,000 or less is 30%, it is seen that the preliminary loss conversion factor is derived by dividing 70% by the state permissible loss ratio. This first approximation was then tested in conjunction with the established range of basic, minimum and maximum premium ratios taking into consideration the excess or redundancy in the preliminary loss conversion factor as respects the provision for claim adjustment expense when compared with the standard provision for such expense. If it were found that the loss conversion factor was not sufficient to cover the full provision for claim adjustment expense and if such deficiency could not be absorbed in the basic premium, the loss conversion factor was increased in the amount necessary to bring about the proper balance. Likewise, if the basic premium were insufficient to cover the full provision for general administration, inspection and payroll audit, the preliminary loss conversion factor was increased to take care of such deficiency.

Table A-7 presents an analysis of the basic premium charges and the loss conversion factor for Connecticut where the basic premium charges were sufficient to permit the inclusion of an additional amount covering partial claim expense. It will be noted that the loss conversion factor for this state has been correspondingly reduced from the amount which would have been necessary if the full claim adjustment expense had been included therein.

Table A-8 presents a similar analysis for Tennessee, where the basic premium charges were not sufficient to cover the full provi-

sion for general administration, inspection and audit expenses. It will be noted that in this case the loss conversion factor has been increased above the amount which would have been necessary if such deficiency in the provision for these expense items had not been included therein.

In the case of risks involving ex-medical coverage, it is necessary to adjust the loss conversion factor applicable to losses on the ex-medical basis in order to provide an adequate expense loading. Such adjustment is made in the loss conversion factor for each state in which coverage on an ex-medical basis is subject to the Plan and takes into consideration the ex-medical ratio applicable to the risk in connection with such coverage in each state. For example, if a risk is written on an ex-medical basis in several states, the ex-medical ratio applicable to the coverage in each state is used in adjusting the loss conversion factor to be applied to the ex-medical losses in each of such states.

The computation of the adjusted loss conversion factor is illustrated by the following example for a Connecticut risk with an ex-medical ratio of 20%:

(1)	Loss conversion factor (statutory medical basis)	1.12
(2)	Tax provision	.025
(3)	Loss conversion factor unloaded for taxes (1) × (1.000 − (2))	1.092
(4)	Provision in loss conversion factor for company expenses (3) − 1.000	.092
(5)	Ex-medical ratio for governing classification	.200
(6)	Expected loss ratio for full coverage	.625
(7)	Ratio: Full coverage losses ÷ ex-medical losses (6) ÷ ((6) − (5))	1.471
(8)	Company expense provision adjusted for ex-medical coverage (4) × (7)	.135
(9)	Loss conversion factor (ex-medical basis) $\frac{1.000 + (8)}{1.000 - (2)}$	1.16

It will be seen that the purpose of adjusting the loss conversion factor is to provide therein the same loading for company expenses as contained in the standard loss conversion factor applicable to losses on a full coverage basis. This is accomplished by first determining the provision for company expenses in the standard loss conversion factor, and then proportionately increasing this ratio to reflect the fact that the revised loss conversion factor will apply to the losses incurred under ex-medical

coverage instead of to full coverage losses. In this calculation it is assumed that the ex-medical ratio for the governing classification represents the ratio of the medical losses which will be eliminated to the full coverage standard premium. After making this adjustment in the company expense provision, the result is added to unity and the total is loaded for taxes in order to produce the revised loss conversion factor to apply to the coverage in the state written on an ex-medical basis.

TABLE A-1

NEW YORK—POLICY YEARS 1932 AND 1933 COMBINED

PREMIUM SIZE		No. of Risks in Group	SELECTED LOSS RATIOS PER RISK												
Actual Group	Adjusted Average*		.20	.30	.40	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.30	1.40
			EXCESS PURE PREMIUM RATIOS												
$4,000– 4,999	$3,921	548	.711	.604	.517	.444	.382	.333	.292	.257	.226	.202	.181	.163	.147
5,000– 5,999	4,556	357	.701	.586	.494	.420	.362	.314	.274	.237	.204	.177	.154	.136	.119
6,000– 6,999	5,573	246	.696	.578	.480	.395	.325	.267	.219	.183	.153	.128	.107	.089	.074
7,000– 7,999	6,585	182	.702	.586	.489	.416	.356	.308	.266	.228	.197	.166	.140	.117	.099
8,000– 8,999	7,236	154	.693	.570	.469	.388	.319	.262	.216	.180	.148	.121	.099	.084	.071
9,000– 9,999	7,377	133	.688	.560	.451	.370	.310	.265	.228	.195	.167	.142	.124	.109	.097
10,000– 14,999	10,947	288	.682	.548	.439	.352	.281	.221	.176	.143	.119	.098	.080	.067	.055
15,000– 19,999	13,889	119	.678	.540	.417	.315	.239	.185	.145	.112	.088	.068	.052	.039	.026
20,000– 24,999	21,313	74	.674	.531	.407	.306	.232	.173	.129	.096	.068	.049	.038	.029	.021
25,000– 29,999	24,901	47	.675	.528	.398	.293	.211	.151	.113	.083	.061	.046	.035	.025	.017
30,000– 39,999	31,671	52	.672	.525	.391	.281	.190	.118	.073	.046	.030	.018	.009	.002	.000
40,000– 49,999	33,341	33	.666	.513	.391	.290	.210	.142	.087	.051	.028	.020	.015	.011	.006
50,000– 74,999	47,774	32	.672	.518	.397	.307	.228	.167	.123	.088	.062	.041	.020	.004	.000
75,000– 99,999	73,279	15	.666	.498	.345	.203	.103	.060	.030	.011	.001	.000	.000	.000	.000
100,000–149,999	100,463	4	.666	.498	.331	.164	.058	.001	.000	.000	.000	.000	.000	.000	.000
150,000 & over	174,843	3	.666	.498	.331	.164	.033	.000	.000	.000	.000	.000	.000	.000	.000

*Experience of each premium group was adjusted to basis of permissible loss ratio of 59.8%.

TABLE A-2

MASSACHUSETTS—POLICY YEARS 1930, 1931, 1932 AND 1933 COMBINED

PREMIUM SIZE		No. of Risks in Group	SELECTED LOSS RATIOS PER RISK												
Actual Group	Adjusted Average*		.20	.30	.40	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.30	1.40
			EXCESS PURE PREMIUM RATIOS												
$5,000– 9,999	$7,560	734	.688	.558	.455	.372	.304	.250	.204	.167	.138	.116	.098	.085	.073
10,000–24,999	14,528	330	.668	.526	.409	.306	.222	.160	.118	.087	.062	.044	.031	.021	.014
25,000–49,999	32,358	75	.668	.526	.409	.320	.233	.177	.128	.088	.058	.038	.023	.013	.007
50,000–99,999	67,293	28	.664	.503	.357	.221	.131	.080	.050	.031	.019	.010	.005	.001	.000
100,000 & over	119,830	7	.664	.492	.329	.179	.091	.040	.017	.002	.000	.000	.000	.000	.000

*Experience of each premium group was adjusted to basis of permissible loss ratio of 60%.

TABLE A-3

WORKMEN'S COMPENSATION—EXCESS PURE PREMIUM RATIOS
Ratios to total losses of losses in excess of any selected loss ratio per risk
Graduated Values for Application in all States

Premium Size	SELECTED LOSS RATIOS PER RISK												
	.20	.30	.40	.50	.60	.70	.80	.90	1.00	1.10	1.20	1.30	1.40
	EXCESS PURE PREMIUM RATIOS												
$500	.835	.775	.730	.691	.658	.630	.602	.583	.561	.542	.523	.505	.490
1,000	.810	.746	.697	.650	.612	.580	.550	.529	.505	.484	.465	.445	.427
1,500	.784	.721	.667	.616	.572	.535	.502	.477	.450	.427	.405	.382	.360
2,000	.775	.700	.640	.586	.539	.499	.463	.430	.400	.378	.345	.319	.295
3,000	.755	.667	.595	.535	.483	.441	.403	.367	.332	.300	.269	.240	.210
4,000	.732	.640	.559	.494	.439	.394	.355	.323	.289	.257	.227	.198	.170
5,000	.720	.620	.530	.459	.401	.353	.314	.283	.250	.218	.190	.160	.135
7,500	.695	.582	.489	.410	.345	.295	.254	.224	.196	.170	.146	.125	.106
10,000	.685	.573	.470	.383	.314	.259	.215	.185	.160	.138	.118	.100	.085
15,000	.684	.564	.455	.363	.287	.230	.186	.156	.132	.110	.095	.079	.065
20,000	.683	.560	.447	.352	.272	.215	.171	.141	.118	.098	.083	.070	.057
25,000	.678	.556	.441	.342	.259	.201	.157	.127	.105	.086	.070	.056	.045
50,000	.673	.538	.412	.304	.210	.146	.104	.076	.055	.039	.026	.015	.005
75,000	.670	.523	.392	.284	.183	.118	.076	.050	.032	.016	.004	.000	.000
100,000	.668	.513	.378	.260	.161	.096	.054	.028	.013	.005	.000	.000	.000
150,000	.666	.505	.368	.247	.151	.087	.046	.023	.009	.002	.000	.000	.000
200,000	.665	.499	.360	.237	.143	.079	.040	.019	.006	.000	.000	.000	.000

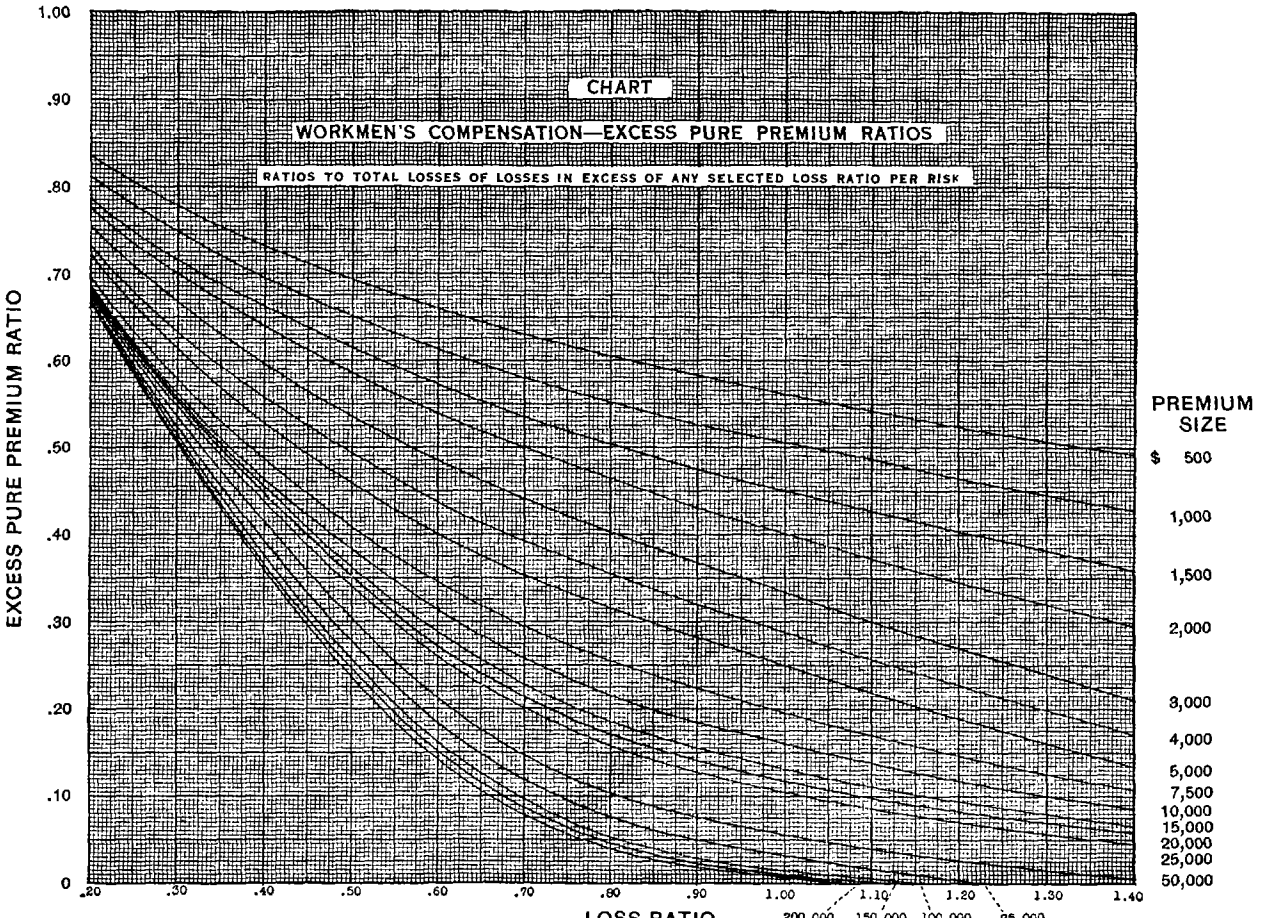
CHART
WORKMEN'S COMPENSATION—EXCESS PURE PREMIUM RATIOS
RATIOS TO TOTAL LOSSES OF LOSSES IN EXCESS OF ANY SELECTED LOSS RATIO PER RISK
EXCESS PURE PREMIUM RATIO
1.00
.90
.80
.70
.60
.50
.40
.30
.20
.10
0
.20
.30
.40
.50
.60
.70
.80
.90
1.00
1.10
1.20
1.30
1.40
LOSS RATIO
200,000
150,000
100,000
75,000
PREMIUM SIZE
$ 500
1,000
1,500
2,000
3,000
4,000
5,000
7,500
10,000
15,000
20,000
25,000
50,000

TABLE A-4

Examples of Method of Calculation of:
(a) Charges for Losses in Excess of Maximum Loss Limitation, and
(b) Off-setting Reserves for Losses due to Minimum Loss Limitation.

Maximum Loss Limitation (Ratio to Std. Prem.)	Excess Pure Prem. Ratio (From Chart)	Charge for Losses in Excess of Max. Loss Limitation* (Ratio to Std. Prem.) (2)×.60	Minimum Loss Limitation (Ratio to Std. Prem.)	Excess Pure Prem. Ratio (From Chart)	Ratio of Losses below Min. Loss Limitation to:		Reserve for Losses due to Minimum Loss Limitation* (Ratio to Std. Prem.) (4)−(7)
					Total Losses 1.000−(5)	Standard Premium (6)×.60	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) $5,000 Standard Premium							
1.300	.160	.096	.400	.530	.470	.282	.118
1.250	.175	.105	.375	.550	.450	.270	.105
1.200	.190	.114	.350	.570	.430	.258	.092
1.150	.204	.122	.325	.592	.408	.245	.080
1.100	.218	.131	.300	.613	.387	.232	.068
1.050	.233	.140	.275	.636	.364	.218	.057
1.000	.248	.149	.250	.662	.338	.203	.047
.950	.265	.159	.225	.690	.310	.186	.039
.900	.282	.169	.200	.720	.280	.168	.032
.850	.298	.179	.175	.751	.249	.149	.026
(b) $25,000 Standard Premium							
1.300	.056	.034	.400	.437	.563	.338	.062
1.250	.064	.038	.375	.464	.536	.322	.053
1.200	.071	.043	.350	.492	.508	.305	.045
1.150	.078	.047	.325	.518	.482	.289	.036
1.100	.086	.052	.300	.547	.453	.272	.028
1.050	.095	.057	.275	.578	.422	.253	.022
1.000	.104	.062	.250	.610	.390	.234	.016
.950	.116	.070	.225	.643	.357	.214	.011
.900	.127	.076	.200	.678	.322	.193	.007
.850	.141	.085	.175	.718	.282	.169	.006

*The values shown are net, exclusive of the loading for Claim Adjustment expense.

TABLE A-4—(Continued)

Examples of Method of Calculation of:
(a) Charges for Losses in Excess of Maximum Loss Limitation, and
(b) Off-setting Reserves for Losses due to Minimum Loss Limitation

Maximum Loss Limitation (Ratio to Std. Prem.)	Excess Pure Prem. Ratio (From Chart)	Charge for Losses in Excess of Max. Loss Limitation* (Ratio to Std. Prem.) (2)×.60	Minimum Loss Limitation (Ratio to Std. Prem.)	Excess Pure Prem. Ratio (From Chart)	Ratio of Losses below Min. Loss Limitation to:		Reserve for Losses due to Minimum Loss Limitation* (Ratio to Std. Prem.) (4)−(7)
					Total Losses 1.000−(5)	Standard Premium (6)×.60	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(c) $100,000 Standard Premium							
1.300	.000	.000	.400	.377	.623	.374	.026
1.250	.000	.000	.375	.411	.589	.353	.022
1.200	.000	.000	.350	.445	.555	.333	.017
1.150	.001	.001	.325	.479	.521	.313	.012
1.100	.005	.003	.300	.514	.486	.292	.008
1.050	.009	.005	.275	.552	.448	.269	.006
1.000	.015	.009	.250	.589	.411	.247	.003
.950	.020	.012	.225	.628	.372	.223	.002
.900	.028	.017	.200	.668	.332	.199	.001
.850	.039	.023	.175	.708	.292	.175	.000

*The values shown are net, exclusive of the loading for Claim Adjustment expense.

TABLE A-5

Examples of Net Insurance Charges Calculated for Various Combinations of Minimum and Maximum Loss Limitations

Specified Combination		Net Insurance Charge*		
		(Ratio to Standard Premium) Basis: Table A-4, Col. (3) minus Col. (8) For Standard Premium of:		
Minimum Loss Limitation (Ratio to Std. Prem.)	Maximum Loss Limitation (Ratio to Std. Prem.)	$5,000	$25,000	$100,000
(1)	(2)	(3)	(4)	(5)
.400	1.300	−.022	−.028	−.026
.400	1.250	−.013	−.024	−.026
.375	1.300	−.009	−.019	−.022
.375	1.250	.000	−.015	−.022
.375	1.200	.009	−.010	−.022
.350	1.250	.013	−.007	−.017
.350	1.200	.022	−.002	−.017
.350	1.150	.030	.002	−.016
.325	1.200	.034	.007	−.012
.325	1.150	.042	.011	−.011
.325	1.100	.051	.016	−.009
.300	1.150	.054	.019	−.007
.300	1.100	.063	.024	−.005
.300	1.050	.072	.029	−.003
.275	1.100	.074	.030	−.003
.275	1.050	.083	.035	−.001
.275	1.000	.092	.040	.003
.250	1.050	.093	.041	.002
.250	1.000	.102	.046	.006
.250	.950	.112	.054	.009
.225	1.000	.110	.051	.007
.225	.950	.120	.059	.010
.225	.900	.130	.065	.015
.200	.950	.127	.063	.011
.200	.900	.137	.069	.016
.200	.850	.147	.078	.022
.175	.900	.143	.070	.017
.175	.850	.153	.079	.023

*Exclusive of loading for Claim Adjustment expense.

Standard Premium	Maximum Loss Limitation (Ratio to Std. Prem.)	Excess Pure Prem. Ratio (From Chart)	Charge for Losses in Excess of Max. Loss Limitation (Ratio to Std. Prem.) (3)×.60	Minimum Loss Limitation (Ratio to Std. Prem.)	Excess Pure Prem. Ratio (From Chart)	Ratio of Losses below Min. Loss Limitation to:		Reserve for Losses due to Min. Loss Limitation (Ratio to Std. Prem.) (5)−(8)	Loss Conversion Factor (Ex. Taxes)	Insurance Charge [(4)−(9)] ×(10)
						Total Losses 1.000−(6)	Standard Premium (7)×.60			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CONNECTICUT										
									(1.12×.975)	
$ 5,000	1.295	.162	.097	.402	.527	.473	.284	.118	1.092	−.023
10,000	1.205	.116	.070	.357	.503	.497	.298	.059	1.092	.012
15,000	1.116	.108	.065	.312	.547	.453	.272	.040	1.092	.027
20,000	1.027	.112	.067	.290	.567	.433	.260	.030	1.092	.040
25,000	.982	.108	.065	.268	.588	.412	.247	.021	1.092	.048
50,000	.960	.063	.038	.246	.606	.394	.236	.010	1.092	.030
75,000	.937	.043	.026	.223	.635	.365	.219	.004	1.092	.024
100,000	.929	.024	.014	.232	.618	.382	.229	.003	1.092	.012
150,000	.915	.021	.013	.246	.594	.406	.244	.002	1.092	.012
TENNESSEE										
									(1.25×.945)	
$ 5,000	1.160	.200	.120	.360	.562	.438	.263	.097	1.181	.027
10,000	1.080	.142	.085	.320	.541	.459	.275	.045	1.181	.047
15,000	1.000	.131	.079	.280	.583	.417	.250	.030	1.181	.058
20,000	.920	.136	.082	.260	.603	.397	.238	.022	1.181	.071
25,000	.880	.133	.080	.240	.623	.377	.226	.014	1.181	.077
50,000	.860	.086	.052	.220	.642	.358	.215	.005	1.181	.055
75,000	.840	.064	.038	.200	.670	.330	.198	.002	1.181	.043
100,000	.832	.044	.026	.208	.655	.345	.207	.001	1.181	.030
150,000	.820	.040	.024	.220	.633	.367	.220	.000	1.181	.028

TABLE A-7

WORKMEN'S COMPENSATION RETROSPECTIVE RATING PLAN

CONNECTICUT

(a) Rating Formula: Basic Premium + 1.12 × Losses = Retrospective Premium
(Subject to specified Minimum and Maximum Premiums)
(b) Total Acquisition Cost allowance is 17.5% of Minimum Premium
(c) Taxes to be paid on final Retrospective Premium

Standard Premium	Min. Prem.	Max. Prem.	Distribution of Basic Premium (All ratios are in terms of Standard Premium)						
			Acq. (2) × .175	Taxes (10) × .025	Partial Claim Adj. Expense	H.O. Admin., Insp. & P.A.	Ins. Charge	Balance for Contingencies	Basic Premium Sum of (4) to (9) inclusive
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$ 5,000	.750	1.750	.131	.008	.026	.092	−.023	.066	.300
10,000	.700	1.650	.123	.008	.026	.092	.012	.039	.300
15,000	.650	1.550	.114	.008	.026	.092	.027	.033	.300
20,000	.625	1.450	.109	.008	.026	.092	.040	.025	.300
25,000	.600	1.400	.105	.008	.026	.092	.048	.021	.300
50,000	.550	1.350	.096	.007	.026	.092	.030	.024	.275
75,000	.500	1.300	.088	.006	.026	.092	.024	.014	.250
100,000	.500	1.280	.088	.006	.026	.092	.012	.016	.240
150,000	.500	1.250	.088	.006	.026	.092	.012	.001	.225

Distribution of Premium Dollar—Standard Rate Basis

Item	Provision
Losses	.625
H.O. Admin.	.058
Inspection	.026
Payroll Audit	.008
Claim Adj.	.083
Acquisition	.175
Taxes	.025
Total Expenses	.375
Total Losses & Expenses	1.000

Derivation of Loss Conversion Factor of 1.12

(a) Standard Provision for H.O. Admin., Insp., & P.A.	.092
(b) Available in Basic Prem. for Company Expenses	.118
(c) Redundancy available for partial Claim Adj. Expense (b) − (a)	.026
(d) Standard Provision for Claim Adj.	.083
(e) Difference (d) − (c)	.057
(f) Standard Provision for Losses	.625
(g) Ratio (e) ÷ (f)	.091
(h) Standard Provision for Taxes	.025
(i) Loss Conversion Factor $\frac{1.000+(g)}{1.000-(h)} = \frac{1.091}{.975} =$	1.12

TABLE A-8

WORKMEN'S COMPENSATION RETROSPECTIVE RATING PLAN

TENNESSEE

(a) Rating Formula: Basic Premium + 1.25 × Losses = Retrospective Premium
(Subject to specified Minimum and Maximum Premiums)
(b) Total Acquisition Cost allowance is 17.5% of Minimum Premium
(c) Taxes to be paid on final Retrospective Premium

Standard Premium	Min. Prem.	Max. Prem.	Distribution of Basic Premium (All ratios are in terms of Standard Premium)						
			Acq. (2)×.175	Taxes (10)×.055	Partial Claim Adj. Expense	H.O. Admin., Insp. & P.A.	Ins. Charge	Balance for Contingencies	Basic Premium Sum of (4) to (9) inclusive
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$ 5,000	.750	1.750	.131	.017	—	.097	.027	.028	.300
10,000	.700	1.650	.123	.017	—	.097	.047	.016	.300
15,000	.650	1.550	.114	.017	—	.097	.058	.014	.300
20,000	.625	1.450	.109	.017	—	.097	.071	.006	.300
25,000	.600	1.400	.105	.017	—	.097	.077	.004	.300
50,000	.550	1.350	.096	.015	—	.097	.055	.012	.275
75,000	.500	1.300	.088	.014	—	.097	.043	.008	.250
100,000	.500	1.280	.088	.013	—	.097	.030	.012	.240
150,000	.500	1.250	.088	.012	—	.097	.028	.000	.225

DISTRIBUTION OF PREMIUM DOLLAR—STANDARD RATE BASIS

Item	Provision
Losses	.570
H.O. Admin.	.075
Inspection	.025
Payroll Audit	.020
Claim Adj.	.080
Acquisition	.175
Taxes	.055
Total Expenses	.430
Total Losses & Expenses	1.000

DERIVATION OF LOSS CONVERSION FACTOR OF 1.25

(a) Standard Provision for H.O. Admin., Insp., & P.A.	.120
(b) Available in Basic Prem. for Company Expenses	.097
(c) Deficiency in provision in Basic Prem. for Company Expenses (a) − (b)	.023
(d) Standard Provision for Claim Adj.	.080
(e) Sum (c) + (d)	.103
(f) Standard Provision for Losses	.570
(g) Ratio (e) ÷ (f)	.181
(h) Standard Provision for Taxes	.055
(i) Loss Conversion Factor $\frac{1.000+(g)}{1.000-(h)} = \frac{1.181}{.945} =$	1.25

ABSTRACT OF THE DISCUSSION OF PAPERS READ AT THE PREVIOUS MEETING

SOCIAL BUDGETING

W. R. WILLIAMSON

VOLUME XXIV, PAGE 17

WRITTEN DISCUSSION

MR. C. A. KULP:

Mr. Williamson presents a completely rational argument for a thorough re-analysis of American ways and means for meeting *all* of the average man's important risks. We suffer, he believes, from an over-emphasis on the purely private approach, and more particularly from the over-development of life as against other insurance and the related emphasis on the banking as against the insurance method of accumulating funds. As long as these were restricted in their effect to the top drawer of our population, to people generally quite able to care for themselves, there was no objection to them. The difficulties and the dangers—the latter word is mine not Williamson's though he will probably agree—which arise, are arising, because we assume that principles suitable and inevitable for a few of us will be suitable for all of us.

The Williamson arguments are essentially two. Social as against individual provision is better suited to the risks of the great masses; social provision is inevitable. The mere description of the average man's principal lifetime risks and their costs in terms of national income is a short and effective proof of the first argument. Of the five risks listed, two are clearly catastrophic. The cost even at minimum estimates runs to 16 per cent of income, and risks as important as these simply cannot be left to voluntary provision or private competition. The way things are, death gets more than its fair share, the banking more than the protective function, of the average man's income. I am grateful to Mr. Williamson for his candid treatment of more than one sacred insurance cow. As a people we are much too inclined to treat insurance, which we take to mean the private insurance

business, with reverence. It is and should be regarded as another economic and social institution. Of things that need saying I appreciate particularly his contrast of insurance as business and as cooperative enterprise, his comments on the reserve in Federal old age insurance.

But the implications of the Williamson statement of risks and their costs is deeper and more pervasive. It suggests, and I agree, that social provision is inevitable. Indeed in a country that to date insists that no man shall starve it is axiomatic. We are making social provision right now. The question is: what form shall this provision take? One form is social insurance. Conservatives may argue that they are opposed to social insurance; they can hardly argue against social provision because they are committed to social provision under the present arrangements. "When the bills are presented they must be paid."

The rub is that as a people we are not yet prepared for all of the consequences of the fact that the bills must be paid. We still most of us dwell in a happy land of political-economic juvenilia where we can annually demand more and more governmental services and costs, higher and higher standards, and yet believe that somehow, even if all the rest of the citizenry will have to pay, we somehow will be allowed to escape. It is a completely unrealistic attitude toward taxes, one that would seem strange in Britain or Germany at every level of income, but it is an American fact. We are all looking for a way to meet these costs out of other people's pockets. Social insurance is a shock because it itemizes and dramatizes a bill we thought hadn't existed. Most social insurance antis oppose it because they believe that it imposes a new cost.

One reason, then, for our distaste of social insurance is that it represents a new allocation of a tax. I cannot agree with Williamson on "the relative simplicity of universal contribution," except in perhaps the actuarial sense. Perhaps a more fundamental reason, one more rooted in our folkways, is our wistful nostalgia for a day and a country where such problems did not exist. It is easy to underestimate this force, even in a land that prides itself on having no past, only future. It explains our insistence that social insurance must not cramp or suppress the acquisitive or at least the independent instinct that we like to believe springs pure only

from American soil. On this, by the way, we are unduly fearful. Social insurance is generally, and in this country will inevitably be, insurance for the great mass of wage-earners, not for those few for whom individual and voluntary provision is suitable. Incidentally, even the British worker, insured for flat benefit rates in his social insurance schemes, is quite unable to understand the objections of Americans to social insurance. "The more you earn," he says, "the more you save and can add to flat insurance benefits": social insurance benefits, he considers "are just something to go on with for a while." Private saving, that is, and social provision, complement each other. The British Royal Commission on Health Insurance vetoed for the same reasons proposals to eliminate private and commercial health insurance bodies. These, said the Commission, are just as surely symbols of British self-help as any form of social insurance under state operation.

In brief, the social insurance institution must meet not one but two basic tests: it must be shaped to meet a particular risk; it must be shaped to suit as well as may be a particular people. On the first we are more likely to agree on details than on the second, but even here we have spilled a lot of ink arguing whether the unemployment risk is insurable. Probably not, by the standards of other social insurances; but whatever we call it, we are committed, as the whole world is committed, to some sort of orderly social provision for the unemployment risk. Social insurance institutions are traditional and social and political (in the broad sense) and not technical: this means in the nature of things they are empirical, flexible and thus (in the narrow sense) often illogical. Above everything else, to be able to do its work the social insurance institution or plan must have the confidence and support of its members and contributors. This is why the social insurance scheme in practice often includes characteristics entirely illogical or even improper on the point of pure theory. This explains why it is perhaps better to have an old age scheme complicated and limited by the banking element Williamson deplores (and I) rather than no old age scheme at all. State administration of unemployment insurance, which can be very bad, is perhaps better than waiting for the perfect way to handle unemployment, whatever that perfect way is. In short, here, as everywhere, you can't have perfection even if all parties could decide on

perfection. I am afraid that here, as everywhere, including I should say even Sweden, social insurance is also class legislation. How could it be otherwise?

Mr. Williamson does not expect apparently a completely rational treatment of what is admittedly a complex social, administrative, financial and tax-distribution problem. (His card-playing analogy, indeed, since it implies individual players and equality of skill, doesn't go nearly as far as his main argument.) But the rational content must and will grow. On such thoughtful discussion is laid the groundwork of an American social insurance institution more nearly fitted both to the risks and to the people that face and under any scheme will have to pay for them.

AUTHOR'S REVIEW OF DISCUSSION

MR. W. R. WILLIAMSON:

I appreciate Mr. Kulp's understanding comments. Whether the cooperative or social provision be called "insurance" or "security" or "services," we seem to be committed to a growing community of interest in these areas of need.

The paper was intended to carry certain challenges. I am glad to find Mr. Kulp questioning my "relative simplicity of universal contribution." The alternative, which we have so far adopted requires us to determine categories of coverage and other categories excluded from coverage. Definitions of coverage boundaries are necessarily complex, since the variety of human activities consistently defies the classifier. For example, the coverages of Titles II and III commonly exclude agricultural labor. A mass of decisions as to what constitutes "agriculture" is accumulating. A judge recently implied that some of the Federal decisions on this point seemed to him illogical. Of course they are. To decide that the horticultural part of plant care is non-agricultural, and that at some point in food-processing agriculture terminates forces variety of decision unless a single individual makes all the decisions, and probably even then. Since many members of the excluded categories are even more needy than the covered groups, alternative

provisions through either general or specialized relief, both commonly more demoralizing than "insurance" have to be devised. On providing for the welfare of our citizens our Federal government has long been committed to a policy of non-discriminatory benefits to the whole constituency. On caring for certain classes it is awkward to feel required to prove that no discrimination exists. It therefore seems probable that in a practical as well as an economic sense, simplicity lies with universality.

If uniformity, as well as universality, is accepted, the saving in record-keeping is tremendous. The broad sharing of social insurance can be much simpler than the meticulous accounting of the bank-book.

It is well to admit that there *is* a somewhat specious simplicity in leaving for later analysis most of the serious questions of detail. No apology is offered for this technique, since it seems necessary to limit the factors for consideration in any one discussion.

The real point of the card playing analogy is that we must have some inkling of the range and crude frequency distribution of the catastrophes against which insurance is provided. Is the average duration of life beyond 65 nearer 10 or 15 years? When jobs are lost are men out of work 1 week or 20? How much time is lost because of sickness in a year, 1 week per capita or 3 weeks? The pack of cards was supposed to follow in a labored fashion the simple aptness of a Biblical parable.

PURE PREMIUMS FOR COMPENSATION INSURANCE

ARTHUR G. SMITH

VOLUME XXIV, PAGE 35

WRITTEN DISCUSSION

MR. W. N. MAGOUN:

Mr. Smith has so skillfully diagnosed his "case" that no room is left for doubt as to what he considers to be the trouble. But whether the remedy he proposes will effect a satisfactory cure without causing other and equally distressing disturbances is open to possible doubt.

He finds the patient suffering from an over-dose of nationalism,

and I fear he would substitute an over-dose of sectionalism. May it not well be that a moderate dose of each in more suitable proportions than is now the case would be more effective?

In reviewing the workmen's compensation experience for a particular state, the classifications fall into three general groups. There may be argument as to the dividing line between these groups, but we will find that:

(1) The first group is comprised of those classifications with sufficient exposure within the state so that national experience may be entirely disregarded. No discussion of this group is here necessary. Each class within it is independent and in no way concerned with outside influences.

(2) The second group is comprised of the borderline classifications, with sufficient state exposure to demand attention, yet without enough to be conclusive. In this group will be found the classes with such small credibility that they barely qualify for "review" under the present system, and those classes which, while just failing to qualify, nevertheless have almost the necessary credibility, and are in many instances of particular importance locally. It seems to me that this is the group shouting the loudest for attention.

(3) The third group is comprised of classifications with such a small state exposure that it is admittedly meaningless.

If I have interpreted Mr. Smith's paper correctly, he does not admit the existence of this third group, and in such case I cannot agree with him.

I will go along with him, however, in a willingness to see this third group kept as small as possible, which is the equivalent of enlarging the second group, and it is the treatment of this second group which I will briefly discuss.

With the use of a credibility formula I am in accord, but there is a need for more recognition of the individual state's experience by some means other than its mere inclusion in the national experience.

To illustrate, in the national experience for policy years 1930-1934, for the classification Sugar Refining, the Massachusetts payroll was $7,322,800 out of a total of $40,155,000, or 18%, and the Massachusetts "serious" losses were $48,625 out of a total of $194,881, or 25%. Yet when this class came up for review in Massachusetts, the formula produced no credibility whatever for Massachusetts "serious" losses, and the national pure premium

which is less than one-half the Massachusetts indication was proposed.

The reverse situation is difficult to justify. To cite an example of this kind, consider the classification Eyelet Manufacturing. In the national experience for policy years 1930-1934, the Massachusetts payroll was $7,578,600 out of a total of $19,118,500, or approximately 40%. It is true that in this national experience Massachusetts had one "serious" case with a national "serious" pure premium of .09 (attributable to the year 1930).

For the years 1931-1935 Massachusetts, with a payroll of $7,387,300, had no "serious" losses whatever. The formula produced no credibility, so that, except insofar as it comprised part of the total countrywide experience, the Massachusetts "serious" experience received no recognition, and the national "serious" pure premium of .29 (on Massachusetts basis .18) was proposed. The situation is further aggravated by the fact that the $19,118,500 of national experience actually produced a "serious" pure premium of only .12, and the national "serious" pure premium of .29 as proposed, is a "selected" pure premium.

I am not objecting to this selection, but merely point out that if Massachusetts over a period of five years had no "serious" losses, with 40% of the exposure, some small reduction from the national basis is indicated.

Though we should be cautious about placing too much reliability on small exposures, if a fine record is established, some definite recognition thereof creates a good feeling and tends to avoid criticism on the part of assureds. I do not advocate sacrificing sound principles or accuracy in order to cater to public opinion, but if it is possible to make some slight modification in established practices which will produce a result more satisfactory to local supervising authorities and assureds, and still maintain equally sound principles and no less degree of accuracy, I am in favor of the change.

In the two cases above mentioned, instead of including the Massachusetts experience as a part of the countrywide experience, and then saying that the Massachusetts "serious" pure premium should be determined solely therefrom, why should we not determine the countrywide experience, exclusive of any Massachusetts experience, and then compare the national and state.

giving recognition to the state, at least according to its proportion of the combined exposure and probably somewhat greater recognition through a weighting process.

Again, take the case under the present system, where to some extent the state's later and more valuable experience may be offset by its own earlier and hence less valuable experience.

Under the Pyroxylin Manufacturing classification, the national experience for policy years 1930-1934 shows a payroll of $5,606,700 of which Massachusetts produced about 90%. Surely the Massachusetts later experience covering policy years 1931-1935, representing 90% of all the experience available, is a better indication than the countrywide experience for 1930-1934 which includes one year prior to that used in the current local revision, and as the national experience becomes older, will include two or more years of prior experience, which further emphasizes the point. Under the formula treatment the Massachusetts credibility for the "serious" pure premium was 25%, for the "non-serious" 25%, and for the "medical" 50%.

Several of the Boards and Bureaus have followed the practice in recent rate revisions of tabulating and presenting for Committee consideration, the experience for some of the lesser classifications. In other words, the national pure premiums have not been blindly adopted for classifications having a particular local interest, even though the exposure was small.

I believe that a modest expansion of this procedure, taken in conjunction with some improved method of applying formula credibilities, to place somewhat more emphasis on the smaller state exposures, offers a solution of Mr. Smith's problem, which I understand to be primarily the placing of less reliance on the national pure premiums.

Several methods of treating the credibility formula, such as reducing the qualifying volume of expected losses for the several credibility groups, establishing more of such groups, or providing separate credibility criteria for each of the recognized "industry groups," might be considered; but that subject is important enough to warrant presentation in a paper devoted exclusively thereto, and I do not propose injecting it into this discussion.

For such classifications as have almost no state experience, I would still adhere to the national pure premiums, bearing in mind

that upon production of sufficient evidence that the local risks are substantially different in hazard from that contemplated by the national experience, it is always possible to recognize the local condition by reducing or increasing the national pure premiums on the basis of such facts.

To attempt to make rates for classifications with an extremely limited exposure, on the state experience alone, would seem to lead to that situation, admittedly undesirable, under which one or two bad losses would cause a wide fluctuation in the rates from year to year.

Abnormal fluctuations would be apt to result not only in unwarranted changes in rate relativity within the particular state, but also in the impairment of the reasonably steady rate relativity which exists between states resulting from the use of a common national base.

If reasonable stability of the rate making structure as a whole has been achieved, I would dislike to see that stability jeopardized by any treatment of the smaller and less important classes which might by reason of constant changes in their alignment, react unfavorably on the whole system of classification and rate relativity.

AUTHOR'S REPLY TO DISCUSSION

MR. ARTHUR G. SMITH:

I do not, as Mr. Magoun thinks, precisely deny the existence of a group of classifications with such limited state exposure as to be meaningless. Of course, there are such classifications. I will go farther and say that there are some where the entire national experience is meaningless but where, nevertheless, the scheme of selecting national pure premiums provides a minimum of 10% credibility. It hardly seems reasonable that such a limited volume is more worthy of consideration when it appears in an exhibit of national experience than in a state exhibit, especially in view of the fact that the national exhibit is quite likely to be a mixture of dissimilar exposure not representative of any given state, and

may furthermore be distorted by the application of the conversion factors. Volume for volume it is safe to say that state experience is more reliable than national and therefore if the national method is sound it should be still more sound when applied to a single state, at least down to a point corresponding to the smallest volume which is in fact used for national pure premium determination. It is true that there are some classifications which cannot be rated on state experience alone. I deliberately omitted mention of these because I was merely outlining the system proposed and did not think it necessary to mention that, as in the case of all of the present systems of pure premium selection of which I know, some exceptions to the general procedure will be required. Obviously exceptional treatment should be accorded those classifications showing no exposure whatever or only a few thousand dollars payroll a year. A number of such classes would probably be dropped entirely if the state experience were reviewed instead of the national pure premium accepted automatically, and there would be nothing to prevent the responsible committees from selecting pure premiums departing from the formula as they have done in every rate revision in New York since there has been a formula. In any event I see no virtue in blindly taking the national pure premiums even on this group of classifications without even having an opportunity of comparing them with whatever the state experience has to show.

Mr. Magoun is entirely correct in stating that the second group he mentions is the one needing most attention. Examples of the type cited for Massachusetts can readily be found for New York and probably for every other sizable state. A very definite step in the right direction was taken in New York in connection with the general revision effective July 1, 1938, where the formula was extended to permit 20, 15 or 10% credibility for corresponding expected losses. While this has been an improvement it does not take care of the classifications with medium credibility which continue to show a definite differential from national year after year. For such classifications the national pure premiums are not a proper base and their use as such prevents either reasonableness or adequacy of rate as the case may be.

Except on but the very smallest classes, where I admit some variation from the general proposal is necessary, I do not think

that applying a formula against present state pure premiums will produce any less stability than present methods. National pure premiums are not revised annually as are state pure premiums, and consequently, even though the larger volume may tend toward more stability this is offset by the fact that two or possibly three years are dropped and the same number added. In state revisions four-fifths of the experience is from policy years which were used in the previous revision. It is quite possible for one or two bad losses to cause a wide fluctuation in national indicated pure premiums, and if a minimum credibility of 10% is too high to achieve the desired degree of stability (either in national or in state revisions) it would not be impossible to adopt a smaller figure.

THE DISTRIBUTION OF CASUALTY ADMINISTRATION EXPENSE BY LINES OF INSURANCE

THOMAS F. TARBELL AND HARRY V. WAITE

VOLUME XXIV, PAGE 45

WRITTEN DISCUSSION

MR. PAUL DORWEILER:

The expenses incurred in operating the casualty insurance business are about one-half of the total cost. They constitute that part of the cost which has aroused greater resistance among the insurance buyers and has produced greater criticism by state administrative authorities. Every effort to allocate and measure the incidence of expenses more accurately and to introduce the distribution of expenses into the rating procedure more equitably should be of interest to insurance carriers.

In their paper "The Distribution of Casualty Administration Expense by Lines of Insurance," Messrs. Tarbell and Waite have made a creditable addition to the growing list of papers on expense analysis in the *Proceedings*. A reference to the two Indexes to the first twenty volumes of the *Proceedings* and the later individual numbers reveals an even dozen papers that have dealt with ex-

penses in casualty insurance. A casual survey of the list shows the scope of the field covered.

Author	*Date*	*Volume*	*Pages*	*Subject*
Woodward	1917	III	140-8	Provision for Expenses in Workmen's Compensation Premiums.
Kirkpatrick	1922	VIII	340-3	Current Notes on Allocation of Administration Expense by Lines.
Hull	1922	IX	38-50	Allocation of Administration Expense by Lines.
Michelbacher	1923	IX	242-65	Incidence of Acquisition Expenses under the New Rules of the Acquisition Cost Conference.
Craig	1923	X	9-16	Allocation of Expenses.
Tarbell	1924	X	107-18	Determination of Acquisition and Field Supervision Cost by Lines.
Bailey	1928	XIV	233-42	Allocation of Adjusting Expenses to Lines.
Van Tuyl	1929	XVI	121-130	Use of Hollerith Cards in Expense Analysis.
Perryman	1930	XVII	22-41	Theory of Distribution of Expenses.
Barber	1934	XXI	65-80	Compensation Expenses Per Policy.
Waite, H. V.	1935	XXII	15-31	Distribution of Inspection Cost by Line.
Tarbell & Waite	1937	XXIV	45-59	Distribution of Casualty Administration Expense by Line.

In these papers are revealed methods for allocating expenses to carriers, to lines, and to size of risk. There is still left to be treated however, the problem of allocating claim expense by kind of injury and by time periods. It would be interesting and possibly useful to know to what extent there is a variation in the cost of adjusting non-compensable, temporary total, minor, major, permanent total, and fatal workmen's compensation claims. There should be a study undertaken along this line. It would also be desirable to study the incidence of claim adjustment expense according to the period of time elapsed since the date of the accident. Knowledge gained from such a study would be useful in setting up reserves for claim adjustment expense and would serve to check the percentage now used in Schedule P to distribute calendar year unallocated claim expenses to policy years.

On rereading the papers on expenses in the *Proceedings* one may trace the development of a process which in some aspects has attained its highest stage in the paper under discussion. Under this process the carriers' internal operations are divided into departments which incur the same kind of expense: acquisition, inspection, claim, administration, and payroll audit. Each department is then subdivided into homogeneous units of employees doing the same work. These units are studied and the salaries are allocated: to lines directly, if the whole unit is devoted to one line; and on the basis of time studies, number of items treated, amount of paid losses, or amount of premiums, if two or more lines are involved. The distribution of salaries has come to be used as the basic distribution. Any other item of expense which cannot be allocated specifically or which it is not practicable to allocate specifically is then associated with and pro-rated on the basis of salaries.

In the paper, the authors have developed this procedure and applied it to an analysis of the administration expenses of the Travelers Insurance Company. The procedure is briefly outlined and explained with a statement regarding fundamentals and principles. I do not take exception to the fundamentals or principles enunciated; as, for example, that:

> All items which can be should be charged to specific lines or combination of lines.
>
> In setting up a system reasonableness should govern between the theoretical and practical.

It should be pointed out, however, that differences of opinion arise, not regarding the acceptance of these principles, but rather regarding their interpretation when applied in specific instances. There probably would be differences as to what constitutes "all items which can be" or what is "reasonableness." This is not meant as a criticism of the procedure, but rather to call attention to inherent difficulties.

The authors have gone into such detail, far beyond anything heretofore, that it may seem out of place to call for further explanation. However, there is a question regarding the meaning of "judgment" in assignment on basis of judgment. Does this mean an estimate of the time of employees without resorting to a time study, number of items, losses, or premiums as a basis for this esti-

mate—Page 50, Division A (2)? Apparently where some such basis is used for the separation between two lines, the procedure is not referred to as an assignment on basis of judgment—Page 50, Division B (2).

The method used by Messrs. Tarbell and Waite produces results that deviate from arbitrary judgment to the extent that the salaries in the ultimate units can be assigned to lines directly, or on some proper formula basis. That portion not so assigned, called the residue, must be allocated on an arbitrary basis. The accuracy of the procedure depends inversely upon the relative portion left in the residue. In a large organization having a high division of labor it follows that the residue is relatively small and the accuracy correspondingly high. In a smaller organization where an individual employee may have not only several lines to deal with but may even be associated with two or more kinds of expense there would result a residue that is relatively large. It follows that the method will not produce the accuracy in allocation of expense for such a small organization, that it will produce for the larger one. In other words, by this method the expense can be more accurately allocated in large than in small organizations.

The appraisal of the results produced under different methods of expense allocation should be on a relative basis. The test should not be the absolute degree to which the residue that is to be arbitrarily assigned has been minimized but a comparison of the residue under one method with the residues under other methods duly weighing the practicability of each method.

AUTHOR'S REVIEW OF DISCUSSION

MR. THOMAS F. TARBELL:

Mr. Dorweiler's discussion is of particular interest for the suggestions as respects the proposed study of claim expense by kind of injury and duration of disability, and for its contribution of a bibliography on papers on expense distribution appearing in the *Proceedings* over the past twenty years. There are many phases of expense distribution that will well repay further study and it is hoped that the *Proceedings* will contain a larger rather than a

smaller number of papers in the future on both the general subject and the more specialized divisions of the subject.

Mr. Dorweiler's comments regarding the interpretation of certain principles set out by the authors are well taken, and unquestionably certain rather concise or unelaborated statements could well have been enlarged upon. The general statement that "all items of expense which can be charged to a specific line . . . should be so charged" did not contemplate in the minds of the authors that every small item of expense should be examined to determine if it is subject to such treatment, but rather that all items of consequential amount should be so charged. Admittedly, some latitude is contemplated and the element of judgment or opinion will have some influence. The same general idea was in the minds of the authors in using the word "reasonableness." Conceivably, a system might be set up which would be ideal from a theoretical standpoint but would be unreasonable from a practical standpoint, particularly in view of the expense of maintaining the system. "Judgment" as used in the paper has the meaning assumed by Mr. Dorweiler—an estimate of the time of employees without resorting to a time study or other basis. This basis is used where the tasks performed by the individual vary rather materially by kind or nature but not so extensively by line. In such instances the individual is usually able to estimate rather closely the time spent on the average on the various lines.

It is undoubtedly correct, as Mr. Dorweiler points out, that greater accuracy of distribution is attainable in a large organization than in a small organization because of a greater degree of division of labor and concentration of work involving a single line, or two or three lines, in the larger organization. However, careful expense analysis, within practical limitations, is worthwhile regardless of size of company, because of its benefits in executive guidance, particularly since profit margins are narrow in some lines and underwriting results are subject to periodic fluctuation.

DISCUSSION OF EXPERIENCE RATING PLAN CREDIBILITIES

FRANCIS S. PERRYMAN

VOLUME XXIV, PAGE 60

WRITTEN DISCUSSION

MR. ROBERT V. SINNOTT:

Mr. Perryman's three *a priori* conditions must be accepted as entirely reasonable. His progress from axioms to ultimate conclusions are logically flawless in so far as a careful study of his paper reveals. His conclusions are acceptable from both scientific and practical viewpoints. This contribution to the business of rate-making is invaluable.

An Experience Rating Plan is a determination of the degree in which a risk differs from the average risk in its loss-producing potentialities and in the manifestation of this degree as a departure from the Manual Rate. In determining this degree of departure, we examine the risk's past experience and accept, as being significant, certain elements of the risk's history and reject others. We consider the size of the risk, the age of the experience, and the size of the individual losses. We recognize that the experience of a large risk is more significant than that of a small one; we recognize that more recent experience, provided it is reasonably developed, is more significant than older experience; and we also recognize that each successive dollar spent in the settlement of any claim is less significant than its predecessor.

Some of us use other language in assessing a risk's potentialities of loss and give consideration to the elements in the experience for which the assured is responsible. Many factors contributing to the occurrence of an accident exist through the deliberate choice of the assured. Promptness in obtaining medical aid by the assured, and the efficiency of such first aid treatments operate to minimize the severity of a loss. In general, we hold that the assured is more responsible for the occurrence of the accident than for its ultimate cost or that the assured's responsibility for loss arising out of any one accident diminishes with each succeeding dollar of loss expenditure.

The principle that the larger the risk, the greater the degree of control the assured can exercise over the incidence and severity

of the accidents, by making use of physical and moral means of accident control and prevention, is universally accepted.

The professors of the responsibility doctrine also hold that with changing time comes changing custom. To hold an assured equally responsible, in his future compensation rate, for an accident which happened some time in the dim past and for an accident which happened only yesterday, is illogical.

It is important to note, however, that there is no reason to believe that this significance, or responsibility, grows greater or less in discrete jumps. So far as we know, the quantum theory is not yet involved in Experience Rating. The algebraic functions which we choose to represent it should proceed as smoothly and as continuously as is possible with due regard to the practical aspect. We must not overwhelm the rating bodies with a multiplicity of intricate calculations. In other words, in our procedure, we must measure as closely as possible the individuality of the risk and at the same time, produce results economically.

Our present rating plan is a compromise of this sort. The measure of significance of the past experience is the Modification; and each of the three principles stated above enters into its calculation. The Modification is a weighted average between the assured's own experience and the experience of the average risk. The weights, or credibilities, have been carefully calculated for various sizes of risks and proceed smoothly from 0 to 1, giving little or no credence to the experience of a small risk and full credence to the experience of a large one. It is this calculation to which greatest attention has been given in the past and which has, in Mr. Perryman's paper, reached what is probably its ultimate refinement, at least in form. I say in form because the initial point of qualification for rating, and the point of full self-rating, are chosen not with an eye to the actual significance of past experience of the risk but on the basis of expediency alone. In contrast to the meticulous calculation of credibility, the age of the experience is recognized by giving arbitrary, uniformly increasing weights to each successive year of experience. In the plan now in use, recognition is given to the inverse significance of each successive dollar of any one loss in a crude and curious way. We have set an arbitrary limit of say "a" dollars and the first "a" dollars of any one loss is called the "normal loss." The remainder of the loss is

called "excess loss." We hold that "normal loss" is highly characteristic of the risk; "excess loss" is not.

If the normal split is $1,000, then the $1,001st dollar is presumed to have far less significance than the $1,000th dollar but the $999th dollar is held of equal significance with the first dollar. We hold that the first $1,000 of loss is just as indicative in the case of a Clothing Manufacturer, with carefully guarded machines, as it is in the case of a conscienceless Contractor, who sends men into an unshored tunnel. We regard the normal split as immutable as the laws of the Medes and Persians, or the hitching post in front of the First National Bank, never changing in the face of circumstances. This device has limped along, posing as the truth far too long. We have held to it through thick and thin until we, ourselves have begun to believe it, although I have never heard of an explanation of the "normal split" adequate to satisfy a curious and unsympathetic assured. The multi-split principle of loss evaluation is a long step in the right direction toward the true method. A smoothly falling curve is substituted for the two horizontal lines of the present plan.

Any rating formula takes the significant losses from the risk's experience and compares them with losses from the average risk, chosen in the same way. An analysis of the formula, now in use, as well as the formulae cited in Mr. Perryman's paper, will indicate that this is done through the three devices described above. If these three ways of doing essentially the same thing could be reduced to two, or even to one, without loss in refinement, or an increase in complexity, the simplification should be welcome. I have attempted to do this with Mr. Perryman's Formula 31:

$$M = \frac{A_d + K_E + W(A_c - K_E)}{E_d + K_E + W(E_E - K_E)}$$

A_d is the portion of the actual loss selected by the Multi-Split Formula as being significant for risks below the Q point (i.e. small risks). A_c is the portion of the actual loss discarded by that Formula. As the size of the risk W become greater than 0 and a part of these discarded losses is reintroduced into the rating formula; *but* it is important to note that the discarded loss is not reintroduced in the same way in which it was discarded. In being reintroduced, the discarded portion of the last dollar to be expended carries the same weight as the discarded portion of the

first dollar. For example, if we have a loss of two dollars and the Multi-Split Formula takes ½ the first dollar, and rejects the other ½; accepts ¼ of the second dollar, and rejects ¾; then if W is .5, ¼ of the first dollar and ⅜ of the second dollar is brought back into the formula again. This may seem academic until we see that if we have a series of small losses of which we discard a certain aggregate amount; and a single large loss of which the same amount is discarded; and then these losses are reintroduced into the formula, the amount of the large loss, so reintroduced, will equal in amount the amount brought in for the smaller losses. The additional amount for the smaller losses should be the greater.

The Q point is therefore a critical point in Formula 31, due to the necessarily artificial method of treatment of losses. It would be an improvement if, instead of taking out these losses and then putting them back in again, this end could be accomplished in a single operation. With this thought in mind, I have examined the Multi-Split Discount Formula to see if it could be adapted to this requirement. This Formula is:

$$\text{Discounted Loss} = \text{Maximum Ratable Loss}\left(1 - r\,\frac{\text{Actual Loss}}{\text{Constant}}\right)$$

$$\text{or more briefly} D = M\left(1 - r\frac{L}{c}\right)$$

where $0 < r < 1$ and where the loss used in the rating is D if L is greater than c or L, if L is less than c. If M, r, or c instead of being constants were parameters which varied by size of risk, D could be made to vary. The practical difficulties of varying c, or r, seem too great to be overcome and it would be possible to get a rating value in excess of an actual loss by varying M; so, in the brief experimenting which I have done, I have explored the possibility of adding a parameter to the right-hand side of the formula, thus:

$$D = N + M\left(1 - r\frac{N - A}{c}\right)$$

where "N" increases from 0 at the Q point to infinity at the S point and where the portion of the loss used in the rating is D if the actual loss is greater than $N + c$, and the full actual loss, itself, if it is less than $N + c$. Thus, the A_d of Mr. Perryman's

Formula becomes variable by size of risk. Suppose for purposes of distinction, we call it A_v. Then to preserve the result of Mr. Perryman's deductions

$$A_v \text{ must equal } A_d + W A_e.$$

I had at hand a tabulation of W as a function of E for Georgia, where $r = \frac{2}{3}$, $c = 300$, and by using a statewide, all risk, distribution of losses, indemnity and medical combined, and by using the suggested Discount Formula above, the following relationships between N and E were found to exist:

N	E	Losses Rated at Actual Value if Less Than $N + c$
0	4,000 Q point	300
50	5,744	350
100	7,332	400
200	9,996	500
300	12,132	600
400	14,412	700
500	16,292	800
600	18,004	900
750	20,620	1,050
900	22,848	1,200
1,000	24,248	1,300
1,250	27,584	1,550
1,500	30,568	1,800
1,750	32,900	2,050
2,000	34,485	2,300
2,500	35,692	2,800
3,000	36,700	3,300
4,000	38,328	4,300
5,000	38,968	5,300
	40,000 S point	Actual value of all losses used

The relationship between the two functions follows a curve of the exponential type, asymptotic to $E = S$ and passing through $c = 0$, $E = Q$.

I have made no effort to determine whether any direct mathematical relationship connects N and E. Such a relationship would necessarily be an empirical one since the relationship between number of losses and size of loss is fortuitous. Such an empirical relationship might be found which would fit the circumstances in most cases.

The Rating Formula would then be:

$$M = \frac{A_v + K_E (1 - W)}{E_d + K_E + W (E_E - K_E)}$$

with the practical advantage that the actual losses are treated only once and in a uniform manner for all risks. Moreover, there would be a definite limit to the amount at which any loss, regardless of its size, would be included in the rating plan $(N + M)$ up to the point of self-rating.

MR. HARMON T. BARBER:

Too infrequently there appears in the *Proceedings* a paper of the type which must be carefully studied in order to be fully appreciated. Mr. Perryman's paper is one, and a review of it is bound to arouse one's admiration of the skillful way in which the author has treated this difficult phase of rating theory. That the paper constitutes an exhaustive and logical exposition of the restrictions which should be imposed on credibility and of methods for incorporating these limitations in various types of experience rating plans, has been confirmed by the writer after stumbling through an abundance of mathematical entanglements. An acknowledgment is due to the author for the service which he has rendered by this comprehensive study but it is difficult to express it appropriately. In simple words Mr. Perryman's paper represents a good job well done and the writer feels that this view will be shared by all including those who will have occasion to consult it as a reference in the years to come.

Essentially, the effect of experience rating on risk premium is to produce a cost to the assured which has many of the characteristics of the cost of a combination of deductible and coinsurance coverages. The prospective nature of the experience modification and the fact that it is predicated on the experience of several policies dims this comparison but does not alter the fundamental similarity. Thus under the original or elementary no-split experience rating plan which involved a comparison of risk loss ratio with the expected loss ratio of manual rates there existed a situation directly comparable with co-insurance. The credibility element in this plan as in other plans defined the degree or percentage of co-insurance which should prevail. As the premium size of the risk increased the loss provision in the adjusted premium approached the loss cost of self-insurance until it actually

attained this status at the self-rating point, the rate of approach being controlled by the behavior of credibility.

With the introduction of the split type of experience rating plan, first based on kind of injury and later involving the normal-excess type of split, certain desirable features analogous to deductible coverage were incorporated in the plan and were subjected to the coinsurance principle by means of dual credibilities. The multi-split principle represents a refined application of the deductible principle and should allow a higher degree of coinsurance or credibility than was practical under previous plans. In fact one advantage of the split type of plan is the greater opportunity which it offers to expand credibility or, as it might be expressed, to increase the assured's participation in the coinsurance relationship.

The intent of these comments is to direct attention to the point that credibility and the treatment of losses in experience rating are interdependent. Particularly is this so in the case of the multi-split plan which employs a loss valuation table from which is obtained the discounted loss (A_n) corresponding to each actual incurred claim cost. This may be illustrated by a transformation of formula (12) of the paper under discussion and which relates to a split plan similar to the present experience rating plan.

$$\text{Mod.} = 1 - Z_n \cdot \frac{E_n}{E} + Z_n \cdot \frac{A_n}{E} - Z_e \cdot \frac{E_e}{E} + Z_e \cdot \frac{A_e}{E} \quad (12)$$

$$= 1 - Z_n \frac{(E_n + E_e \cdot Z_e/Z_n)}{(E)} + Z_n \frac{(A_n + A_e \cdot Z_e/Z_n)}{(E)} \quad (12a)$$

Compare (12a) with formula (2) of the paper, the latter relating to the no-split type of plan with its recognized advantage of simplicity.

$$\text{Mod.} = 1 - Z + Z \cdot \frac{A}{E} \quad (2)$$

If by some contrivance the expression $A_n + A_e \cdot Z_e/Z_n$ of formula (12a) could be transformed to a single term corresponding to A of formula (2), some of the simplicity of the no-split plan might be captured for a large range of rated risks. Since varia-

tions in the ratio Z_e/Z_n are not important in their effect on the modifications of small rated risks it was a short step beyond assuming this ratio to be constant to test the principle that it should decrease in accordance with some definite plan as the size of the loss increases. In this way the underwriting tendency to regard the occurrence of exceptionally large losses as largely fortuitous as to the resulting cost might be recognized and standardized. This explains the genesis of the multi-split principle. The loss valuation table is entered with A and a rating value A_n is obtained which is equivalent to the sum of the terms of a geometrical progression with $r < 1$. Applying similar treatment to E in the aggregate gives E_n and thus a rating formula of the following type can be used for the great proportion of rated risks with premium of less than Q.

$$\text{Mod.} = \frac{A_n + K}{E_n + K}.$$

It is apparent that the loss valuation method should be regarded as an integral part of the credibility structure and should be subjected to the minute scrutiny which Mr. Perryman has applied to other elements. In his paper there is a promise to discuss the treatment of losses under the multi-split plan at greater length and it may be anticipated that this second chapter will prove to be a valuable supplement to the current study.

Throughout the paper frequent reference is made to the three cardinal conditions to which Z must be subject. With these as with other principles enunciated in the paper, the present writer has no quarrel but there is another restriction which is not susceptible to mathematical expression which should be added and preferably superimposed on the original three. This is the requirement that credibility create as little complication of the rating procedure as is possible and in those instances where a simplified approximation will produce results of the same general character as a more exact application of the theory, the choice should rest with the former.

There are several points where such a choice may be exercised and in its deliberations on the credibility elements of the multi-split plan the National Council Actuarial Committee has evidenced a disposition to follow a trend toward simplicity. For

example in experimenting with formula (31) sentiment has been expressed in favor of employing "straight-line" values of W and K_e, i.e. values which are simple functions of premium rather than to use the more refined "continuous" values resulting from an exact application of the principles developed in the paper. When these two series of values are calculated using the same value of S, the "straight-line" values appear at a disadvantage as respects the degree of effective credibility assigned to certain premium sizes. This disparity can be and should be corrected by a readjustment of S so that the "straight-line" values will produce the same general credibility effect as do the values which they are designed to replace. It is claimed for the "straight-line" values that they may be more readily explained and will be more easily understood by an inquisitive layman. Whether this advantage is material or not, the simplification of any part of the plan has a very definite appeal to the writer providing we do not stray too far from the path marked out by theory.

As a matter of fact the attractiveness of formula (30) in this respect is so strong that the writer dislikes to see it summarily abandoned. This formula achieves the maximum in simplicity by employing a constant K for all premium sizes in place of a variable K_e for risks above Q as in formula (31). Mr. Perryman properly points out that in some cases formula (30) violates the basic condition that Z should not exceed unity, or to state it in more practical terms, under formula (30) an assured may pay more than \$1.66 of adjusted premium for \$1.00 of actual incurred loss. In spite of the theoretical validity of the criticism there are several observations which weaken its effectiveness with the writer. In the first place the experience modification is not the ultimate result of experience rating but is only a step toward establishing an adjusted premium for the risk for the ensuing year. This adjusted premium is also effected by some highly variable conditions such as payroll exposure. If the extent of a risks operations should change materially, many of the theoretical niceties of the perfect rating plan are nullified as respects their practical effect on premium. Secondly the full effect on adjusted premium of any loss is not attained until its particular policy year has completed its full term of service in the experience period. Thus the premium effect of one loss cannot be readily

disassociated from the effect of other losses of the same year and of the several other policy years represented in the experience period, unless one goes to great lengths in analyzing several annual ratings. Then if the result is actually found to be, say, $1.50 premium effect per dollar of loss under formula (31) and $1.70 under formula (30) will any reasonable judgment praise one formula and condemn the other? In the consideration of experience rating credibility it is necessary to continually bear in mind the limitations of the statistical evidence on which the rating is predicated in order not to be inordinately exact in the treatment of a single element out of the many which affect premium cost.

There is an opportunity to apply the doctrine of simplicity to good advantage in dealing with the rating of risks at the lower end of the range of risks by premium size. The credibility curve illustrated in Figure II of the paper requires a slight modification in order for it to be truly representative because of the eligibility requirements which are a part of every experience rating plan. To be typical of actual conditions the curve should run along the E axis until the qualification size is reached and then rise to an appreciable value and follow the curve as depicted thereafter. If the process of stream-lining the credibility curve were to be carried out completely the curve would start with a reverse hook similar to the curve of Figure III for the same reasons as are set forth in the discussion which precedes it in the paper. However, it is not necessary to be precise in rating risks in this size-zone because the practical effect of the rating on the adjusted premium is nominal. Obviously as the size of premium diminishes a point is eventually reached where the administration expense of experience rating is no longer warranted—hence, eligibility requirements. This suggests the possibility of a still further simplified procedure to use in rating risks which are too small to meet the present qualification standard. A rule might be established reading somewhat as follows (with values to be adjusted to conform with the experience rating plan):

> For risks which fail to meet the premium qualification of the experience rating plan but which have produced total earned premiums of $500 or more during the last three completed policy periods prior to the current policy, the percentage

> credit or charge to apply to manual rates for the renewal policy shall be the difference between (a) a credit of 7% for each $1,000 of earned premium and (b) a charge of 14% for each $1,000 of discounted actual losses.

This rule departs from the procedure of the multi-split plan in several particulars. Actual earned premiums and an average excess ratio which does not vary by classification are used in determining expected losses. Credibility is proportional to premium and the credibility curve becomes a straight line which joins the credibility curve of the rating plan at the point of eligibility.

The algebraic expression of the rule is:

$$\text{Credit} = .07\ (.001\ P) - .14\ (.001\ A_n).$$

Its derivation may be traced from formula (2) of the paper:

$$\text{Modification} = 1 - Z + Z\,\frac{A}{E} \text{ or } \text{Credit} = Z - Z\,\frac{A}{E}.$$

Adapting this to the conditions of formula (31) we have:

$$\text{Credit} = Z_n - Z_n\,\frac{A_n}{E_n}.$$

Now the credibility curve of formula (31) for premiums of less than the eligibility requirement is transformed to a straight line by making Z_n proportional to premium. The risk which is just eligible produces $1,500 premium over three years and is entitled to a credibility of .10. Hence $Z_n = .10$ per $1,500 premium or roughly .07 per $1,000 premium. Expressing the other symbols in the preceding formula in $1,000 units produces:

$$\text{Credit} = .07\ (.001\ P) - .07\ (.001\ P)\,\frac{(.001\ A_n)}{(.001\ E_n)}$$

$$\text{Assume } E_n = .83\ E = .83 \times .60\ P = .50\ P$$

$$\text{Then, Credit} = .07\ (.001\ P) - .14\ (.001\ A_n).$$

There are many advantages to be derived from a method of rating small risks by a rule of this nature. It answers the demand of the average employer that individual recognition be given to his risk in the determination of rates. It should obviate the necessity for lowering the eligibility requirements of the standard plan, as has been done recently in some states, with the increased burden of administration expense which follows such a move. The

rule can be applied readily and economically to experience as reported under the Unit Statistical plan. The modifications which result should tie in closely with those of the experience rating plan so that it can be asserted that the method really represents an approximate application of the standard plan.

Mr. Perryman's paper, although limited by title to credibilities of experience rating, tends to incite one's imagination as to possible variations in rating methods. For instance, the benefits resulting from an increased incentive toward accident prevention activities afforded by the imposition of moderate financial penalties for the occurrence of each accident are recognized as substantial. It is interesting to speculate on how effective would be an insurance plan which imposed an experience rating plan of the multi-split type on the premium cost of $50 deductible compensation coverage. This would in effect provide full credibility on the first $50 of every loss of every risk with diminishing degrees of credibility applying to successive increments in the size of each loss, the effective credibility on the excess over the deductible amount being dependent on risk size. Such a plan would offer to an assured all the required protection against occasional severe losses and at a cost which would be largely commensurate with his ability to suppress accidents. Some day we may be seriously considering a combination of this kind even though it seems highly visionary at present.

MR. MARK KORMES:

In this latest contribution to the theory underlying credibilities used in rating plans Mr. Perryman as usually displays his mastery of the subject and presents a complete analysis of the various approaches to this difficult and delicate problem. Beginning with an analysis of the experience modification formula underlying a no-split plan, that is where each loss is used with an equal weight, he develops the necessary conditions which must be met in order to have satisfactory credibility values and demonstrates the superiority (theoretical at least) of the use of a tangential parabola instead of a tangent straight line for reaching the self-rating point. Next he analyzes the modification formula of the present

plan which splits losses into "Normal" and "Excess" portions, an arbitrary value being considered as "Normal" and then proceeds with the development of several formulæ for the so-called "Multi-split" plan.

It is not within the frame of this discussion to comment on the desirability of a multi-split plan and therefore I shall proceed with the review of the several formulæ for experience modification.

I.

Mr. Perryman gives an extended analysis of three such formulæ although he explains (see paragraph 22) that many more could be devised. Before going further into the subject, it should be emphasized that in the multi-split plans similarly as in the no-split plan, the modification formulæ considered have only one self-rating point. This, as Mr. Perryman points out, was done advisedly for the sake of simplification. The first formula considered (Formula (14) in the paper) is:

$$\text{Modification} = \frac{A_n + E_e + K - W\ (A_e - E_e - K)}{E + K\ (1 - W)} \qquad (1)$$

where $W = 0$ for $E \leqq Q$ and $0 < W \leqq 1$ for $Q < E \leqq S$. The value of Q up to which the excess portion of actual losses would be disregarded and the value of S or the self-rating point must be selected on the basis of judgment and I find myself in full agreement with Mr. Perryman's suggestions as to the method of their selection (see paragraph 25). The values of W being zero up to $E = Q$ the modification for risks falling in that range (and, which is important, the vast majority will fall in this group!) is very simple, namely

$$\frac{A_n + E_n + K}{E + K} \qquad (1a)$$

The difficulty arises for risks where $E > Q$. The values of W must be determined as a function of E in such a manner as to satisfy certain fundamental conditions. The modification formula (1) allows the following credibility values for normal and excess portions

$$Z_n = \frac{E}{E + K\ (1 - W)},\ Z_e = W\, Z_n \qquad (2)$$

and in order to obtain satisfactory credibilities Mr. Perryman introduces a new function:

$$\zeta = Z_n + a\,Z_e = \frac{E\,(1 + a\,W)}{E + K\,(1 - W)} \tag{3}$$

which must obey certain terminal conditions for $E = Q$ and $E = S$ and for $Q < E \leqq S$ behave in a certain fashion (see pages 77-78) and where a is the maximum ratio of excess loss to normal loss. The conditions imposed upon ζ require the solution of a differential equation with given terminal values. It can be shown easily that there is an infinite variety of solutions and therefore it would be only of interest to find a formula as simple as possible. This Mr. Perryman does by an ingenious device, namely, by putting

$$\zeta = \frac{E}{Y} \tag{4}$$

and by subjecting Y to such conditions as to obtain satisfactory values of ζ he constructs Y as a sum of the ordinates of two hyperbolas and obtains finally for Y the expression (see Appendix I)

$$Y = \frac{C_3 + B_3\,E - A_1\,E^2}{(C_1 + E)\,(C_2 - E)} \tag{5}$$

where the A's, B's and C's are constants suitably determined. The substitution of (5) in (4) demonstrates that ζ is cubic.

Now an examination of Y discloses that in the interval considered the mean curvature of Y is very small and therefore it could be approximated by a straight line:

$$Y = A\,E + B \tag{6}$$

where $A = \dfrac{S - (Q + K)(1 + a)}{(S - Q)(1 + a)}$ and $B = \dfrac{S\,[(Q + K)(1 + a) - Q]}{(S - Q)(1 + a)}$

It should be noted that S, Q, K and a being constant values which are to be determined in advance, the calculation of A and B presents no difficulty. This approximation results in reducing the degree of the function ζ from 3 to 2 and it can be readily recognized that ζ will be a hyperbola. The calculation of Y for any given value of E is very simple and since

$$W = \frac{E + K - Y}{Y + K} \tag{7}$$

the calculation of W values presents no further difficulties. Table I shows the values of W, Z_n and Z_e calculated on basis of Y from formula (6) and gives a comparison with the values obtained by Mr. Perryman using the more exact formula (5).

It will be seen that the values obtained differ but slightly and formula (6) provides, therefore, a satisfactory approximation.

II.

The second formula for modification (see formula 31) analyzed is:

$$\text{Modification} = \frac{A_n + K_E + W\,(A_e - K)}{E_n + K_E + W\,(E_e - K)} \tag{8}$$

where, as before $W = 0$ for $E \leqq Q$ and $0 < W \leqq 1$ for $Q < E \leqq S$ and where K_E is also a function of E such that it has a constant value K, for $E \leqq Q$ and then increases in a suitable manner. This modification formula while simpler in form contains two functions which must be determined, W and K_E and Mr. Perryman demonstrates that W depends upon K_E and both depend upon the excess ratio r. Thus he uses

$$\zeta = \frac{E}{Y\,(1 - r)} \tag{9}$$

and determines Y in a similar manner as for formula (3). It appears that also in this case a straight line approximation of Y will produce satisfactory results. It can be found without difficulty that

$$A = \frac{S - Q\,(a + 1)(1 - r) - K\,(a + 1)}{(a + 1)(1 - r)(S - Q)}$$

$$\text{and } B = \frac{S\,[Q\,(a + 1)(1 - r) + K\,(a + 1) - Q]}{(a + 1)(1 - r)(S - Q)}. \tag{10}$$

As before the above values can be readily determined and once they are determined for a given set of values the process of calculation of W depends only on the determination of K_E. This Mr. Perryman accomplishes by means of the hyperbola

$$K_E = \frac{(K - Q\,g)^2}{g\,E + (K - 2\,Q\,g)} + g\,E \tag{11}$$

where g represents the maximum value of r. Again the straight

line approximation appears to be in order, the mean curvature in the interval being very small and we obtain for K_E the straight line:

$$K_E = K + \frac{(g\,S - K)(E - Q)}{S - Q}. \tag{12}$$

This was recognized by the Actuarial Committee of the National Council who even proposes to go much further and to approximate W by means of the straight line

$$W = \frac{E - Q}{S - Q} \tag{13}$$

It seems to the reviewer, that the last suggestion goes a little too far in that it depresses credibilities for the larger sizes of risks as will be seen from a study of Table II.* The writer has calculated in Table III some values of W, K_E, Z_n and Z_e on basis of formulæ (10) and (12) and a comparison of these values with those obtained by use of the exact formulæ of Mr. Perryman discloses that the approximation suggested show very small departures. In this connection it should be also borne in mind that the break in continuity by using the straight line approximations will be obliterated in actual practice anyway on account of the use of finite intervals. Tabular values are shown in intervals of one thousandth and therefore could be represented by a graph resembling a staircase. This practical consideration further justifies the use of approximation formulæ.

The third formula given in the paper becomes incidental to the first formula by replacing K with $K\,(1 - r)$. Since this formula presents no new problems it does not appear necessary to make any remarks.

III.

As regards the selection of a formula for practical application, I am inclined to agree with Mr. Perryman that the first formula is preferable. It requires only the determination of one variable and therefore the construction of one set of tabular values for any

* Based on a memorandum dated April 18, 1938 by Mr. Perryman to the Actuarial Committee of the National Council on Compensation Insurance. This defect can be corrected by changing the point *og* self-rating and the point Q.

given state. Some feel that the second formula is easier to explain. This, perhaps, is true as regards the formal appearance but difficulties will arise in explaining the two variable elements W and K_E. As explained above, most of these difficulties can be eliminated by the use of a straight line formula for both W and K_E but it is questionable whether the resulting lower credibility would produce satisfactory ratings on large size risks which have not yet reached the point of self-rating.

IV.

The actuarial fraternity owes a debt of gratitude to Mr. Perryman for this contribution to the theory of credibility as it has paved a way to new approaches to the problem of experience rating and undoubtedly will find application in more than one line of insurance. May I be permitted to close my remarks with a hint to the Educational Committee that it is very unfortunate that the Syllabus does not require the elements of trigonometry and plane analytic geometry. How can a candidate for Fellowship, who has passed successfully his Associateship examinations, be required to study and understand this paper? I have no doubt that it will be included among the standard requirements for Fellowship examinations.

TABLE I

COMPARISON OF RESULTS OF USING STRAIGHT LINE FORMULA FOR Y WITH RESULTS OBTAINED BY THE USE OF THE EXACT FORMULA

	Straight Line Y Basis				Quadratic Y Basis*		
	E	W	Z_n	Z_e	W	Z_n	Z_e
New York							
S = 140,000	14,000	.000	.670	.000	.000	.670	.000
Q = 14,000	20,300	.065	.759	.050	.040	.754	.030
K = 6,900	26,600	.127	.815	.104	.095	.810	.077
= 4	39,200	.247	.883	.219	.211	.878	.185
	51,800	.360	.921	.332	.328	.918	.301
	77,000	.568	.963	.547	.558	.962	.536
	102,200	.754	.984	.742	.776	.985	.763
	127,400	.922	.996	.919	.958	.998	.956
	140,000	1.000	1.000	1.000	1.000	1.000	1.000
Massachusetts							
S = 90,000	9,000	.000	.620	.000	.000	.620	.000
Q = 9,000	13,050	.060	.716	.044	.041	.711	.029
K = 5,500	17,100	.119	.779	.093	.095	.774	.074
= 4	25,200	.233	.856	.199	.208	.852	.177
	33,300	.343	.902	.310	.320	.899	.288
	49,500	.549	.952	.522	.543	.952	.517
	65,700	.740	.979	.723	.760	.980	.745
	81,900	.916	.994	.911	.950	.997	.947
	90,000	1.000	1.000	1.000	1.000	1.000	1.000
Georgia							
S = 42,000	4,200	.000	.503	.000	.000	.504	.000
Q = 4,200	6,090	.050	.608	.031	.050	.607	.030
K = 4,140	7,980	.101	.690	.070	.100	.682	.068
= 4	11,760	.201	.781	.157	.200	.780	.158
	15,540	.301	.843	.254	.301	.843	.253
	23,100	.502	.918	.460	.502	.918	.460
	30,660	.701	.961	.675	.703	.961	.675
	38,220	.901	.989	.890	.904	.990	.894
	42,000	1.000	1.000	1.000	1.000	1.000	1.000

* Taken from Table I of the paper.

TABLE II*

COMPARISON OF STRAIGHT LINE W AND K_E VALUES WITH TANGENTIAL CURVE VALUES FOR SECOND FORMULA

New York $S = 135{,}000$ $Q = 13{,}500$ $K = 6{,}900$ $g = .4$

E	$r = .4$				$r = .25$				$r = .1$			
	Straight Line		Curve		Straight Line		Curve		Straight Line		Curve	
	Z_n	Z_e	Z_n	Z_e	Z_n	Z_e	Z_n	Z_e	Z_n	Z_e	Z_n	Z_e
13,500	.900	.000	.900	.000	.795	.000	.710	.000	.710	.000	.710	.000
14,850	.910	.010	.935	.005	.800	.010	.730	.005	.715	.010	.730	.005
20,250	.940	.050	.975	.060	.830	.045	.765	.050	.740	.040	.765	.050
27,000	.960	.105	.990	.135	.850	.095	.785	.120	.765	.085	.785	.105
40,500	.980	.215	.998	.275	.880	.195	.820	.250	.795	.175	.820	.225
74,250	.995	.485	.999	.615	.905	.450	.895	.580	.845	.425	.895	.550
108,000	.999	.780	.999	.895	.970	.755	.970	.880	.935	.730	.970	.870
121,500	.999	.890	.999	.970	.985	.875	.990	.965	.970	.865	.990	.960
128,250	.999	.945	.999	.990	.990	.935	.997	.990	.985	.930	.997	.985
135,000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

* Based on Mr. Perryman's memorandum to the Actuarial Committee of the National Council dated April 18, 1938.

TABLE III

COMPARISON OF VALUE BASED ON STRAIGHT LINE Y AND K_E WITH THE VALUES BASED ON HYPERBOLIC Y AND K_E

(*New York*, $S = 140{,}000$, $Q = 14{,}000$, $K = 7{,}000$, $r = .333$, $g = .333$)

E	Straight Line Y and K_E			Hyperbolic Y and K_E*		
	W	Z_n	Z_e	W	Z_n	Z_e
14,000	.000	.857	.000	.000	.857	.000
20,300	.082	.909	.073	.034	.946	.032
26,600	.154	.937	.145	.092	.972	.089
39,200	.292	.967	.292	.218	.990	.216
51,800	.414	.982	.414	.346	.995	.344
77,000	.623	.994	.619	.594	.999	.593
102,200	.793	.999	.792	.813	1.000	.813
127,400	.933	1.000	.936	.971	1.000	.971
140,000	1.000	1.000	1.000	1.000	1.000	1.000

* Based on Table II of the paper.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. FRANCIS S. PERRYMAN:

The three discussions by Messrs. Barber, Kormes and Sinnott are most helpful and sympathetic. In reviewing these discussions I think it will be best for me to make a few comments on each of them in turn and then conclude with some general remarks.

Taking Mr. Barber's comments first; he is quite evidently in favor of simplicity. He advocates "straight lines" instead of "curves" and with that I have no quarrel, as will be seen later. Mr. Barber goes even further and advocates Formula (30) instead of Formula (31) on the grounds of further simplicity and despite the very serious theoretical objections. This, of course, does not take me by surprise and as usual Mr. Barber has expressed his arguments very forcibly and clearly and, indeed, from the practical point of view he has a good deal on his side, although I am not prepared to concede his point. I believe we should be simple but not unsound. Mr. Barber proceeds (again not for the first time) to put forward the idea of a "tabular" plan for smaller risks. The plan he proposes is ingenious but, of course, the great objection to using such a plan is in the great difficulty of securing a smooth join between such a plan for smaller risks and the regular Experience Rating Plan for larger risks. As a matter of fact, it was the necessity for careful treatment of a similar join between the multi-split plan for medium-size risks and a self-rating plan for very large risks that caused the writing of the paper under discussion. In any experience rating plan we have at least two or three such joins to deal with, namely, one at the qualification point (this is usually not a serious problem); another one at what is called in the paper the "Q" point (namely, where we start to proceed toward self-rating); and another join at the self-rating point (this again is usually not a serious problem). Mr. Barber's "tabular" plan would introduce another join at what might be called the "T" point (namely, where the tabular plan ceases to be used). Mr. Barber's final suggestion as to the possibility of further progress in the rating of individual risks, involving the use of small deductibles, may possibly be worked out in the future—perhaps coupled up with Mr. Sinnott's idea of a variable

multi-split commencing point. However, such ideas do not seem to be within the range of practical consideration at present.

Mr. Sinnott's general remarks, like those of the other discussers, are very helpful in elucidating the ideas and aims of the paper. The paper itself was so long that I hesitated to enlarge my remarks on the basic objectives and the discussers have helped me out by stating these objectives clearly in different language. I like Mr. Sinnott's remarks on the absence of a quantum theory in experience rating but must resist the temptation to enlarge mathematically on this aspect of the subject. He is, of course, perfectly right that from the point of view of theory improvements could be introduced by having variable points at which to commence to discount losses and perhaps variable discount ratios, but I am afraid that the multi-split plan is complicated enough without making more of the constants variable. Mr. Sinnott's suggestion for the introduction of a further parameter N is ingenious but I believe impractical. In any case, does not the plan as set forth in the paper accomplish something very similar to what Mr. Sinnott wants? As the size of the risk goes to the self-rating point, the maximum value for any loss goes from what Mr. Sinnott calls "M" to infinity in theory, but in practice, to a limited value since presumably average death and permanent total values would be used with suitable maxima for catastrophes. One further point must be borne in mind and that is that the treatment of the actual losses must always be paralleled by a similar treatment of expected losses. The two are always dealt with in the same way, and this must not be forgotten. I would hesitate to put forward a plan in which E_v has to be calculated in a manner corresponding to the A_v of Mr. Sinnott's suggestion. Any plan to be used in practice must be even less complicated than the multi-split plan dealt with in the paper and, as will be seen later, it is suggestions directed toward simplification that we want rather than further complications.

I am grateful to Mr. Kormes for his sympathetic treatment of the mathematics involved in my paper. His suggestions regarding a straight line Y are very sound, although, as indicated below, I would rather go further, directly to a straight line W, correcting, if necessary, for the rather lower credibilities which this entails by suitably adjusting the self-rating point. Mr. Kormes' straight

line Y and the straight line W, mentioned below, both involve, theoretically, discontinuities at the Q point but I do not believe this is an insuperable obstacle. I am very much in accord with Mr. Kormes' remarks regarding the absence from the Society's syllabus of branches of mathematics like trigonometry and plane geometry. Other actuarial societies have seen the wisdom of having their students grounded in such subjects. Trigonometrical functions are not solely surveyors' measuring functions but are very useful in analysis and crop up there continuously. For instance, they found their way into a paper of mine on rate levels in Volume XX of *Proceedings*. They should certainly be understood by actuaries. I am rather reminded of an anecdote of Professor de Morgan, the eminent British mathematician and actuary of a century ago. He was explaining to a friend some actuarial problem involving probability and in the formula he set down the symbol π appeared. The friend asked what that stood for; de Morgan answered that it was a constant number that frequently occurred in mathematics and said that the simplest illustration he could give was that it was the ratio of the circumference of a circle to the diameter. The friend replied, "Now, I know you are talking nonsense because what has a circle to do with this actuarial problem?" Plane geometry is also useful, for graphs and geometrical illustrations often give an easy visual picture of a function, as, for example, a graph of the simple credibility function $Z = E/(E + K)$ (see Fig. I).

It seems advisable in closing these remarks to mention briefly some developments regarding the subject matter of the paper that have taken place since the paper was written. Except where otherwise indicated these remarks apply principally to Formula (31) as this is the formula that the Actuarial Committee of the National Council has had chiefly under discussion. Last November I calculated full values of K_E and W for a particular state (Georgia), for certain determinate values of K, Q and S. The Committee felt that the computations involved were rather complicated so in December I investigated the shape of the W curves for various states with varying methods of determining K and found that the following formula was satisfactory.

$$W = 1 - \frac{(x-1)^2 \{L + (2L + M)x\}}{L + Mx - x^2}$$

where $x = (E - Q)/(S - Q)$ as in Formula (21) and L, M are constants. We were assuming that S would be taken as ten times Q and found that constants of $L = .0161538$ and $M = 1.4523077$ (which were chosen so as to give $W = .375$ at $x = .3$ and $W = .825$ at $x = .7$) gave good results for all states. Note that in the above formula, when $x = 0$ W always $= 0$ and $W^1 = 0$, while when $x = 1$, $W = 1$ and $W^1 = 0$.

Later on, in order to obtain a formula on which could be based a standard table of W and ballasts $B_E = K_E(1 - W)$, so that values could be readily got out for any particular state, once values of Q, S and K had been fixed, I proposed to modify the K Formula given in equation (38) of the paper to

$$K_E = K + (g S - K)\frac{(1+f)\,x^2}{x+f}$$

where f is a constant, which must be less than

$$\frac{K - Q g}{g S + Q g - 2K}.$$

I found that in practice, if as usual, $S = 10 \cdot Q$, the value of .03 was satisfactory for f. Then B_E can be written as

$$\frac{(1+f)\,g\,x^2\,(1-W)}{x+f}S + \left\{1 - \frac{(1+f)\,x^2}{x+f}\right\}(1-W)\,K$$

or say $B_1 S + B_2 K$. I gave a table of W, B_1 and B_2 in terms of E/S from which, for any state, the necessary table of W and B_E for various values of E could be readily computed. The specimen two lines below will serve as illustration.

E/S	W	B	B
.386315	.400	.072360	.419101
.389947	.405	.072739	.413153

Suppose now for example that for a particular state $S = 85{,}000$ and $K = 5{,}500$ then multiplying the E/S column by 85,000 and calculating $B_E = B_1 S + B_2 K$ we get

E	W	B_E
32837	.400	8456
33145	.405	8455

Then for E between 32837 and 33145 we use .400 for W and 8456 for B_E. This represents perhaps the high-water mark of complexity of treatment of multi-split plan credibilities. The next steps

were directed toward simplifying the procedure. It should be emphasized here, however, that such simplification is only in the calculation of the tables which must necessarily accompany a multi-split experience rating plan. In the actual rating of a risk the procedure is just the same, for instance, whether the tables are based on curved W's or on straight line W's. Simplicity, however, is extremely helpful to the rating organizations in preparing the necessary tables and also in explaining such tables to the supervising authorities and to assureds.

The Actuarial Committee of the National Council, as mentioned by Mr. Kormes, decided to test "straight line" W and K_E values and accordingly in April I gave the results of my investigations along these lines. By "straight line" W is meant putting $W=(E-Q)/(S-Q)$ i.e. x of the paper and $K_E=K+(g\,S-K)\,x$ i.e. a straight line is drawn in Fig. IV from g to the point $(S_1\ g\ S)$ on the line $K_E = g\,E$. Mr. Kormes has given an illustration of the values thus produced in comparison with curved values (these curved values were calculated from the table just mentioned). Mr. Kormes thinks straight line credibilities are on the low side but I don't think this is necessarily so and in any case suitable adjustment can easily be made by changing the S values. The straight line values will fill all the requirements laid down in the paper, except that of giving a smooth join at Q and at S. The break in continuity at S is scarcely noticeable and that of Q is hidden by the other break in continuity caused by the use in actual practice of tables of W and B_E proceeding by discreet intervals. In my memorandum to the Actuarial Committee I illustrated this graphically. My conclusion was that straight line values were satisfactory.

For comparison I give straight line values corresponding to the curved ones given above for $S = 85{,}000$ and $K = 5{,}500$.

E	W	B_E
32789	.320	9289
33171	.325	9307

The table is, of course, in exactly the same form as the previous one and either can be used with equal facility. It is the lower W and higher B_E values (for the same values of E) that produce lower credibilities.

There have been numerous discussions of many other phases of the multi-split plan but I think the above completes the account of the developments regarding credibilities, the subject of the paper.

In conclusion, let me say that a multi-split plan, as set up with "straight line" W and ballast values is probably easier to explain, although I believe that curved W values could be almost as easily justified. If a formula such as (31) is used and not what I still believe is theoretically preferable (namely 14) then even with straight line values there remains, it seems, some difficulty in explaining the reason for an increase in the ballast above Q. Mr. Barber would obviate this by not increasing the ballast, but I believe it necessary to have the increase. It can be explained as follows: below Q we are using A_n and E_n with a ballast of K. Above Q we bring in A_e and E_e proportionately, i.e., $W A_e$ and $W E_e$, and to balance these we must add apportionate amount of an "excess" ballast K_e, i.e., we must add $W K_e$ to K. Now in order to reach self-rating at S we must start to take the balance out proportionately as E is increased so that it is entirely out at S. That is we take $(1 - W)$ only of the total ballast. The final ballast is thus $B_E = (1 - W)(K + W K_e)$. Now if we take $g S$ for K_e we get the straight line ballast as above. For convenience of course we calculate the final ballast B_E ahead of time and show it in the rating table.

Here, as in the paper itself, I have wandered perhaps somewhat from the discussion of credibilities to consideration of other aspects of the multi-split plan. It is hard to avoid doing this, for after all in any experience rating plan the various component parts are quite closely interconnected.

INFORMAL DISCUSSION

PROPOSED REVISION OF THE NEW YORK INSURANCE LAW

PRESIDENT SENIOR: We will now proceed with the informal discussion on the "Proposed Revision of the New York Insurance Law." We have with us several representatives of the New York Insurance Department who have been active in the preparation of the draft. May I call upon Mr. Joseph J. Magrath, who had a large part in the draft of the code.

MR. JOSEPH J. MAGRATH: That mustn't be taken to indicate that I am going to advocate the revision of the law as it stands, the fact that I participated in it.

I have been irregular enough to depart from Mr. Hobbs' suggestions as to the subjects to discuss. I am going to discuss the rating law in principle. Two editions of the proposed revision of the New York Insurance Law have already appeared in print; one the product of a committee within the New York Insurance Department, and the other based upon a study by a joint committee of the New York Legislature.

There is in preparation I am informed, a third edition that is very much abbreviated and may tend toward the code principle rather than toward the self-construing doctrine.

During my participation in the first draft I was occasionally disconcerted by the tendency toward wordiness and the disposition to cover by specific language every variety of condition that presented itself in the past as well as every sort of possibility that might present itself in future.

The revision contained so much that was new and so little that was recognizable of the present law that comparisons were very difficult. As a matter of fact except for footnotes and references, many sections would be unrecognizable both as to source and intent. In some respects perhaps the revision can be both praised and condemned for the same context.

It may be worthy to include in a statute that which has been developed as a sound treatment and procedure over years of administration, and yet it may be a serious mistake to give the inflexibility of law to that which has been enforcible under a system of rules.

The Rating Law. In the first draft of the revision, the rating law contained an attempt to include a measure of control over commissions. This is conspicuously absent in the second draft. The change is a tribute to the political influence of producers who feared abuse arising out of legislation on commissions. Their opposition by no means indicates a feeling on their part that commission warfare or excess commissions are favored.

The gap in the rating law resulting from the omission of even a filing section with a penalty for wilful violation leaves the commission problem where it was, under the state's power of persuasion only. This will not suffice unless companies, agents and brokers show that they can regulate and control themselves to the extent of making excess commissions an infrequent and lesser evil.

Some new features of the second draft of the revision with brief comments thereon are as follows: The revision makes the members of the executive or governing committee of a rating organization individually responsible for the compliance of the organization with the provisions of the law. Such a provision was never found necessary in carrying out the provisions of the present law, and I am rather fearful that it may discourage some worthy people from accepting responsibility for membership on the executive and governing committees. Any new rating organization would have to be licensed, show a sufficient number of members and that it was qualified to function. Some questions exist even now as to the status of some organizations, and it is hoped that this change will clear up their status and avoid as well some potential abuses in the creation of pseudo-rating organizations. I have in mind particularly where a small group of companies not competent or qualified to create a bona fide rating organization might attempt to establish an individual status in rate-making by grouping their activities.

The prevention of rating organization control over individual brokers is improved by completely eliminating any authority of the rating organization to boycott a broker. A rating organization recently adopted rules, the effect of which would have been to permit such a boycott.

The authority for uniform rate deviations is continued with an

improvement that permits such modifications by type of insurance. Properly supervised, this is a beneficial provision.

The provision that the rates and rules and standards of a rating organization may be adopted only by members and subscribers grants something of a copyright privilege to the organization. The further language of this subdivision is confusing, since it includes reference to companies making their own rates. The first part seems proper, but the second part implies stricter control over independent companies than over rating organizations. This is probably not the purpose of the change and is foreign to the purpose of the rating law.

The prohibition against unfair discrimination is substantially unchanged except that it has some repetition and fails to indicate that fire insurance rates are referred to where reference is made to protection against fire.

In one of the changes in the prohibition against unfair discrimination that was proposed in the first redraft of the law, it permitted the recognition of variations in necessary expense, admittedly designed to permit a recognition of a different standard of rate-making by size of risk. That has been omitted in the second draft of the law, the one prepared by the Legislative Committee. My comment on that is just this: Modernizing the law to definitely recognize the right to vary rates not only according to hazard but also according to necessary expense was included in the first draft but dropped in the second draft. I have heard no reason for this backward step and look forward to possible enlightenment on the subject.

The requirement that class rate schedules and rating plans shall be made, is not sufficiently clear, nor is the reference to flat or non-scheduled rating, although these words appear in the present law. It might be held to mean that an exceptional risk could not be rated on its merits but must be related to some class, schedule or plan. The expressions, "flat" and "non-scheduled", have been used in different ways and it might be preferable to indicate that what is really meant is that different standards may be adopted under the conditions specified.

That privilege in the law was designed particularly for fire insurance companies and recognized that there were occasions

when particular localities did not permit of schedule rating, such as the Catskill hotel district, and in those cases flat ratings were made that were entirely different from the ordinary hotel schedule rating. But the use of the words, "flat" and "non-scheduled", is rather vague.

The power of the Superintendent to reduce rates, as expressed in the revision, is related to cases where the profit derived, or to be derived, is excessive, discriminatory or unreasonable. I believe that the word "excessive" sufficiently describes the circumstances calling for the exercise of this power, and that the words "discriminatory or unreasonable" should be eliminated as potential trouble-makers.

In the same subdivision it is provided that where a finding of excessiveness is made, he shall order such rates correspondingly decreased. The word "correspondingly" may place an unwelcome burden upon the Superintendent and nullify his present power of compromise. I would recommend the substitution of the word "appropriately".

The death sentence for rating organizations which fail to comply with the law should be amplified to provide that the finding of the violation should be based only upon a final order of the Superintendent, not reversed upon review, and that the ban should be lifted upon removal of the violative condition. That power of the Superintendent has never been exercised, but it has been written in this second draft of the law that if a rating organization violated the law no company may thereafter contribute to its purposes, to its cause. That would mean that once a rating organization violated the law, however trivial the violation may be it would be a death sentence to the rating organization.

The provision in the first draft permitting an assured to agree to pay a higher rate, in order to get coverage where he wants it, has been dropped in the second draft. I have never heard a sound argument against this provision and consider its omission unfortunate.

Accident and health insurance and title insurance are brought under the rating law in the revision. There is some doubt as to the necessity for or suitability of these additions, and the business affected should be fully heard on its objections.

The patience, perseverance and talent of Professor Patterson in designing the voluminous document called, "The Law Revision", is deserving of high praise. Few people realize the sincerity of his purpose to produce an eminently fair and yet comprehensive law.

PRESIDENT SENIOR: Mr. Hobbs, at my request, prepared a memorandum* concentrating attention to certain parts of the revision; one part dealing with the declaration of dividends by stock companies, another part dealing with reserves of casualty companies, and a third part relating to the limitation of amount to be written on a single risk. May I call upon Mr. Hobbs to give us his story of this memorandum in synopsis form?

MR. CLARENCE W. HOBBS: The story of this memorandum is a somewhat sad one to me because it involved the dispelling of an illusion. When I undertook the task I thought that it would be very simple; that all I would have to do would be to go to certain offices wherein sit learned jurists concerned with the legal affairs of company associations and get a full list of the sore points, if I may so call them, in the code. I visited two offices, was very pleasantly received and one gentleman indicated that he would write me a list, which he never has done; the other one indicated that he hadn't read the bill yet but that he would be very pleased to know what I thought about it. Having picked up a copy or so of the proposed code, I departed from their offices no richer than I went in, and in consequence spent some time in the library studying certain sections of this code.

It is not an easy thing to grasp the extent to which the code changes the present law. It is not merely a codification of the present law; it is the addition of considerable new matter, and how much new matter has been inserted can be gathered only by a careful comparison of the sections as they stand, with their sources. The sources can be found from the footnote in the tentative draft prepared by the Insurance Department, and while the sections appearing in that tentative draft have been changed in the final draft, the Act printed by order of the Legislature, it is necessary to take the final draft, go to the Insurance Department's draft and read the footnote at least, and then go to the law as it now stands and compare the first and the last.

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* Copy of the memorandum is annexed to the discussion.

That comparison was made with regard to three sections. To have carried the comparison further would have taken a great deal of time. I am particularly glad that Mr. Magrath has discussed the rating law, as I had strong desire to go through that myself but found the task was going to run into so much time that I did not undertake it. I had, incidentally, a rather limited time at my disposal, for the President was clamoring loudly on my telephone almost daily to learn if I had prepared the statement. So I confined myself to just three sections.

One section, Section 91.5, relative to the declaration of dividends by stock companies, is stated in the draft of the Insurance Department to be based upon the analogy of present Section 117 extended to include casualty and surety companies, but the provisions of Section 117 consist merely of a limitation of the right to declare dividends exceeding in any one year 10 per cent of the capital stock unless there is a surplus to policyholders at least equal to either 30 per cent of earned premium liability or 50 per cent of outstanding capital stock, whichever shall be greater.

On top of that limitation, the Insurance Department inserted two other provisions; the first being that no stock, casualty or surety company may declare or pay any cash dividend except out of earned surplus, meaning thereby surplus less contributions to surplus, less also sums representing appreciation in value of investments not sold or otherwise disposed of.

The second limitation was that no company shall pay any cash dividend unless after providing for such dividend its surplus to policyholders is at least equal to 50 per cent of the net premiums written during the preceding calendar year, that is, gross premiums written, less premiums returned or cancelled and less premiums for reinsurance on such business, as reported in its annual statement.

I have in this memorandum set out a fictitious set-up, if you please, the figures being put down more or less at random but with some attempt to preserve a proportion that was not absolutely impossible as far as a casualty company was concerned. This particular company was to have a $5,000,000 capital and a $15,000,000 surplus, making a surplus to policyholders of $20,000,000. $10,000,000 of the surplus has been contributed by

stockholders, during its corporate life; $3,000,000 represents the appreciation in value of its investment.

Now, under the first part of the section which I have described, the amount of the surplus which would be available for the payment of dividends would be $15,000,000, less the $10,000,000 contributed to surplus, less the $3,000,000 representing the value of appreciation of investments; that is to say $2,000,000.

Under the second condition, you must take one-half of the premiums written during the next preceding year and in the set-up I used that was set at $45,000,000, and I think it may be conceded that casualty companies rather often write between two and three times their capital and surplus in premiums. Half of that $45,000,000 would be $22,500,000, and since the surplus to policyholders is but $20,000,000, that means that the company would not be entitled to pay any dividend at all.

Now, when you compare that with the set-up under present Section 117, the difference is seen to be striking. Under that Section, the company would have something like $14,000,000 available for dividends and yet the note says that this Section is drafted on the analogy of present Section 117. I think it is a rather forced analogy.

Whether this is a fair provision, I do not undertake to discuss. It depends upon actual set-ups rather than upon a fictitious set-up. I tried to intimate to a member of the New York Insurance Department that it seemed rather a severe condition, and he overwhelmed me promptly by statements that the present surpluses of all casualty companies were fictitious; that they all of them had their statements loaded to the muzzles with padded reserves so as to make the surplus look decently small, but I think it may be submitted that a casualty company, faced with the very severe penalties imposed in this section on the declaring of a dividend not in accordance with the provisions of this section, would be in an extremely awkward position if it used any other surplus than that which appeared on its annual statement and unless that surplus was correct.

I think (and hope that some gentleman here will be able to expand upon it) the requirement as to amount of premiums is perhaps the most burdensome because there certainly are companies that write over twice their indicated capital and surplus.

The provision as to contributed surplus practically freezes into the surplus of the company any surplus which may be contributed. Now it might very easily happen that a company would put in a good deal of surplus to tide over a certain emergency, and after the emergency was past and the company in a sound condition might reasonably wish to draw that surplus down. Under this provision it couldn't do it; it would have to keep that surplus in its surplus account world without end, and it is not entirely certain that it could be drawn out even if the company went into voluntary liquidation.

Those points I mention as to Section 91.5.

Section 95, as to the reserves of casualty companies, makes several changes which are noted in this memorandum, and I don't think I will undertake to discuss them. Briefly, there is a considerable increase in the reserves for liability and for workmen's compensation, the changes being in the reserves for the three latest years. The present liability reserve is on the basis of 60 per cent of earned premium and this is marked up to 65. The present compensation reserve is on the basis of 65 per cent of earned premium, and this is marked up to 70, and there is a further increase made necessary by the fact that the rate of discount is changed from 4 per cent to 3 per cent. Just how that would figure out is a matter which I conceive is very worthy of the attention of the members of this Society, some of whom at least are familiar with the methods of setting up the reserves of casualty companies.

The criticism that I made upon the power given to the Superintendent's authority to modify proposed requirements is possibly not such a very serious criticism. We have perhaps gotten out of the way of considering the vesting of an executive officer with authority definitely to set aside the law as an infringement upon the constitutional division of the powers of government; but obviously if the executive officer has the authority to say that a company may set up a reserve less than the statutory standard, he is practically vested with authority to set aside the law.

On the other hand, I think it may be fairly conceded that all executive officers vested with the supervision of insurance companies have on occasion interpreted their laws with such extreme lenity in a case of need that it amounts to about the same thing.

I do not apprehend that any misuse would be made of the power by any one who was authorized to represent the State of New York.

The matter of the limitation of amount to be written on a single risk is a matter that is not so very important, I think, to any casualty company, although on that I am subject to correction. I think that the section ought to be changed so as to omit not only workmen's compensation but liability as well, because really the 10 per cent limitation means very little if anything as applied to a liability policy.

As to the knocking out of the contingent assets of a mutual company, as a basis for determining the amount they can write on a single risk, that, so far as casualty mutuals go, probably is not so very important unless, as I say, they undertake to write surety bonds.

The factory mutuals, of course, have a very large contingent liability and have used that very deliberately as a means of increasing the amount that they were able to write on a single risk. It might be a matter of some consequence to them.

On the other hand, the statement in the note that contingent assets, when a company goes into liquidation, seldom pan out at their full value is undoubtedly correct.

I think I have used up my fair share of time in discussing this matter and I take pleasure in leaving the floor to others who will speak with knowledge of the facts.

PRESIDENT SENIOR: My next speaker on the list will be Thomas F. Tarbell. Mr. Tarbell, may I call on you to continue the discussion?

MR. THOMAS F. TARBELL: My knowledge of the code in general is somewhat limited and, in addition, I, of course, have the further handicap of not being a lawyer. I have been interested in two phases of the law: one which you might term or define as that which deals with sections affecting the conduct of the business in certain respects; and the other the effect of the code on the financial situation of the companies.

In insurance legislation, it seems to me that the goal should be three-fold: any adequate and satisfactory law should aim to ensure the proper conduct of the business, the protection of the

policyholders and the general public, and I would like to add another, the protection of the stockholder, the individual who hazards his money in the enterprise.

Laws should not be unreasonably restrictive as respects the honest, efficient and well-managed company. Any efforts to control the situation of a small minority which we might term inefficient, poorly-managed or perhaps even dishonest companies, by statutory provisions which will be burdensome upon the majority of companies in the opposite category will, in my opinion, be most unsatisfactory both to the Department and to the companies and are likely to bring on worse problems than they attempt to solve.

Laws which raise high barriers to keep the minority, so to speak, the exceptional cases in check will tend to put all companies more or less in a straightjacket. I hesitate to repeat the old trite expression that you cannot legislate morals, honesty, good judgment and efficiency, but somehow I feel it may have some application to this case.

It seems to me that the new code attempts to provide automatically by statute a measure of control which in large part should be a function of supervision. Now, if I may be pardoned for referring to the State of Connecticut, we don't have so very much statutory insurance law. In fact, anticipating one phase of this subject, the reserves for compensation and liability losses are not covered by any specific statute, but we do have, we feel, adequate supervision. That might be considered as the opposite extreme from which I conceive the proposed code. I think that the answer lies somewhere in between these two extremes and I might say that the balance, so to speak, that exists at the present time as between the statutory control and supervisory control in New York has worked out pretty satisfactorily.

The new law, the proposed code, if enacted, will automatically set up very rigid standards of solvency. That is accomplished by certain restrictions on the valuation of assets and also by the requirement of certain additional reserves, particularly for the compensation and liability lines.

Mr. Hobbs has mentioned the restrictions on payment of dividends. Several of us were discussing that matter rather briefly last night and we had a solution, but Mr. Hobbs has almost dis-

couraged me from mentioning it. We came to the conclusion that if a company got in a rather bad financial strait and had to get more money, the only way that they would get it would be to have a sort of an agreement that when they got on their feet they would liquidate the old company and form a new company and thus the contributors and stockholders could get their money back; but I notice Mr. Hobbs thinks possibly that won't work.

There are two items in particular that I want to mention in connection with the assets and liabilities. In connection with assets, one of the major changes (I am not talking at all about any restrictions on investments but merely a change in the law that would affect the assets for which a company could take credit) is that of premiums in course of collection. The present law provides that companies may take credit for premiums in course of collection not over 90 days due. That law in those states where it has been a law has been in effect for a good many years, I don't know how many, and has affected the policies and practices of the companies and the agents. Agents have operated more or less on a 60 to 75-day basis in paying their accounts or for their premiums, and I feel that even the pressure of a law reducing the period to 60 days, as proposed in the code, would not be sufficient to enable the companies to require the agents to change their basis of reporting. It would be rather revolutionary.

If that is the situation, it would simply mean that the companies would automatically be deprived in their assets of about one-third of the premiums in course of collection and that is a lot of money for most companies.

The other item is the question of loss and loss expense reserves for liability and compensation lines. The first draft, or at least the first published draft, the one that was the subject of the hearings last year, set up standards very much higher than those contained in the present draft. It is not necessary to go into that. They have been eliminated and the only changes from the present requirements of Section 86 are the increasing of the percentage of earned premiums for liability from 60 to 65 per cent and for compensation from 65 to 70 per cent.

Now, five per cent of the earned premiums for these lines also will amount to a lot of money. It is true that these percentages may not be sufficient for certain companies under certain condi-

tions, or may not be sufficient for all companies under certain conditions. However, these percentages, or rather the reserves computed on the basis of these percentages, only establish a minimum reserve. There is still the provision in the law, or at least will be, which is there at the present time, empowering the Superintendent to increase the reserves if the percentages do not produce a sufficient reserve, and that has been given practical effect for a series of years by requiring in Schedule P that the present value of the claims be shown, as well as the formula reserve, and if such present values or individual estimates produce a larger reserve, then the larger reserve must be carried as a liability.

I am sure none of us quarrel too much with some of the objectives which the Insurance Department desires to achieve, but, to use a current phraseology, we don't approve of the methods of attaining those objectives. I am very fearful myself that if this code should be enacted into law in its present form the companies would be put into such a straight-jacket that in a time of stress or difficulty, because of economic or other reasons, companies might be forced out of business on the basis prescribed, whereas, in fact, they would be highly solvent.

Taking the liability and compensation reserve as an example, at the end of 1937 the ten leading companies had reserves of $161,000,000 for liability and compensation. On the proposed basis, these reserves would be $175,000,000, or an increase of $14,000,000, and the percentage increase would be 8.9 per cent. The surpluses of those same companies were $111,000,000 and this would be reduced to $97,000,000 or a depletion of 13 per cent. In the case of one large company, the new basis would require an increase in reserves of about $5,500,000. In addition, the 60-day limitation on premiums in course of collection, assuming that it was unable to convince its agents to come across earlier, would take from its surplus another $2,500,000, assuming that it would affect one-third of the premiums. Well, that is $8,000,000 and that is a lot of money to come out of the surplus of any company.

PRESIDENT SENIOR: What is $8,000,000 in these days, Mr. Tarbell?

MR. TARBELL: It is something to an insurance company.

The other change in Section 86, the reduction of the interest basis from 4 per cent to 3½ per cent seems to me reasonable. I don't think anybody will quarrel with that, at least not in view of the experience with interest rates over the past few years, or the prospective trend in the next few years.

It seems to me that if the code does go into effect the companies won't need to worry about dividends at all. That will be a matter purely theoretical for a good many years.

Perhaps I could make my thoughts a little bit clearer by stating the matter this way: I think the Department should give more consideration in its attitude on the code to what we might call the "going concern" phase of the insurance business. It may be a fact that its experience in the past with defunct companies has shown that the premiums in course of collection are a doubtful asset, but in the case of laws governing practically all other corporations and the valuation of assets more consideration and weight are given to the value of the assets as a going concern. That is quite generally true. Take for instance a manufacturing concern that necessarily requires a large plant, possibly in an isolated location; the value of that plant is a certain amount to the corporation as a going concern, but if it were to liquidate that value might shrink 90 per cent.

Now, referring to the premiums in course of collection, it has been the experience of the companies that over the years and from the standpoint of a going concern, the loss on such items is less than one per cent; considerably less.

I might also mention briefly the matter of valuation of bonds.

The original draft of the law did not permit casualty companies to amortize their bonds. The revised draft permits this at the discretion of the Superintendent under certain conditions which I will quote. "If he finds the interest of policyholders so permit or require, to permit or require any classes of insurers to value their bonds or other evidences of indebtedness in accordance with the foregoing rules," that is, on the amortized basis. It seems to me that there should be a definite provision in the law which would permit casualty companies to amortize their bonds without any further permission on the part of the Superintendent. Here, I think, the going concern view should be taken of the situation.

That concludes the remarks that I have to make, but I would like to express the hope that some basis or plan or method can be worked out and amendments put into the proposed code whereby the casualty companies will not be placed in a straight-jacket which may prove detrimental not only to the companies but embarrassing at some future time to the Insurance Department.

PRESIDENT SENIOR: I shall now offer the opportunity to the Insurance Department to defend itself against the strictures presented by Mr. Hobbs and Mr. Tarbell. May I call upon Mr. Joseph F. Collins, who had an important part in the preparation of the code, in fact, I think he is spending most of his waking hours still working it out.

MR. JOSEPH F. COLLINS:* I might say at the outset I am not speaking entirely for the Insurance Department. I want to say that I am not the author of some of the subjects which have been discussed, but I will attempt at least to give some explanation as to some of the reasons behind the attempt to set forth revisions in the statute which may have good effects.

I would like to tell Mr. Hobbs that the problem with regard to the question of contributions to surplus has been removed by an amendment in the second draft which only includes contributions to surplus made during the last three years.

Now, in regard to the so-called restrictions on dividends, I believe that part of the reason for this provision is to set up some form of control of the volume of premiums written by a company. It may possibly be that a limitation of premium volume to two times the amount of surplus to policyholders may in a few cases prevent dividends. It probably would be up to those individual companies (I don't know how many there are) to bring forward their objections, but I have been told by Mr. Wheeler that practically all of the companies come within the requirement of having at least half of their premium volume in the form of surplus to policyholders.

Now, in regard to Mr. Tarbell's thought in connection with the increase in the percentages in Schedule P, based upon earned premiums, it was at least my thought that this other clause in the

* Mr. Collins appeared on invitation.

revision that Mr. Hobbs referred to as giving the Superintendent the power to decrease reserves might authorize some formula which would take into consideration the actual developed loss ratios of the companies. Even without this increase in the percentages from 60 to 65 and from 65 to 70 in compensation, there have been certain companies which have objected to the lower percentages.

Take some of the reinsurance companies that confine their business to a large extent to excess. Of course, it is known that on excess business the loss ratios run down possibly below 40 per cent. As you also know, the New York State mutual companies have been permitted to reserve on compensation on Special Schedule R, which is considerably below the standards of Schedule P.

For a short time of about six months I was in the Bureau in charge of the New York mutuals, and I did have an idea that we might possibly do away with Schedule R by some formula based on Schedule P, which would add a contingent factor of possibly two or five points higher than the companies' own developed loss ratios. I am not saying positively, but I do believe that under this provision the Superintendent could provide for a flexible Schedule P which would have a reasonable margin over the developed experience of the companies in the third, fourth and fifth year and which would in case of favorable experience reduce the 65 or 70 per cent.

I might say that where the companies have shown loss ratios higher than 60 per cent the Insurance Department has had a tough time getting them to put up reserves higher than 60 per cent. If we have Schedule P on a statutory basis up above 60 per cent, then it will be up to the company to prove that it should be less. I wonder if I have answered Mr. Tarbell sufficiently on that.

MR. TARBELL: I might say, Mr. Collins, that leaves the company, so to speak, at the mercy of whoever happens to be Superintendent at the time. One Superintendent might have what we call a reasonable view of the subject. Another Superintendent might feel, "Why, we need a greater margin here". My thought is that we should have a minimum requirement and then perhaps a formula which would take into account the experience of the individual company which would be, let us say, a maximum.

MR. COLLINS: I believe that the Casualty Bureau would rather

have the company at the mercy of the Department than the Department at the mercy of the insurance companies.

MR. HOBBS: But still I don't suppose you would favor dropping the whole code and inserting a simple provision that the companies shall conduct their business in any way which the Superintendent of Insurance shall direct?

MR. COLLINS: If Professor Patterson is here today he can talk to you about that.

I might also say that the Casualty Bureau during the depression had quite a number of casualty companies which failed, and it also had a lot of casualty companies which were rescued and bailed out by their fire affiliates, and perhaps it is still mindful of those conditions and wants to be on the safe side. I do realize that there is a little bit of a squeeze there by setting up reserves and also jacking up the capital requirements and possibly the surplus in connection with dividends, but I don't think we have gone far enough on this question of controlling of premium volume, because it only appears in the code in regard to the casualty companies.

There should also be a limitation of volume for other kinds of insurance. Today it is an admitted fact that the fire companies are very much over-capitalized and they are lucky if they get enough premiums to just one-time their capital and surplus, but in theory the thing should be applied to all insurance.

I'd like to answer something that Mr. Magrath has mentioned. I do agree with him that the provision in regard to the charging of higher rates where a man cannot obtain insurance is desirable, and I believe it may be a necessity at some time in the future when the occasion may arise for the need of an assigned risk pool if and when there is a compulsory automobile insurance act; but after I became acquainted with the rating law I have looked with some doubt as to the wisdom of the language in regard to the regulation of rates and the periodic adjustment of rates solely on the basis of whether there has been a reasonable or excess profit. Taking it literally, it places no limitation or restriction whatsoever on the expense factor in the rate. That means that if there were no such thing as competition, conceivably the acquisition cost could keep going higher and higher and the companies would be always guaranteed a profit. I recognize that there are competi-

tive factors which control that, but I have seen some statistics running back to 1916, where the average acquisition cost in 1916 was somewhere down near 20 per cent—between 20 and 25 per cent. About ten years later it was up around 27. Acquisition cost now is way up around 34. That, of course, is something to be considered.

Mr. Magrath spoke about the accident and health business being subject to the rating laws. I know that if we have to take it over it will be on a sort of half-way basis until such time as it may be standardized, but I was wondering also whether or not we should have included some part of the inland marine business. I do know that there is a certain amount of overlapping of coverage which is rated for the casualty companies and also rated for the fire companies, although it is usually the same fire company that does the inland business.

I don't expect to answer Mr. Tarbell about the 60-day business. I am not expressing an opinion on it.

I notice on the program that there was a paper previously submitted by Mr. Dorweiler which bears on a thought that recently came into my mind that there will have to be a slight adjustment in the Casualty Experience Exhibit with regard to the income tax paid by the companies. I don't know how they balance it now, if they put all of the income tax in there. They must balance it by putting in a part of the income tax. I don't know whether I have covered the ground thoroughly. If there is anything that I have passed by, I would be glad to discuss it. I wish to express my thanks for being invited here today.

PRESIDENT SENIOR: We have with us now really the Hamlet of the play. I am very glad to announce the presence of Professor Patterson, who is the chief author of the proposed revision of the insurance code. I am sorry he wasn't here to listen to the criticism presented by Mr. Hobbs and Mr. Tarbell, but I think there will be time to answer any questions that may come up yet. Professor Patterson, may I ask you to come to the front?

PROF. EDWIN W. PATTERSON:* I am very sorry to have been late, but I was unavoidably detained by a faculty meeting. I am very sorry I didn't hear the previous discussion. Hence I shall

* Professor Patterson appeared on invitation.

have to take up the topics for discussion seriatim and perhaps I shall repeat some of the remarks that have previously been made.

I appreciate very much the honor of being invited to address the Casualty Actuarial Society. I always had a great awe and respect for an actuary because I never quite understood just what he is. Everybody knows what a lawyer is or what a doctor is, but an actuary has just a mysterious sound and when you add on the word "casualty" it certainly makes a most terrifying combination of polysyllables. A casualty actuary must be a sort of prophet of doom.

So we are here today to see how far the insurance law affects the work of the prophet of doom. I can't go into the technical details to the extent to which Mr. Collins has gone, and therefore I want to say a few words about the revision in general before I take up the discussion of the three sections which are listed on your program.

The revision was introduced into the Assembly in 1938, and that bill, which is numbered 3,010, Introductory 2380, is the bill upon which we proceed henceforth. We refer to that as the Second Draft. The Joint Legislative Committee took a great many of our recommendations and made changes in the tentative draft which were incorporated in the second draft, but, owing to lack of time and other considerations, the Joint Committee did not insert a number of recommendations which the Insurance Department Committee made to them, and hence the Insurance Department is still making recommendations for changes in the second draft.

We have now gone over Articles I to V of the second draft especially with a view to condensation. The revision has been criticized from various quarters because it is too long. Partly this is due to the fact that Mother New York tolerates a great many chickens in her brood, and hence we have to have a different Article or a different Section for each chicken. In other words, we have a great many different kinds of insurance companies and kinds of insurance. That is unavoidable.

On the other hand, we have found that some of the provisions are repetitious and unnecessary and that they can be deleted. In some cases an additional sentence may serve to clarify the law for the benefit of the uninitiated, and when I originally drew these

provisions, as I did in most instances, I tried to make the law intelligible to a judge or lawyer who had not had previous experience in interpreting insurance law.

I now feel that perhaps that attempt, although a noble attempt, did not justify the expense of ink and paper which is necessary to carry it into effect, and so wherever a provision seems clear by implication we have endeavored to delete the explanatory matter and to leave the substance and core of the provision.

We are preparing to print these recommended changes in the form of a Supplement which will be issued by the Superintendent of Insurance within a few weeks and distributed to the insurance companies. This Supplement will give the recommended changes on Articles I to V and will merely indicate the part to be deleted and the substitution if any. In order to use this Supplement it will be necessary to go over the second draft and correct it and insert the part to be inserted and delete the part to be taken out. Since we expect the individual companies to do this on all their copies, we are circulating only a limited number of these changes. The Supplement will also contain a complete table which we have prepared showing all of the changes which were made in the tentative draft and incorporated in the second draft, so that a clerk going through the second draft can mark the parts that are new and indicate the omissions.

There are a few features about the second draft which I want to mention just in passing. First I call your attention to the definition section which is Section 3. We find that this Section saves a great deal of space and I particularly urge any one who is using this revision to keep one thumb at the definition section for the definitions of terms used in various parts of the statute.

We have made a distinct improvement in the clarity of administrative procedure. Someone was speaking a moment ago about the arbitrary action of the Superintendent. The present statute makes no express provision for notice and hearing before administrative action on a great many important questions. It does make provision for notice and hearing on agents' and brokers' licenses, but not on questions which affect insurance companies.

In Sections 22 and 23, we have general notice provisions and we have also made a clear distinction between administrative orders and official regulations or rules of the Department. We

have incorporated a definition of "insurance contract" and "doing an insurance business" which we hope will prevent some of the litigation which goes to the Appellate Division and the Court of Appeals every year to determine what is an insurance business.

We have broken down the three-part classification of insurance which has become classical in this country by listing the kinds of insurance under 22 or 23 different headings thereby making it very easy to permit the writing of multiple-line insurance whenever the insurance industry is prepared for that change.

We have made a limitation on similarity of name which may escape the attention of some of you. Whereas the present law forbids a new company taking the name of an old company engaged in the same line of business, the new law prohibits a new company from taking the same name as any company engaged in the insurance business. We think that will be a good thing to prevent the possibility of one company stealing the good-will of another even though it is not engaged in a competitive line.

And finally I call your attention to the investment provision which in the second draft now provides that all classes of companies must have investments equal to 70 per cent of reserves in those classes of investments which are eligible for life insurance investments. We believe that that will be a decisively stabilizing factor in the fire and casualty insurance field. We find that very few of the present New York companies will be adversely affected by it, and we believe that it will serve to keep out of this state a number of companies which would like to be admitted but which could not meet that requirement.

Now, coming to the provision which seems to have aroused the most discussion today, the one relating to stockholders' dividends, I want to comment on the three sentences in subsection 1 of Section 91.5 which begins on page 436 of the second draft. The Department Committee recommended to the Joint Committee that the contributions to surplus out of which dividends could not be paid should be limited to those made within the preceding three years. This recommendation was not incorporated in the second draft. I think the general principle that dividends should not be paid out of recently-contributed surplus is a thoroughly sound principle. A company should not be allowed to contribute

surplus to a faltering subsidiary, to get the surplus credited to the subsidiary in its annual statement, advertise the surplus as a part of assets of the subsidiary and then take it back by a cash dividend before the policyholders have had a chance to get a smell of it.

The doing of business through holding companies is in other fields being severely criticized and unless its abuses are checked the time will come when the revolt against corporation management will bring about the entire abolition of the business corporation as a device for attaining limited liability.

Therefore the thing to do when a device is working badly in certain instances is to restrict it so that it does not work badly in those instances rather than to let it run on to its ultimate abolition.

I agree with President Butler who said, in a recent book or address, that the corporation device was one of the most significant factors in the development of American business. But it is subject to abuses and those abuses must be checked. Now, the parent company which sends its pup out to bite the insuring public must be responsible for the pup. However, the Committee realizes that it is not practicable to trace contributed surplus over a long period of time as an accounting matter, and therefore we believe that this provision should be limited to surplus which has been recently contributed.

The second sentence of Section 91.5 states a rule as to the payment of dividends which is in accord with the practices of the domestic casualty and surety companies in New York. Mr. Wheeler has made a careful check of the annual statements of 1935 and 1936 and he assures me that no domestic company paid dividends in either of those years without conforming to the rule laid down in the second sentence, namely that the surplus to policyholders must be at least equal to 50 per cent of the net premiums written during the preceding year.

This sentence will serve as a limitation upon the company whose business is declining, the company that is faltering and headed toward liquidation, because it will have to measure its surplus to policyholders by reference to the net premiums written during the next preceding year, and if the premium volume is falling off that will mean a higher surplus due to this restriction.

On the other hand, the third sentence of this subsection applies only to abnormal dividends, those which are in excess of 10 per cent of the outstanding capital stock, and this sentence is taken directly from Section 117 of the present law which is applicable to fire insurance companies.

The unearned premium liability under this sentence and the outstanding capital stock will be determined as of the date of declaration of the dividend, and therefore if the unearned premium liability is higher at that time, that will mean that the increased unearned premium liability or reserve will increase the amount of required surplus to policyholders. And the alternative limitation of 50 per cent of capital stock is also based on Section 117 and is intended to apply to a case where the outstanding capital stock is very large in proportion to the free surplus, in which case the 10 per cent dividend, since it is 10 per cent on the capital stock, will be correspondingly larger.

May I call your attention to the last sentence of subsection 2 of this Section which limits the bringing of an action against directors or stockholders to the Superintendent as official liquidator. We believe that that is a fair provision and one which the companies ought to appreciate because it makes it impossible to have a strike suit by minority stockholders for the purpose of surcharging directors and stockholders because of a declaration of dividend. As a practical matter, while the statute prohibits the payment of these dividends, the question of surcharging directors and stockholders does not become important until the company goes into liquidation.

Now, coming to the loss and expense reserves, Section 95, which is on page 457, I hope you will note that the Insurance Department has withdrawn the proposal contained in the original tentative draft that the valuation of suits in litigation under personal injury liability policies should be based on the date of claim rather than on the date of the policy. We feel that the date of claim is a more significant date for that purpose, since the older the suit or the injury presumably the less chance of settling it for a small amount, but when the company representatives showed us that this would require a change in their bookkeeping methods we felt that we didn't want to be pigheaded about it and so we have withdrawn that proposal.

I wish to call attention to cases in which we have made some concessions, although they were right in principle in the first place. Eventually I hope, personally, that the time will come when we shall not have to have this annual renewal of casualty policies. It is a wasteful practice. Whenever that time comes you may have three and five year liability insurance policies, in which case the date of the policy will become less and less reliable as a significant determinant of the probable amount to be paid under the suit filed under that policy. That is, one suit is filed during the first policy year of one policy, another suit comes in the third policy year and obviously on this theory the date of issuance of the policy, as a measure of the seriousness of the claim, will break down.

The increase in percentages was justified, we felt, by the experience of the companies during recent years. To meet the objection that the experience might change and these percentages might prove to be too high in future years, rather than attempt to forecast the future optimistically and put the optimistic forecast in the statute, we put in a provision for administrative discretion. That is, the Superintendent in subsection 7 is permitted to increase or decrease the required resrves if he finds that the reserves required by the statute are excessive or inadequate.

I am a little bit surprised to find that this provision is objected to. The question of constitutionality has been raised. In my judgment there is very little doubt about the constitutionality of a provision which permits an administrative official to vary from the statutory requirement in favor of the individual citizen or the private company. That is what is called in administrative law a "dispensing power." It is generally recognized that it is proper for the Legislature to establish a general rule and then permit an adminstrative official to make dispensations in particular cases. The language in subsection 7 is so worded that it applies to any casualty or surety company, and that means that he would make the dispensation in individual cases based upon individual experience, which seems the proper way to do it.

Throughout the discussions of the revision I have been interested and somewhat amused in noting the variation between two arguments against it, namely, either not enough discretion, or too much discretion. It has been criticized from both sides and it is

very hard to strike a balance between too much discretion and not enough discretion.

Personally, I think this dispensing requirement may prove to be a headache to the Insurance Department, but I am not in the Insurance Department permanently and since they think it is all right, I see no objection to it.

The minimum of 10 per cent on fidelity premiums and 5 per cent on surety premiums has been mentioned in Mr. Hobbs' memorandum. I believe the theory of that provision was that since there is an exposure to liability under certain types of bonds on which there may be no losses during the particular year, the companies should be obliged to maintain some reserve at a consistent figure for the unreported losses under those bonds.

The formula for workmen's compensation premiums, as you doubtless understand, was changed because the workmen's compensation law prescribes three and a half per cent basis of calculation.

The limitation on credit for reinsurance to authorized insurers is in accordance with the settled practice of the Insurance Department, and in my judgment that is one of the most vital provisions for the protection of the policyholder.

Now we come to the section on limitation of risk, and I have only a few words to say about that. We have endeavored to work out a special formula for limitation of risk in the case of mutual fire insurance companies, but we do not feel that the contingent assets in the form of policyholders' liabilities is a sufficiently stable asset to be counted in determining limitation of risk.

I judged that Mr. Hobbs' memorandum was meant to raise the question, why 10 per cent? I agree I don't understand myself why it should be 10 per cent rather than 5 or 15 or 20 or some other figure, but the 10 per cent limitation has been in the statute for a long time. It does provide a working rule for the small company. If you look at this picture of regulation of insurance companies as a whole, you see that there are certain provisions which particularly affect the small company, the minimum capital requirements and the 10 per cent limitation of risk, and then there are other provisions which particularly affect the larger companies, such as the limitation on dividends, which I pointed out previously.

The minimum capital is just a starter for a company organizing and should not be regarded as adequate capital for a company after it has increased its premium volume.

I would like to point out that we could not include workmen's compensation in the 10 per cent limitation because the workmen's compensation policy does not specify an upper limit of liability, and we did not know of any reliable method of determining the exposure to coverage under workmen's compensation policies.

MR. HOBBS: There is none, as far as I know, and the same thing is practically true about a liability policy.

PROF. PATTERSON: At least the liability policy fixes an upper limit, such as $5,000 on one life and $10,000 on one accident.

The highest limit I have heard of is $300,000, which is regarded as unlimited liability, I think the liability policies, at least in this country, always specify an upper limit.

MR. HOBBS: But you may have any number of claims on one liability policy, theoretically.

PROF. PATTERSON: Yes, as I say, this limitation would apply chiefly to the small companies and would say that a small company ought not to issue a policy under which it might be called upon to pay $100,000 on one policy unless it has surplus to policyholders of $1,000,000.

MR. HOBBS: There is no stop limit on any liability policy.

PROF. PATTERSON: You mean you could have a series of accidents.

MR. HOBBS: You could have a series of accidents, on every one of which you might pay the maximum stated in the policy.

PROF. PATTERSON: That is true, but we considered it rather unlikely that the same person would have a series of accidents. These policies all have cancellation clauses and that oughtn't to be overlooked.

I also call attention to other provisions which somewhat relax the limitation of liability in favor of casualty and surety companies, namely Section 92 in the second draft, page 437, which carries forward in substance the present law as to the fidelity and surety risks and also Section 94.7 which permits any company to insure $10,000 on any one personal injury risk.

I think that is all I have to say by way of general comments and I would be glad to answer any questions if possible.

PRESIDENT SENIOR: Professor Patterson, pardon me, there was no intention on our part to limit you to any particular sections of the revision. Of course, you understand that. If you want to expand by giving some story on the philosophy and the theory underlying the revision, we would be glad to hear from you on the general background.

PROF. PATTERSON: Your Chairman has suggested that you would be interested in hearing some more general comments about the revision. I think that any one who attempts to read certain sections of the present law can readily understand the motivation for this rather ambitious attempt to revise the insurance law. The other day a representative of a Canadian company came in to ask for an interpretation of Section 28 of the present law which relates to the trusteeing of assets by companies in foreign countries. Well, it took the Superintendent, two deputies and myself to answer his question, and even then we were very doubtful.

We hope that we will be able to clarify a good many of these provisions. The insurance law has just "growed up" like Topsy by a series of amendments. Each Superintendent found something that needed correcting and he put in an amendment and stuck in a sentence here and there. The continuity is broken and there is no orderly arrangement of the ideas.

Now, we don't hope that this revision, if enacted, will escape amendment, but at least we shall start with a clean slate, with a bill that has been drawn at one time and by the same group of people with the same ideas in mind, and it certainly ought to prove easier for any one to read and interpret.

Then, of course, the insurance law is encumbered by a good many provisions which are entirely obsolete and which ought to be taken out, and yet when you begin to perform a minor operation of taking out those provisions you find that sometimes they are connected with other provisions and you are pretty soon led into a rather extensive revision of the whole thing. We therefore decided to undertake a complete revision of the statute.

Now, one of the problems was to bring together in a group of general articles as many provisions as possible which were com-

mon to all types of companies, and Articles I to VII at least represent that attempt. Article VIII, dealing with rates, is also of very broad application.

The general provisions for organization of insurance companies need not be repeated in connection with each company because the same procedure is followed in each case, and it isn't necessary to say four or five times that the Attorney General must approve the charter and that the notice must be published for four successive weeks in the newspaper. Those provisions are set forth in Article IV.

We have also put in Article IV a general classification of kinds of insurance business. Despite some criticism of our definitions, I think personally that they have stood up pretty well; that the classifications and groupings that we have made will confirm to the lines along which the business now runs; and that the definitions are reasonably clear.

The investment article is perhaps the core of the whole law because the primary purpose of insurance regulation is safety and safety depends largely upon the character of the companies' assets. Article V determines the character of those assets.

When it comes to the determination of the minimum capital which a company must have to engage in business, I think every one recognizes that any amount you set is somewhat arbitrary. A competent and honest group of men can start a company with a small capital and make it go and grow into a large company and be successful. We all know that that has happened and it can happen again, and yet experience has shown that a great many companies have failed which did have small capital. It is not fallacious to reason that the small capital was a cause of the failure. Hence we have proposed fairly severe restrictions upon the amount of minimum capital which may be permitted especially in the case of casualty and surety companies. There is one consideration which to my mind makes the regulation of this type of company more important than that of the fire companies, (though not any more important than the life companies), namely, that a great many of the casualty policies involve the third party liability. It seems to me most unjust to deprive an injured person or an injured workman of his claim because the policyholder didn't choose the right kind of a company. Hence there is a

peculiar public policy involved in the regulation of companies which insure for third party liability.

I think, Mr. Chairman, that is all I have to say.

PRESIDENT SENIOR: Thank you very much, Professor.

The Chair now invites discussion from the floor.

A MEMBER:* I would like to ask Professor Patterson in regard to the administrative decisions of the Superintendent—may he give those arbitrarily or must he perforce have a hearing so the company affected will be able to give its side of the argument? I have in mind the Federal Supreme Court's recent decision on administrative decisions of that nature, and I was interested to know whether anything has been put in there so that the arbitrary part that Mr. Tarbell referred to might be taken care of and the company given a chance to give its side of the case.

PROFESSOR PATTERSON: The question is whether or not the revision requires notice and hearing before administrative decisions. The revision contains in numerous places specific requirements that the decision shall be given only after notice and hearing to the persons affected, and Article III specifies the kind of notice and the kind of hearing which must be given.

We did not put in any provision that every action of the Superintendent shall be preceded by notice and hearing. We discussed that possibility and we felt that there were too many decisions on which the company presents its own data and the Superintendent makes his decision from the facts shown by the company. Also, we did not want to encumber the record of the Department with too much red tape, but you will find if you will go through this revision carefully that all of the important decisions, such as those affecting the revocation or refusal of a license, are subject to notice and hearing and they are also subject to judicial review by express provision of the statute so that the company does not have to go to a court and argue to the court that this is a proper case for review.

The statute provides that the company is entitled to a judicial review and the first stage of the review procedure is therefore eliminated. Perhaps I should explain that New York has for many years used certiorari as a method of review. Under that

* Name of member omitted by request.

proceeding there are two stages: one to show the court that this is the proper kind of decision for a court to review; and, second, the review itself after the first question has been answered in the affirmative.

We have cut out the first stage in all cases in which we specify judicial review. I wish to emphasize again that this revision provides to a much greater extent than the present insurance law, or than the insurance law of any other state in the Union, for notice and hearing before official action and for judicial review after official action.

MR. MAGRATH: Regarding Section 91.5 concerning the declaration of dividends by stock companies, is there a similar provision concerning other than stock companies?

PROF. PATTERSON: Mr. Chairman, this provision relates only to dividends on capital stock and it could only be applicable to a stock company, but there is a provision further on as to declaration of dividends to policyholders of mutual companies.

MR. MAGRATH: Subject to similar standards?

PROF. PATTERSON: They must be approved by the Superintendent of Insurance.

MR. MAGRATH: These are rather severe standards; the superimposing of B upon C is rather a severe requirement upon the payment of dividends, and the payment of a 10 per cent dividend on capital stock is not a very high dividend in view of the fact that those companies are organized with a surplus of at least equal to capital stock, and sometimes double capital stock, so that on the original investment 10 per cent dividend on capital is a much smaller dividend on the original investment.

PROF. PATTERSON: There is a provision in Section 94.6 as to dividends of mutual casualty insurance companies, but this Section does not establish any definite rules as to the payment of dividends.

MR. MAGRATH: I notice that in the language quoted there is no reference to it being dividends on the stock of the company. It simply says "cash dividends".

PROF. PATTERSON: On page 436, lines four and five, "no stock casualty insurance or surety company shall declare or pay any

cash dividend on its capital stock except"—and the next sentence is "no such company shall pay any cash dividend on its capital stock". There is no limitation on stock dividends.

MR. MAGRATH: I was just reading the quotations from Mr. Hobbs.

PROF. PATTERSON: Mr. Hobbs may edit that.

PRESIDENT SENIOR: Mr. Hobbs is cogitating upon the proper repartee. While he is searching for his material, may I call for further discussion? Are there any questions or further discussion on this subject?

MR. TARBELL: Mr. Chairman, I might explain for the benefit of Professor Patterson that I gave my views on certain phases of Section 95 before his arrival, particularly the loss and loss expense reserves, and I won't attempt to go over the ground. I am sure that the companies appreciate the fact that the committee did eliminate the provisions as respect loss and loss expense reserves in the original draft, but I don't feel that the present provisions in the second draft are satisfactory; that they do place the minimum requirement at too high a point. I feel that some basis should be considered whereby the present minimum would stand as in Section 86 and some formula, so to speak, be developed if more than that minimum is required.

I would also like to ask Professor Patterson one question in regard to dividends. The proposed provision, as I recall it, eliminates from surplus any unrealized appreciation. Now, it is the practice of quite a few companies to carry as a liability a contingent reserve or special reserve or security, fluctuation reserve, by whatever name or term it is designated, equal at least, we will say, to the amount of appreciation taken credit for as an asset. Now, by doing that the company has already eliminated that appreciation from its surplus. Is there any provision in the code which would recognize that fact?

PROF. PATTERSON: We have a general provision in Section 40 where we thought we covered that question once and for all. I may say that as an accountant I am a perfect novice or even worse, but I soon discovered that the accountants could shuffle the cards back and forth and sometimes a thing is an asset and sometimes it is a liability.

PRESIDENT SENIOR: You are not referring to casualty actuaries, Professor?

PROF. PATTERSON: No, sir, only to other accountants, but we have on page 92 in the second draft, at the end of Section 40, a statement as follows: "Admitted assets may be allowed as deductions from corresponding liabilities and liabilities may be charged as deductions from assets," and we expect to add the following: "or deductions from assets may be charged as liabilities in accordance with the form of annual statement applicable to such insurer, etc."

So it would seem to me in the case that you speak of that the actual surplus to policyholders, as measured by the value of the securities valued in accordance with the statute, would be higher than the net value which you assign to them after deducting this contingent liability, and therefore that would be the amount of your actual surplus to policyholders.

MR. TARBELL: In other words, to take a concrete example, if the appreciation of a company's securities amounted to three million dollars, and that is a so-called non-ledger asset, and it carries as a liability a reserve for contingencies of three million dollars, do you feel that that section you have just quoted would permit those to be offset?

PROF. PATTERSON: Well, I would hate to answer that.

MR. TARBELL: If they wouldn't be, then you would have that three million out of your surplus twice, or a company would be discouraged from setting up such a contingent liability, which, in my opinion, would not be a sound thing.

PROF. PATTERSON: It would seem to me (but, of course, I am not the Superintendent making a ruling) that when you have once deducted your appreciation in investments, then the amount or value assigned to the investments which remains is available for distribution of dividends under this rule, since no appreciation of investments is included in the surplus which is counted for this purpose.

Another thing that we have trouble with all the way along is that surplus means one thing for one purpose and another thing for another purpose, and so we have tried to get away from using names for surplus for this purpose and surplus for that purpose,

but to use the general term "surplus to policyholders" and then let each company use any name it chooses for a guarantee fund or a contingency reserve or any other special type of reserve or fund.

MR. TARBELL: If you take your surplus to policyholders as the surplus to policyholders shown in the annual statement, then a literal interpretation of the law might penalize the company to the extent of that special reserve. Now, I believe that under past practice of the Department for certain purposes the Department has treated all voluntary and contingency reserves as surplus. That is for certain purposes I am quite sure, but I haven't found any provision in the code, although I admit I haven't read it very carefully, that would permit such a course to be followed in the future, and I thought of this specific example where I think it is of moment.

PROF. PATTERSON: It is a very good point. I wonder if Mr. Collins could answer that point.

MR. JOSEPH F. COLLINS: I understand the question. In computing the amount of surplus from which you can base your limitation of risk, we have always added to your reported surplus the amount of voluntary reserves. I believe the Superintendent, if he has this statute to enforce, probably would add any voluntary reserve to your surplus. We would make possibly one exception to that, that some voluntary reserves may be necessary, such as in the case of a company that has a large amount of real estate and mortgage loans. We don't think that that is surplus.

MR. HOBBS: The term is used in the Section, "surplus to policyholders," I believe at least in one portion, in the second portion. In the first part you use the term, "earned surplus." Surplus to policyholders is defined on page 8 (Sec. 3) as meaning the excess of total admitted assets over the liabilities of an insurer estimated and reported as the sum of all capital and surplus accounts minus any impairments thereof. The words, "estimated and reported," would seem to connote the amount set up as capital and surplus in the annual report. I don't think the term "earned surplus" is defined.

PROF. PATTERSON: It is defined in the introductory sentence of Section 91.5: "Meaning for the purpose of this section surplus

other than that attributable to contributions made within the past three years or appreciation in value of investments not sold or otherwise disposed of."

MR. HOBBS: Is the term "surplus" defined on page 8?

PROF. PATTERSON: That is an accounting term and we thought the meaning of it was generally understood.

MR. HOBBS: I don't think there is any question but what in the second part of Section 91.5 the term "surplus to policyholders" means the definition that is on page 8.

PROF. PATTERSON: That is quite true. Wherever we use that term it refers back to the definition in Section 3 and if you think that the language isn't clear, we should be glad to have any suggestion for its improvement.

MR. HOBBS: I am not the person who is undertaking to plead the cause of the companies, and I think perhaps I had better leave the task of bettering the work of your hands, so far as verbiage goes, to the official representatives of the companies.

PROF. PATTERSON: We shall be glad to have your suggestions because you have had the experience. May I call attention to the fact that the term "liabilities" refers to three sections in Article V which define the various kinds of liabilities, namely in the case of a casualty company the unearned premium liability, the loss and expense reserve liability and the miscellaneous liabilities which is defined as being taxes and other outstanding obligations. I don't believe that by any stretch of the imagination a mere bookkeeping reserve could be classed under the heading of liability. Therefore I believe the language on page 8 is sufficiently clear even when that definition is read into the language in Section 91.5.

MR. HOBBS: I don't know just at what point you would think a reserve is merely a bookkeeping reserve, and whether you mean to imply that the only genuine reserves are those that are required by law.

PROF. PATTERSON: Well, the only reserves that are referred to in the definition of surplus to policyholders are those that are required by law, but in reporting your assets you may report your assets as being thirteen million dollars with a contingency reserve of three million, or you may report your assets as being worth

ten million dollars, which is a conservative valuation of them. Now, in either case it seems to me in your asset account you are getting credit for ten million dollars of assets.

MR. TARBELL: I don't think that is quite correct. You haven't that option. According to the form of statement, which I don't think will be departed from, you must show your gross assets. If you have got the thirteen million of gross assets, you have got to report thirteen million; you can't cut it down to ten, say, and cut out three million on the other side. I shouldn't think so. Mr. Collins may have some ideas on that.

MR. COLLINS: Well, I think that you are talking about a lot of things that are unnecessary. If you are going to put up a voluntary reserve and then squeeze yourself, it is up to you as to whether you want the voluntary reserve or not.

PROF. PATTERSON: There is certainly nothing which says you can't pay a dividend by using a voluntary reserve.

MR. HOBBS: I would like to ask one or two questions. I understand that in Section 91.5 you have made a limitation—you have now limited or propose to limit the application of that Section to contributions to earned surplus during the last three years.

PROF. PATTERSON: That is correct.

MR. HOBBS: Of course, my criticism was directed to the statute in what I assumed was its latest form. Is there any such three-year limitation on surplus attributable to appreciation in value of investments not sold or otherwise disposed of?

PROF. PATTERSON: Well, we hadn't thought of that. It doesn't seem to be worth while to consider that. You mean if the company had held the investments for more than three years, then they should be allowed to take the appreciation on the investment and treat it as an asset for payment of dividends, even though they haven't been sold? Of course, you will note that if the company sells the asset, then it can pay cash dividends out of that appreciation. This limitation applies only if they are going to hold the asset, in which case it will be subject to the risk of depreciation in value due to a bear market. Subsequently they should not be able to pay dividends on the basis of a bull market.

MR. HOBBS: I don't know that it is a terrifically important

matter, because the greater part of the bonds of casualty companies are subject to amortization under present laws. They might, of course, realize a bonanza on some obscure stock holding that might somehow come to light, or, if they had real estate that assumed an abnormal value they would have something in their assets that until sold was clearly worth a great deal, and yet they would not be able to use that for dividend purposes.

PROF. PATTERSON: For cash dividend purposes. They could issue a stock dividend.

MR. HOBBS: Then one thing more. This second provision in Section 91.5, is that applicable to any other company?

PROF. PATTERSON: The second sentence, I believe, is not applcable to any other class of stock companies.

MR. HOBBS: Is it applicable to any class of mutual companies?

PROF. PATTERSON: It relates only to dividends on stock and could not be made applicable, unless you want to include policy dividends.

MR. HOBBS: It does not apply to policy dividends?

PROF. PATTERSON: It does not apply to policy dividends.

MR. HOBBS: It does not apply to fire companies?

PROF. PATTERSON: I can't answer that. I believe the same provision does apply to fire companies, and I believe there is a provision that applies to life companies which limits the amount of dividends that may be paid by stock life insurance companies. If you will give me just a minute I can find that section in the index to Article 9A.

MR. HOBBS: While you are looking for that ——

PROF. PATTERSON: Section 80.5 of the second draft relates to dividends of stockholders of life insurance companies, and there is a somewhat analogous provision at that point.

MR. MARSH: I would like to ask Mr. Patterson in regard to this reserve for incurred but not reported losses on the bonding lines. While I don't consider this increase from three and a half to five per cent on the surety section as burdensome I do wonder why the increase was made and also why the graduated scale for new companies was eliminated.

MR. COLLINS: You mean the reserve for unreported losses? I believe that is a rule in the Department now. It is incorporated in the statutes.

MR. MARSH: Ten per cent on fidelity and three and a half on surety.

MR. GOULD: The present reserve with respect to losses incurred but not reported on the fidelity and surety loss reserves were devised after having sent out circulars some years ago with respect to determining what the ratio of such losses bore to the outstanding loss reserves or to the unearned premium reserves, and the results of our examinations in recent years have seemed to invariably indicate that the reserves produced by formula were inadequate, as a result of which we were using for the most part the actual cases that were developed by determining on that particular examination. I believe it was with a view to that condition that the presently increased requirement has been proposed.

MR. MARSH: And that is on the surety section?

MR. GOULD: That is correct.

MR. MARSH: I happen to be chairman of a committee that went into this thing some years ago when we recommended 10 per cent on fidelity and three and a half on surety.

MR. GOULD: That didn't always obtain. They had a graduated scale.

MR. MARSH: And I guess that is eliminated also.

MR. GOULD: So far as I know that is correct.

MR. MARSH: And you found that even on the new companies —

MR. GOULD: That is correct. There seemed to be no differentiation there. We have only examined the New York State companies, but I believe that similar conditions would obtain with respect to all of them.

MR. MARSH: I don't think it is burdensome, but I hadn't heard of this other development and I just wondered why it was.

PRESIDENT SENIOR: I want to thank Mr. Patterson for his splendid presentation of the subject. Mr. Collins, I want to thank you for your presence and presentation.

Memorandum Relative to Certain Sections of the Proposed New York Code

1. Section 91.5. *Relative to Declaration of Dividends by Stock Companies.*

This is stated in the note to the original draft to be based on the analogy of Section 117 of the present law, applicable to fire companies. Section 91.5 contains three limiting provisions—

(a) No stock casualty or surety company may declare or pay any cash dividend except out of "earned surplus," meaning thereby surplus less contributions to surplus, less also sums representing appreciation in value of investments not sold or otherwise disposed of.

(b) No such company shall at any time pay any cash dividend unless, after providing for such dividend, its surplus to policyholders is at least equal to 50% of the net premium written during the next preceding calendar year; i.e., gross premiums written, less premiums returned or cancelled, and less premiums payable for reinsurance on such business as reported in its Annual Statement.

(c) No such company shall declare or pay cash dividends exceeding in any one year 10% of its capital stock unless it has a surplus to policyholders over and above that required by the next preceding section by an amount at least equal to either 30% of unearned premium liability or 50% of outstanding capital stock, whichever shall be greater.

Of these, the only one derived from the present Section 117 is (c); (a) and (b) are new. The difference can be seen in a concrete example:

A company has $5,000,000 capital and $15,000,000 surplus, making a surplus to policyholders of $20,000,000. Of its surplus, $10,000,000 is the amount contributed to surplus during its corporate life. (The clause—"attributable to contributions to surplus" is not limited in any way). $3,000,000 represents appreciation in value of investments. Its net premiums written during the preceding calendar year are $45,000,000. Its unearned premium reserve is $20,000,000.

AMOUNT AVAILABLE FOR DIVIDENDS

Under (a)	
Total Surplus	$15,000,000
Less Contributions	10,000,000
	$ 5,000,000
Less Appreciation in Investments	$ 3,000,000
Available for Dividends	$ 2,000,000
Under (b)	
Surplus to Policyholders	$20,000,000
50% of Net Premiums	22,500,000
Available for Dividends	— $ 2,500,000
Under (c)	
Of course there would be no surplus in view of the provision "over and above that required by the next preceding section."	
A surplus account set up under Section 117 would be, Surplus to Policyholders	$20,000,000
30% Unearned Premiums	6,000,000
Available for Dividends	$14,000,000

(50% of capital stock is $2,500,000)

This is, of course, a purely fictitious set-up; but offhand, in view of the fact that casualty premiums may be anywhere from two to four times the surplus to policyholders, condition (b) seems terribly severe; Condition (a) on the interpretation given is likewise very severe, particularly in case of a company which has not merely contributed surplus in organization, but has dumped in extra surplus to tide the company over a hard place. Are they never to have it back? If the intention is to include only contributions to surplus during the current year, the provision is more defensible; but the law does not say so. It may be respectfully submitted that to debar a company like the above from the payment of any dividend at all is absurd.

2. Section 95. *Reserves of Casualty Companies.*

This is stated in the note to the original draft to be based on present Section 86. The substantial changes from Section 86 are as follows:

(a) *Reserve for Losses Incurred but Not Reported.*

The present law merely required setting up of reserve to cover the estimated liability. The new draft requires that it shall be estimated in accordance with the company's prior experience, if any; otherwise in accordance with the experience of companies writing similar lines. This probably accords with present practices. In addition, it provides that the reserve shall not be less than 10% of net fidelity premiums in force, and not less than 5% of net surety premiums in force. This is new.

(b) *Special Reserve, Personal Injury Liability, and Employers' Liability.*

The change here is entirely on reserves on policies written during the three latest years. Under present Section 86, the reserve is 60% of earned premiums less loss and loss expense payments. The reserve is in no event to be less than $750 per outstanding liability suit. Under the proposed law the percentage is raised to 65%, and the reserve is required to be not less than the aggregate of estimated unpaid losses and loss expense computed on an individual case basis.

(c) *Special Reserve, Workmen's Compensation.*

There are two changes here.

(1) Present Section 86 provides for setting up reserves on basis of present values at 4% interest of determined and estimated future payments. Under the proposed draft, the interest rate is set up at 3½%.

(2) In case of the reserve for the three latest years, Section 86 provides for a reserve on the basis of 65% of earned premiums less loss and loss expense payments, and stipulates that it shall not be less than the present value at 4% interest of determined and estimated compensation claims. The proposed draft raises the percentage of earned premiums to 70%, and cuts the interest rate to 3½%.

(d) *Definition of Earned Premiums.*

About the same as the present law with two exceptions:

(1) Present Section 86 permits the deduction of "reinsurance premiums." The proposed draft permits the deduction of "premiums for reinsurance ceded thereon to authorized assuming insurers."

(2) Present Section 86 provides that loadings made by participating companies solely for dividends need not be included in earned premiums, provided the amount of such loading has been filed with and approved by the Superintendent of Insurance. This is omitted in the proposed draft.

(e) *Superintendent's Authority to Modify Proposed Requirements.*

The present law permits the superintendent to increase the statutory reserves in case of any company as to which the amounts set up appear to be inadequate. The proposed law adds to this the power to reduce any reserve in case of any company where the amounts set up appear to be excessive.

(f) *Special Reserves on Certain Policies Written by Domestic Mutual Casualty Companies.*

The superintendent is empowered to set up reserves on policies required by the provisions of the vehicle and traffic law of the state; on policies covering owners', landlords' and tenants' liability, and on workmen's compensation policies, issued by domestic mutual casualty companies, apparently entirely in his discretion.

I do not undertake to discuss these changes. The changes in (a), (b), and (c) should be examined by actuaries familiar with setting up reserves in order to develop a factual basis as to what these changes mean when reduced to actual application. I doubt if (d) is very material. (e) and (f) are matters of policy; I presume the reason for (f) is sad experience with automobile mutuals. As for (e) there seems very little reason for inserting a statutory yardstick, if the superintendent can cut it down at pleasure in case of any insurer. There is a constitutional issue involved in this somewhat extraordinary power, which might be worth considering. The power might have some value if used in cases where reserves are clearly excessive. It might be of some damage if used to nurse sick babies along.

3. Section 31.1. *Limitation of Amount to be Written on a Single Risk.*

The most striking change made in this section is with regard to mutual companies. The present limitation for a single risk

is 10% of actual net and contingent assets. The proposed law sets as a limit 10% of surplus to policyholders. I am not sure that this is very important to casualty mutuals, although it would be if they wrote surety bonds. It is probably of considerable importance to the factory mutuals.

The Section should be a deal clearer than it is with regard to its application to liability policies. Workmen's Compensation Policies are excluded; arguably liability policies should be excluded also. Employers' Liability policies are in part excluded under the law as it stands, though the exclusion disappears under the new draft. In the case of liability policies the 10% limitation has no very intelligible meaning, and therefore they should be excluded.

REVIEWS OF PUBLICATIONS

CLARENCE A. KULP, BOOK REVIEW EDITOR.

Automobile Liability Insurance. John A. Appleman. Gallagher and Company, Chicago, 1938. Pp. 591.

Automobile Liability Insurance—beneath this bare title one might perhaps expect to find the history of a business which within the lifetime of men still young has sprung up from nothing to an annual premium volume of about $400,000,000. And history Mr. Appleman has given us, "case" history written by the courts, all of them—the United States District Courts, the United States Circuit Courts of Appeals, the courts of all the forty-eight states and the District of Columbia. It is the history of the meanings of words, phrases and clauses in the National Standard Automobile Bodily Injury and Property Damage Liability Policy, beginning with the earliest decisions on policies having these or similar wordings and continuing down to the present time.

The author's foreword announces his purpose: to assist courts, attorneys, insurance companies and adjusters to construe the provisions of the National Standard Policy.

His task was an ambitious one indeed, for it involved reading many thousands of insurance cases and selecting and arranging more than four thousand which bear on the provisions of this policy. The work was all the more difficult because the National Standard Policy had only been in use for about two years and very few decisions had been based on it. Therefore, most cases had to be taken from those which rest on older policies, having so far as the points involved are concerned, the same or similar wordings as the National Standard Policy. Ambitious also is the author's attempt to distinguish between good and bad judicial logic. He freely commends decisions which he feels have advanced automobile insurance and public confidence in it and just as freely criticizes the flighty and the fallacious.

Like the book of the same title by E. W. Sawyer published in 1936 (*Proceedings* of the Casualty Actuarial Society, Volume XXIV, Part I, No. 49), Mr. Appleman's book takes up the declarations, insuring agreements, exclusions and conditions of the National Standard Policy in order. Opposite each clause of the policy he cites and explains and in many cases quotes from the

applicable decisions. Where different courts have taken different lines of reasoning each stands out unmistakably along with the interpretation having the greatest support. The influence of varying state laws is shown. Older decisions serve to illustrate the evolution of present rulings.

This book probably marks the first attempt in the history of automobile insurance law to organize legal interpretations of the automobile policy in a clear and easily accessible form. The author has earned the gratitude of the courts, attorneys, insurance companies and adjusters whom he has sought to assist and of many others as well.

The style and language of the author's explanations and of the quotations from decisions are clear and free from those legal terms which confuse the layman. Within the insurance business underwriters and agents would benefit from a more thorough understanding of the legal meanings of policy terms. Large buyers of automobile insurance often find it hard to follow the steps taken by the legal departments of their insurance carriers. To all of these Mr. Appleman's book will be a very useful reference book.

W. J. CONSTABLE.

Taxation of Insurance Companies. Philip L. Gamble. New York State Tax Commission, J. B. Lyon Company, Albany, 1937. Pp. 195.

The inevitability of taxation is proverbial. Governments levy and corporations and individuals, producers and consumers pay. However an increasing interest in the incidence of taxes is manifest and the fact that the report under review is the twelfth report published by the State Tax Commission is an indication of the intensive study that has been given to this problem.

Preliminary to the study of taxation, Mr. Gamble in his first two chapters considers the scope and importance of the insurance business in the United States, quotes various definitions of insurance and explains the application of the insurance principle to various types of risk. The increase in both individual and social welfare resulting from the operation of insurance and the resulting distribution of losses are clearly set forth.

A great diversity in methods of taxing insurance companies is

found to exist. While all states but two employ some form of premium taxation, there is no uniformity in the deductions allowed in arriving at taxable premiums. Various other methods are also in use such as taxes on the market value or the book value of capital stock. Massachusetts, for instance, taxes the policyholders' reserve in the case of life insurance companies and Connecticut levies on the investment income of mutual life insurance companies. The federal government likewise taxes the investment income of all life insurance companies and the total net income of other types of insurance companies. The most common and most remunerative source of tax revenue is the premium tax but the author maintains that a tax based on net income would be more equitable.

The author proceeds to compare the taxation borne by insurance companies with that assessed against real and personal property. Then follow comparisons with the taxes paid by savings banks, private banks and other financial institutions and public utilities.

The question whether insurance should be taxed at all is discussed at some length and also the extent to which it should be taxed. The conclusion is that since the business of insurance is not eleemosynary nor an enforced public service it is properly taxable and that the rate of tax should be somewhat comparable to the real property tax level.

Not the least interesting part of this report is found in the appendices which fill 110 of the 195 pages. There are 30 tables and an extensive bibliography. A tabulation of life insurance in force throughout the world shows that the United States has 70 per cent of the entire volume. The author presents summaries of the laws of each of the states on taxation of life and fire insurance companies and sets forth the varying treatment accorded reinsurance premiums in arriving at taxable premiums. (This tabulation of laws is as of 1933 and the many recent revisions and particularly the recent decision of the Supreme Court regarding the taxation of reinsurance premiums cause this summary to be out of date.) Another table lists the real estate tax rates of over 250 cities in various states of the U.S.A.

The report in its present form is a revision of a doctoral dissertation submitted to Cornell University July 1935. A great deal

of research has been involved in the preparation and much of the pertinent material is contained in the appendices. The report should prove of particular value to legislators and insurance men who are willing to analyze and reconsider the whole problem of insurance taxation.

H. O. VAN TUYL.

National Council on Compensation Insurance. Clarence W. Hobbs. National Association of Insurance Commissioners, New York City, 1937. Pp. viii, 233.

This volume, which, although it bears no date of preparation or printing was evidently published in 1937, comprises two distinct parts. The first section is specifically entitled *The National Council on Compensation Insurance* and is in the nature of a report to the National Association of Insurance Commissioners. After a brief review of the early efforts toward interstate cooperation in the field of compensation insurance, including the work done by various standing committees and the National Council on Workmen's Compensation Insurance, predecessor of the present body, it covers at some length the establishment of the National Council on Compensation Insurance, and the appointment of a representative of the National Association to be stationed at the Council.

Then follows a chronological summary of the principal activities of the National Council as reported to Conventions of the Insurance Commissioners and the action taken at these sessions with respect thereto. This provides a historical record of the development of rate-making methods, including the introduction of loss and expense constants and the contingency loading and the use of calendar year experience, as well as of other functions which have been undertaken from time to time by the Council. Since the material has been put together as it was presented at each Convention it is sometimes difficult to follow a particular subject through from start to finish, but a copious index largely makes up for this.

The principal functions of the Association's representative are described as supervising the Council's performance of its duties and reporting its actions to the Convention. Among his more

specific functions is acting as chairman for all committees having to do with rating matters. The author points out that at times several committees meet simultaneously, in which case he divides his time among them, feeling that "his presence is more needed when matters of consequence are being acted on, than when the meeting . . . is being prolonged in protracted and issueless discussion." One might suggest that if the practice of holding several simultaneous meetings were abandoned and the Association's representative were therefore able to give his full attention to each meeting, that "issueless discussion," which so frequently develops when a committee is sitting without a chairman, might be greatly reduced.

Because many of the matters which were sufficiently important to report to the convention have been the subject of more or less bitter controversy between the stock and non-stock elements in the Council, one may receive the impression that the Council is nothing but a battleground. Mr. Hobbs takes pains to show that this is not the case and that for the most part the organization functions smoothly and with much less friction than any of its predecessors.

The second part of the book is entitled *The Rate Making Methods of the National Council on Compensation Insurance.* It contains a rather detailed description of how manual rates are made, including separate explanations of each of the factors entering into the calculations. There are also chapters covering the various elements taken into consideration in rating individual risks, such as manual rules, merit rating plans, minimum premiums, loss and expense constants and special rating plans, as well as various phases of rate administration and filing of statistics.

The volume should be of value not only to the National Association of Insurance Commissioners, but to individual commissioners and persons in the insurance business who find it desirable to have a working knowledge of how rates are made and a history of the development of present methods. Of course, anyone who is interested in rate-making methods and procedure in a single state, especially where an independent board or bureau exists, should realize that the general methods described may not hold good in every state.

There are quite a number of errors of a typographical or editorial nature in the text but fortunately the meaning is generally clear.

ARTHUR G. SMITH.

The Examining Dentist in Food Hazard Cases. Charles A. Levinson, D.M.D. Murray Printing Company, Cambridge, 1937. Pp. 58.

This book concerns itself with the duty of the examining dentist in the handling of food products claims as a representative of the claims department of an insurance company or of a food products company. The author's references to questionable claims and the basis on which claims are settled by insurance companies are unnecessary for the book's purpose.

The outline of the procedure when the dentist is engaged as an expert to handle the technical work required in determining the validity and the estimated value of a claim should prove helpful to the claims departments of insurance companies. Probably the chapter most valuable to the dentist called as an expert and required to appear in court in connection with a food hazard claim is that entitled *How the Examining Dentist Should Conduct Himself in the Court Room.*

S. B. ACKERMAN.

Health Insurance, L. S. Reed. Harper's, New York City, 1937. Pp. xi, 281.

In this book Mr. Reed frankly discloses his belief in the failure of private medical practice and advocates a system of compulsory health insurance or public medicine as the only method whereby adequate medical service can be furnished to those whose means do not permit them to provide this service themselves.

Little of the material presented in the critique of the present system of private practice is new. The publications of the Committee on the Costs of Medical Care (on whose research staff the author served) and other recent writings have already presented most of the factual and argumentative material covered in this book. Most of those who are interested in this subject are by now familiar with the alleged defects of private medical practice in

reaching the indigents and those in the low income brackets and in providing a means of livelihood on an equitable and reasonable scale to the medical profession. It is, therefore, in the solution offered by the author that our main interest lies.

The solution offered is:

> A system of state medicine, with care available to the entire population, organized along the lines of the public educational system, supported from general government revenues, and with the service given by full-time salaried physicians, dentists, and nurses in the employ of government-controlled hospitals and clinics.

With the understanding that development would be gradual, two lines of action are outlined to reach the objective of adequate health care to everyone:

> One line of action is inauguration of state compulsory health insurance schemes, restricted to those for whom the costs of medical treatment constitute an urgent problem, and with direct, earmarked contributions from insured persons. The other lies in the extension of free services, supported out of general tax revenues, beginning, of course, with those services for which present needs are greatest. . . . Compulsory health insurance represents the more promising procedure in the industrial states, and the extension of general tax-supported services is the only feasible course of action in the agricultural states. In the industrial states it is possible through compulsory health insurance to bring a comprehensive health service to a large proportion of the population in need. Once established, the problem of medical care will be solved for this portion of the population whereas with the gradual extension of tax-supported services it will be long before a comprehensive service is made available to those who need it. Also, under compulsory health insurance, service will be received as a right. There will be no odor of charity or relief about it, and that is worth a lot. But in the case of the agricultural states, the proportionate number that can be covered by any system with direct, earmarked contributions is so small that gradual extension of tax-supported services represents the better way.

The author recommends that the compulsory health insurance system should be operated along state lines similar to the operation of the present unemployment insurance laws. Instigation of state action would be prompted by a Federal tax of 1.5 per cent

payable by the employer, irrespective of size of establishment, on all wages and salaries paid to employees, exclusive of those engaged in agriculture or domestic service. The amounts collected through this tax would be turned back to the states which adopt approved systems of health insurance or health care. The state would, in addition, impose a tax of 2 per cent on the earnings of all employees other than those engaged in agriculture or domestic service who earn less than $3,000 a year and would also make a contribution from the state treasury equal to ¼ or ⅕ of the aggregate amount raised from these two sources. Provision would be made for employees engaged in agriculture and domestic service and self-employed persons with incomes under $3,000 to come into the scheme on a voluntary basis.

Quoting again:

> The scheme should be administered by a state health insurance commission, appointed by the governor. One member should be a doctor of medicine agreeable to the state medical and dental societies. The state health officer should be an ex-officio member. Provision should be made for advisory medical, dental, nursing and hospital councils. Among the duties of the commission would be: (1) to allot the funds to the local jurisdictions in proportion to the number of insured residents; (2) to supervise the local administrative units and coordinate their activities; (3) to handle problems which are outside the control or competency of the local units, as for instance, the establishment of facilities for state-wide use; (4) in consultation with representatives of the organized professions to set standards of remuneration, whether such remuneration be by fee, by per capita payment, or by salary.
>
> The local administration of health services should be vested in city or county (or other suitable jurisdictional unit) committees. These should be composed, in part, of representatives of the state commission and, in part, of appointees of the local authorities. One member should be the local health officer, and another a doctor of medicine agreeable to the local medical and dental practitioners. There should be provision for local advisory medical, dental, nursing, and hospital councils. . . .
>
> Complete medical care, with the exception of dentistry, should be provided, i.e., the services of a family physician, specialist and consultant service, hospitalization, nursing care, the various auxiliary services, and drugs, eyeglasses, and appliances.

As regards the other course of procedure (extension of tax-supported free services), the author says:

> In general the problems in the organization of the provision of services are identical with those which arise under health insurance. The administration of the scheme so far as the state government is concerned should be placed in the hands of the state health department. This body should allot the funds to the local communities in proportion to the number of residents. It would be desirable to have the local communities match the funds allotted to them. Administration in the local communities should rest with the local health departments. In general, it should be left to the local community to decide what particular types of services will be provided and to whom (i.e., whether to all or only to those under a specified income level) the services will be made available.

In his general treatment of the medical problem, Mr. Reed likens it to that of providing education for children, welfare for the aged and indigent, unemployment relief and insurance and the setting of minimum standards for wages and conditions of labor. He believes that it is an essential function of government to enact legislation which will accomplish these ends, and many people are undoubtedly in agreement with him. This brings to mind the thought that possibly, in the search for a solution, we are losing sight of the basic problems involved. Human beings are endowed with the natural right to provide the necessities of life for themselves and their families and the basic function of organized society is to eliminate any obstacles which may prevent its members from exercising this right. The normal and ideal situation is where the individuals can provide for all their needs through individual savings or insurance. When, through maladjustment of our economic system, this becomes impossible then social insurance or state aid becomes necessary, but it should be regarded as a temporary and undesirable condition and should be so organized and administered as to speed the return to normal.

JOSEPH B. CRIMMINS.

Questionable Life and Accident Claims. B. A. Richardson. Published by author, Box 694, Atlanta, Georgia. Pp. 222.

This book was written by the supervisor of claims reports of an investigating company frequently employed to make investigations of applicants for insurance as well as of policyholders and others who make claims in accordance with the terms of a policy. The author states the purpose of his book is: ". . . to supply as illustrative material a collection of questionable claims for . . . study. An effort has been made to classify the types of speculative buying and the questionable claims which result, and to show, along with the brief synopses of cases, something of the procedure and methods used by the investigators."

A detailed analysis of many life insurance claims is made. However, an indication of the subjects discussed will show that his remarks are especially applicable to accident and health insurance. Some of the topics discussed are: speculation in buying, claims that date back of issue, suicide, pretended death, disappearances, murder by beneficiary, fraud rings and hot spots, puzzles in life disability, self-mutilation.

It is astonishing to read the numerous examples illustrating the difficulties met by the representatives of claim departments of insurance companies. Unfortunately, these difficulties are frequently accentuated by the demands of company officers on their agents to increase the volume of business, resulting in the acceptance of undesirable risks.

The author believes that many of these questionable claims could have been avoided if the underwriting problem had been adequately handled. In his opinion "the principal reasons why policies get issued on undesirable risks are:

1. The underwriter did not have correct information on which to appraise the risk.
2. Information was on hand, but it was too slight for action. Facts which bulked large afterwards appeared incidental at time of issue.
3. Facts were on hand, but were disregarded."

Should not another reason be added? Have not the insurance companies failed to use adequate means to make the buyer of insurance understand that he is participating in a cooperative

enterprise? Many people who buy insurance fail to realize that there is a difference between the purchase of a commodity such as food which is a completed transaction as soon as the purchase is made and the purchase of insurance which is not a completed transaction until a period after the initial transaction occurs. The purchaser of insurance should be made to realize that his action and the action of other policyholders affect the cost of insurance and that he has an active responsibility as a member of a group. If these were achieved, possibly many policyholders would prevent undesirable applicants from becoming members of their insurance group.

The author might have given more attention to another method which might help solve the problem of questionable claims and perhaps decrease the number. This is the adequate training of the claims personnel. It would be interesting to see whether a reduction in questionable claims would take place if men who intend to enter the claims departments of insurance companies were required to attend a school where such men could be scientifically trained in their work. One has the feeling that many of the cases cited by the author were solved by the element of chance whereas they could have been solved by scientific means and satisfactorily to the insurance companies if personnel had been trained adequately.

S. B. ACKERMAN.

Study Outline of Accident and Health Insurance. Lawrence B. Soper. Life Office Management Association, New York City, 1937. Pp. 131. Mimeographed.

In the rather barren field of accident and health literature this publication supplies a long existing need. Its purpose is to assist students of accident and health insurance, primarily home office employees, to gain a better understanding of the function of accident and health insurance and of the various departments of the business, and to provide a ready reference for those who seek the available literature.

This study outline is comprehensive because it covers the many operating divisions of the accident and health business and yet it

is so condensed that the average student will experience no difficulty in using it as a reference.

It touches broadly upon the functions and purposes of accident and health insurance, giving a brief historical background of the business. All types of accident and health insurance have been classified logically and clearly and detailed analysis is given of the commercial accident and health contract with separate chapters explaining such forms as non-cancellable, group and disability coverage sold with life insurance.

Underwriting and claim procedures are dealt with concisely but the explanation of rate making, reserves and statistics have been treated in detail. The beginner at the home office of an accident and health company will appreciate the simplicity of the author's handling of these rather technical and yet important phases of the business.

The chapter on group accident and health insurance was written by two associates of the author and is most thorough. They have covered not only the origin and background of group disability insurance but its economic relationship to industry, underwriting requirements, policy contracts and provisions, rates and various types of benefits. Group accident insurance for volunteer fire companies, which is a specialized contract, is mentioned separately. The various details of accident and health reinsurance have been adequately outlined with illustrative examples of reinsurance treaties.

In preparing this outline the author undoubtedly was handicapped by the necessity of boiling down a large quantity of material into a compact reference book and for that reason only touched briefly upon legal aspects, governmental regulation, sales and the relation between life and accident and health insurance. However, a bibliography at the end of each chapter containing reference to articles, addresses, reports and other printed material, makes available to the student a wealth of reading matter if he is desirous of making a complete study of the business. This book is a reference that will be used by officials and department heads of accident and health companies as well as those employees who seek to improve their knowledge of this line of insurance.

HAROLD R. GORDON.

Accident Statistics of the Federal Government. Charles N. Young. Central Statistical Board, 1937. Pp. v, 141. Mimeographed.

Accident Statistics of the Federal Government is a study and bibliography of the available publications of the Federal government on accident data, prepared for the Central Statistical Board by Mr. Charles N. Young, a Fellow of the Casualty Actuarial Society. There is a fourteen-page introduction briefly explaining the procedure of the study and reviewing the activities of the Federal government relative to accident statistics. The comments made in this review are based largely on the introduction. The objective has been to bring together in one reasonably complete bibliography accident material now available in the various publications of the government. Up to the present time there have been only partial bibliographies and these were scattered throughout the various government publications.

The author soon found it necessary to introduce certain limitations in order to confine this work to reasonable proportions. He decided to exclude all reference to accident data of individual companies, to safety codes and to safety engineering. No attempt was made to include references to occupational disease as this is considered a separate field. It was also necessary to restrict the period to be covered. Detailed information is given only on publications beginning with the year 1926.

In his preliminary study the author found it expedient to follow the departmental divisions of the Federal government. The findings for each division are treated under these four headings:

Publications. A list of the available publications giving priority to statistics on a regular or current basis is given. Publications are classified according to subjects whenever possible and are followed by miscellaneous material such as specific studies, annual summaries and year books.

Source of Material and Method of Investigation. This contains a description of the most important compilations and gives information regarding forms and methods used in collecting data.

Staff. Comments extending from a paragraph to a page are given on the staff available for statistical work.

Critique. The author evaluates the statistical work per-

formed in the department. Occasionally he makes suggestions regarding fields for further studies that appear promising.

The nineteen departmental divisions listed in the table below are discussed. The number at the right of each division shows the approximate number of pages given to the division:

Departmental Division	*No. of Pages*
Bureau of the Census	15
Bureau of Mines	12
Interstate Commerce Commission	7
Federal Coordinator of Transportation	2
Coast Guard	4
Bureau of Marine Inspection and Navigation	6
Bureau of Air Commerce	7
Federal Communications Commission	3
United States Employees' Compensation Commission	5
United States Navy	2
United States Engineer Department	4
Works Progress Administration	5
Emergency Conservation Work (C.C.C.)	4
Soil Conservation Service	2
United States Public Health Service	5
Bureau of Standards	1
Women's Bureau	4
Children's Bureau	4
Bureau of Labor Statistics	35

Anyone having occasion to refer to accident statistics will find this work a very effective aid in locating the available statistics of the Federal government. The work should prove useful to the casualty actuary and statistician whose course often leads into these fields of accident statistics.

PAUL B. DORWEILER.

The Social Security Act in Operation. Birchard E. Wyatt and William H. Wandel. Graphic Arts Press, Inc., Washington, D. C., 1937. Pp. 382.

Mr. Ralph H. Blanchard says in his foreword:

> *The Social Security Act in Operation* is an explanation of the Act and of its practical operation which should be of the greatest assistance in reaching an understanding of the social security policy of the Government and of the means it has adopted to carry out that policy. The authors are able, both by reason of their positions in the administration of the Act and their earlier training, to present a complete, authoritative

and well-proportioned picture of the accomplishments and problems of the social security program. They have succeeded in combining a feeling for the basic social theory of the program with a comprehension of its detailed practical application.

This book answers the questions which many who have no opportunity to study the social security program in detail have asked: What is the Social Security Act? What is its purpose? What has been done to put it into effect, and what are the problems of the future? It should be read by everyone subject to the Act, and may be read with profit by anyone interested in social problems.

The official position of the authors is a disadvantage at times; it imposes restraints that are devitalizing. This volume is "a study of the facts concerning the operation of the Social Security Act; hence it does not attempt to evaluate the purposes of the Act, the methods the Act provides for the achieving of these purposes, or the probable consequences of either purposes or methods." At times even a statement of the purposes of a provision is omitted.

The authors first give a brief history of the Act and a description of the agencies involved in its administration. Several chapters are devoted to the old-age benefit provision and to unemployment compensation. Old-age assistance and other assistance and welfare provisions are discussed as a group. The final chapter is devoted to the problems that must be faced in the quest for economic security through social insurance. A number of appendices give statistical data on the operation of the Act.

The discussion of old-age benefits includes an analysis of the provisions of the Act together with a consideration of the problems encountered in setting up the individual-earnings record-keeping system, the procedure in the collection of taxes, and the administrative rulings interpreting the coverage provisions of the Act. A chapter is devoted to reserves for old-age benefits "not intended to lead to any single conclusion; many conclusions are possible and more than one may be correct." This presentation is particularly valuable at a time when the arguments against the "reserve" are receiving considerable publicity, while the arguments for it are receiving little or none.

The authors have avoided the pitfalls in the actuary's pension-fund terminology, but the discussion of reserves could have been

made more simple and direct if the actuarial approach had been avoided altogether. The problem is simply one of financing an increasing annual series of disbursements where the amount continues to increase each year for a long period of time and ultimately attains a level that may exceed the amounts collectible directly from employees and employers. The limits on the amount that will be collectible at any time cannot be stated definitely, since they depend on both ability and willingness to contribute, but they should be estimated conservatively in order to avoid a breakdown in the system. If we finance an increasing series of disbursements with a level or more nearly level series of annual contributions, to keep the ultimate rate of contribution within collectible limits, reserves result. Since the continued existence of a particular employer over a long period of time cannot be assumed with safety, in private pension plans we arrange the financing so that as soon as practicable a reserve is accumulated of sufficient size that we need rely on future contributions only to cover annuities based on future service. In public pension systems we may assume the continued existence of the source of income without affecting the security of the system, provided the rate of contribution is kept within collectible limits. The need for and desirability of reserves in a public pension system probably could be defined solely in terms of the rate and duration of the annual increase and the ultimate level of disbursements, with proper attention to the probable economic effects of accumulating a reserve of any specified amount. In considering the economic effects, the pension system should not be regarded as an isolated phenomenon, but should be considered as an integral part of the national fiscal program.

The chapters on unemployment compensation cover the provisions of the Act and the responsibilities of the Federal government and the states in the federal-state set-up. The reasons for requiring that state unemployment funds be deposited in the Treasury are not stated. Some of these reasons probably were: to avoid as far as possible the deflationary effect of liquidating funds in times of stress, and in more normal times to permit the balancing of withdrawals by one state against the deposits of another state; and to insure investment in liquid assets. The state plans

are analyzed with respect to their more important provisions and problems anticipated in their administration are discussed.

The grouping of the old-age assistance provisions with the other relief and public-welfare provisions, while logical in many respects, may tend to perpetuate the apparently common and quite erroneous notion that the old-age benefits and the old-age assistance provisions are mutually exclusive in coverage. The intent was that as far as possible the two provisions together should accomplish a gradual transition from a straight-out relief basis to an earned annuity basis.

In spite of certain shortcomings, this book is well worth a careful reading.

J. B. GLENN.

Compensation Legislation—A Critical Review. Legal Series, Bulletin No. 3. Air Hygiene Foundation of America, Inc., Pittsburgh, 1937. Pp. 76.

This privately published pamphlet is stated on its cover to be "for the confidential information of members. Not for reproduction wholly or in part." The reviewer sincerely hopes that nothing herein contained will infringe upon this caveat.

It is a pamphlet well worth the reading of anybody who has to do with the subject of occupational disease. The second, third, fourth and fifth chapters contain a wealth of detailed information as to statutory provisions and three very handy charts. It is carefully drafted and, to the best of the reviewer's belief, correct. It is something more than an exhibit of things as they are; it is constructive and looks to the future.

There is a certain underlying note of criticism that seems very sound; namely, that in recent years there has been a deal of hysteria on the subject of occupational disease. This has resulted in some rather rash legislative experiments, which have produced something very like a panic on the part of underwriters. It is possible to draft occupational disease legislation in such a way as —given sane administration—will not entail a staggering cost. It is necessary, however, to draft this legislation with some care; and as indicated in Chapter 2, see that proper administrative agencies and a method for competent diagnosis of the diseases and evalu-

ation of disability are set up. The compensation scale should be adequate but should give some cognizance to the fact that the occupational disease problem has marked dissimilarity to the industrial accident problem. Cognizance should be given to the fact, that since some occupational diseases are of slow contraction, justice may require an allocation of the cost burden on the employer responsible for the injury rather than on the one in whose employ the injury finally matured into disability. A different method of filing and establishing claims with different limitation provisions may also be indicated. Above all, great emphasis should be given to the prevention and control of diseases. Under such conditions the cost of compensating occupational disease should not be extreme. The 1 per cent estimate made by the International Association of Industrial Accident Boards and Commissions in 1929 was a trifle optimistic. On the other hand, all statistical evidence now available indicates present insurance charges for the occupational disease hazard are too high. To be sure, the statistical evidence is not as yet very ample, covering only two complete policy years (1934-35), and neither of these was a depression year. The present rates reflect in some degree a very real apprehension on the part of underwriters as to what might result from the sudden inclusion of silicosis within the compensation acts; and that apprehension had back of it what actually did happen in Wisconsin.

The only criticism the reviewer is inclined to make is with reference to Chapter 1, which discussed *Compensation vs. Common Law Actions.* This is a subject which cannot be discussed in brief compass. No notice is taken of a line of cases to the effect that there is no legal liability at common law for occupational disease, though to be sure this represents only a minority of the states, and elsewhere such liability has been worked out either at common law or under the provisions of safety statutes. Again, the statement on page 8 that "the defenses of negligence of fellow-servants and contributory negligence are based upon the doctrine of assumption of risk" is hardly correct so far as contributory negligence is concerned. The defense of assumption of risk is related to the maxim *Volenti non fit injuria;* whereas contributory negligence stems from the doctrine of proximate cause. Assumption of risk and the fellow-servant rule are characteristic

of employers' liability; contributory negligence is common to the entire law of negligence. The paternity of the fellow-servant rule may, if one pleases, be ascribed to the doctrine of assumption of risk, but it is an illegitimate child, representative of a school of thought rapidly passing away. This chapter, however, merely serves as introduction to the other chapters, which constitute the best treatment of the main theme which the reviewer has seen.

CLARENCE W. HOBBS.

Insurance. Its Theory and Practice in the United States. Albert H. Mowbray. McGraw-Hill Book Company, New York, 1937. Second Edition. Pp. xxii, 634.

It is a big task to try to place within a single text the essential facts about the theory *and* the practice of a business as complex and as important as that of insurance. The theory alone makes quite a job. When you add the practice you have practically committed yourself to the impossible. Your successes are likely to be taken for granted. Your failures and omissions will be plain to every tyro.

These failures and omissions are entirely apart from questions of competence or authority. This book for example is intended for the general or beginning student either in or out of the insurance business and it is essential that he be given a broad and a comprehensive view of the whole institution. Later perhaps he will go on and dig deeper into the minutiæ, the technical detail of the various lines and of special problems. Now he needs sound background. In general this book fills his need admirably. I note for the record some of the places at which it seems simply that the insurance institution is so heterogeneous, so inchoate, indeed so little a unit that useful generalization, particularly for the first reader, seems impracticable. Or rather perhaps, that useful generalization must be so much expanded, bring in so many more footnotes, add up to so many more volumes, that we should have at the end not a 600-word text but an insurance encyclopedia. An idea perhaps.

The principal weaknesses of the one-book insurance text idea are two. First, because it must gallop at so mad a pace, it is

frequently incomplete, confusing and even in error. For example, the discussion (p. 266) of the advance premium mutual leaves a distinct impression that it is an important factor only in life insurance. Likewise page 280 says in so many words that mutual companies "usually charge the same rates or even higher rates than the stock companies". This is certainly not true of casualty mutuals which charge the same or *lower* rates. The statement on page 282 on renewal commissions is not universally true. Casualty rates are also a very important exception to the generalization on page 322 on the necessity of sub-dividing classifications according to the ratio of insurance to value.

Second, the summary approach is sometimes so plainly inadequate in view of the nature and importance of a subject that the result is awkward and unbalanced. This difficulty is one, note, not of generalization but of the physical necessity of conserving space. The question here admittedly verges on one of judgment as to the relative importance of a subject on the one hand and of judgment of the results on the other; but one-third of a page for industrial life insurance is hardly adequate treatment for this enormous branch of the insurance business. Group gets a page and a half. The summary approach, even when discussing a specific line, often does not permit the author sufficient space to convey even a fairly complete idea of his thought. Thus it appears that in automobile liability insurance (p. 338) "there are two practical measures of hazard; the make and the model of car". Does this mean that occupational rating has been abandoned, or that the last word has been said on mileage? I am surprised to find not a single page on the practice of self-insurance: a statement of the pioneer findings of Teaf who analyzed the detailed records of all Pennsylvania self-insurers should be a part of every treatment of the subject. (Reviewed, *Proceedings*, Casualty Actuarial Society, Vol. XXI, p. 378). On the other hand the discussions of workmen's compensation rate-making and the Social Security Act go into detail far beyond the requirements of the beginner.

Certain other features are more clearly matters of individual bias or judgment. That is, the points raised and the omissions questioned may or may not be due to the summary method. I should throughout the book like more distinctions between the

results for stocks and mutuals, particularly on such questions as investment profits and policyholders' surplus (there is no statement that in this many mutuals beat many stocks as well as vice versa). I should like loss ratios for these two groups or at least for representative companies in each and I miss very much in the same chapter a statement of premium, underwriting and policyholders' surplus trends. The gist of the matter here lies in the changes of the last 10 years. I think the work of Mays (Reviewed, *Proceedings,* Casualty Actuarial Society, Vol. XXIV, p. 180) deserves recognition in a discussion of fire insurance rates—a field in which scientific investigation is nearly unique. All of this would take space of course.

It is inevitable that a work as ambitious as this will lapse occasionally into errors of fact. For example, German sickness insurance funds do not (p. 512) "differentiate costs according to occupation". On the contrary, the funds covering the majority of the insured population (Ortskrankenkassen) insure a cross-section of the entire community at absolutely the same rate. It is quite possible also to have the organized medical professions choose the method of compensation for services to health insurance members; that is the current German practice. The tax-refund provisions of the unemployment sections of the Federal Social Security Act should hardly be called "grants-in-aid" although there is a certain resemblance.

But this is to appear to put the emphasis on faults and omissions, most of them I believe inherent in the treatment. On the contrary, this is an excellent text. I like the revised Mowbray because it packs so much information within a single book, a considerable part of it not readily available elsewhere. Parts IV and V are for this reason particularly the best of the book. I like its bold seekings—though they don't always come off perfectly—after principles to tie the insurance business together. I like the note introduced in the greatly expanded Part VI: *Insurance in State Policy.* It might be emulated with advantage in other insurance texts. I should even be inclined to say it should come at the head instead of the end of the procession. In new editions it will occupy a greater and greater place.

C. A. KULP.

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Notes on Actuarial Notation before 1950. Henry H. Jackson. Reprint, Record, American Institute of Actuaries, Vol. XXVI, Part I, No. 53, May, 1937.

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Lloyds: The Gentlemen at the Coffee House. Ralph Straus. Crane, Carrick and Evans, New York City, 1938.

Gross Negligence with Automobiles. Frank G. Turner. Turner Publishing Co., Inc., Miami, Fla., 1938.

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Canadian Life Tables, 1931. (Dominion Bureau of Statistics, Census Mono. 13.)

Essentials of the Mathematics of Investment. By Paul R. Rider, New York: Farrar and Rinehart, Inc., 1938. Pp. x, 162.

Report on the British Health Services: A Survey of the Existing Health Services in Great Britain, with Proposals for Future Developments—December, 1937. London: Political and Economic Planning, 1938. Pp. 430.

Twenty-five Years of Health Progress. Louis I. Dublin and Alfred J. Lotka. New York: Metropolitan Life Insurance Company, 1937. Pp. 611.

Mathematics for the Million. Lancelot Hogben. London: George Allen & Unwin; New York: W. W. Norton & Co., 1936. Pp. 647.

Occupation Study, 1937. New York: Actuarial Society of America and the Association of Life Insurance Medical Directors, 1938. Pp. 95.

Mortality Trends in the State of Minnesota. Calvin F. Schmid. Minneapolis: University of Minnesota Press, 1937. Pp. 325.

CURRENT NOTES

THOMAS O. CARLSON, CURRENT NOTES EDITOR

AUTOMOBILE

New Hampshire Automobile Financial Responsibility Act

The Current Notes in the preceding issue of the *Proceedings* included reference to an amendment to the Financial Responsibility Act in New Hampshire effective September 1, 1937, which amendment was noteworthy in its provisions that proof of financial responsibility must be furnished by the owner of any motor vehicle upon which exists any mortgage or lien or for which there is any sum due upon the purchase price, before such motor vehicle may be registered. This amendment was declared unconstitutional by the New Hampshire Supreme Court in a decision under date of March 1, 1938.

The court held that classifying all motor vehicles under mortgage or lien in a common classification is unreasonable and pointed out that the mortgage or lien may be small or large in proportion to the value of the car, and that the average car, after being involved in an accident, has far from adequate value to meet liability for an accident of any serious nature. The decision of the court closed with the following paragraph:

> "The moral compulsion to insure may be intensified, but the compulsion is applied with such disregard of reasonable equality and with so slight relation to the object of security that as an instrument forged to be of service for its purpose of securing financial responsibility the method must be adjudged void."

Safe Driver Reward Plan

The Safe Driver Reward Plan, described in the Current Notes of the preceding issue, has been made effective in 34 states and the District of Columbia. This Plan, which in brief guarantees a return of 15% of the annual premium at the end of a policy period provided no claims are brought under the policy, was introduced February 1, 1938, in the majority of the states for private passenger cars insured for both bodily injury and property damage liability on the specified car basis.

$1,000 Single Limit Policy

With the exception of the Safe Driver Reward Plan, the most important innovation in the reprint of the Automobile Casualty Manual effective February 1, 1938, was the introduction of a $1,000 Single Limit Combination Bodily Injury and Property Damage Liability Policy. This policy, designed to meet the needs of many motorists who are now uninsured and who desire a limited measure of protection, is written at a substantial discount from the premium for the regular standard limits policy. It is now available in all states where the countrywide Automobile Manual is used with the exception of Louisiana, New Hampshire, Pennsylvania and Washington.

Burglary

Innkeeper's Liability Policy

An Innkeeper's Liability Policy was added to the Burglary Manual effective May 16, 1938. This new policy covers the insured's legal obligation to pay by reason of liability for damages because of injury to, destruction of, or loss of property belonging to guests while such property is within the premises or in the possession of the insured.

Liability

Manufacturers and Contractors Rate Revision

Revised rates were issued for the Manufacturers and Contractors Public and Property Damage Liability lines effective February 14, 1938. The Public Liability rates for the more important classifications were revised in nearly every state. A general revision of Property Damage rates was made effective countrywide, resulting in considerable reductions in these rates. This was the first general revision in the Property Damage Liability rates since they were originally established. The minimum rate for this line was reduced from 2¢ to 1¢ and all Property Damage Liability minimum premiums were reduced.

At the same time a consolidation of Manufacturers and Contractors Liability classifications was effected by which 44 classifications out of a total of 202 were eliminated from the Manual.

General

Insurance in Unauthorized Carriers

Much interest has been aroused by the decision of Supreme Court Justice Francis G. Hooley in Brooklyn on July 27, that the action of seven large New York City banks in bonding their employees with London Lloyd's was in violation of section 50-a of the State Insurance Law. This section provides that bonds required from the officers and employees of banks "shall be accepted only from a corporation authorized to issue fidelity bonds and doing business in this state under the insurance department of this state."

A stockholder's action had been brought to make the directors of these banks account for the premiums paid for these bonds and demanding a permanent injunction to prevent the banks from further accepting any bonds from London Lloyd's or from any other insurance company not authorized to do business in the State of New York. The banks interposed affirmative defenses and the ruling of Justice Hooley was contained in several opinions dismissing these defenses on motions of the plaintiffs—two small stockholders of the defendant banks. The banks will appeal the decision.

Personal Notes

Austin F. Allen has been advanced from Executive Vice President to President of the Texas Employers Insurance Association and Employers Casualty Company of Dallas.

Arthur E. Cleary has been appointed Actuary of the State Insurance Department of Massachusetts, Boston, Massachusetts.

William J. Constable was recently elected Secretary of the Lumbermen's Mutual Casualty Company, in charge of the Philadelphia Office.

Jarvis Farley has also been appointed Actuary of the Massachusetts Indemnity Company of Boston.

Russell P. Goddard is now connected with the American Mutual Liability Insurance Company, Boston, Massachusetts.

Robert C. L. Hamilton, Comptroller of the Hartford Accident & Indemnity Company, has retired from active business.

Edward S. Jensen was elected an Assistant Secretary of the Occidental Life Insurance Company of Los Angeles, California.

Rolland V. Mothersill was recently elected President of the Anchor Casualty Company of St. Paul, Minnesota.

Louis H. Mueller has been elected President of the Associated Insurance Fund, Inc. and Chairman of the Board of the Associated Indemnity Corporation and Associated Fire & Marine Insurance Company, San Francisco, California.

Ray D. Murphy, Vice President and Actuary of the Equitable Life Assurance Society, has been honored by election as President of the Actuarial Society of America.

Earl H. Nicholson is now Actuary of Joseph Froggatt & Company, Inc., of New York.

Frederick Richardson has been appointed Deputy Chairman of the General Accident, Fire & Life Assurance Corporation, Ltd. of Perth, Scotland.

LEGAL NOTES

BY

SAUL B. ACKERMAN

(OF THE NEW YORK BAR)

AUTOMOBILE

[Poole *vs.* Travelers Ins. Co., et al., 179 So. 138.]

A lumber supply dealer insured his truck with the defendant's insurance company against bodily injury. The policy provided that the truck was to be for "Commercial purposes." Under the definition of "Commercial purposes," the policy provided that the truck should be insured for the towing of any trailer only when such use is definitely declared and rated. A two-wheeled semi-trailer was attached to the truck in order to haul a load of lumber. On the return trip an accident occurred to the plaintiff. The policy did not provide any specific insurance for the semi-trailer. The agent of the insurance company had knowledge of the use of the semi-trailer at the time the policy was written. What were the rights of the insured?

The court held that the policy provided that trailers but not semi-trailers must be definitely declared and rated in order for the truck towing the same to be insured. The term "trailer" did not include the term "semi-trailer" and the failure to mention the requirements for insurance of a semi-trailer made it permissible for a truck insured under the policy to tow a semi-trailer and be insured, though the semi-trailer was not definitely declared and rated.

The court further held that the type of business performed by the lumber concern could not be performed except by attaching a semi-trailer to each truck. Furthermore, the insurance agent had knowledge of the use of the semi-trailer. Knowledge of the insurance agent was equivalent to knowledge of the insurance company. Therefore, by the failure to demand premiums to be paid for the semi-trailers, the insurance company waived the right to declare a forfeiture of insurance on the truck towing the semi-trailer.

COMPENSATION

[Selig *vs.* Interstate Hosiery Mills, Inc., et al., Supreme Court, Appellate Division, Third Department, 3 N. Y. S. 2d, 96.]

A commercial traveler employed by the defendant suffered injuries while riding in an automobile which was wrecked upon a highway that was being constructed by a paving company. A release discharging the paving company from any and all claims arising by reason of personal injuries was given by the injured employee. A letter signed by an employee of the insurance carrier for the paving company was presented showing that the employee settled the case with the paving company for property damage only. The letter stated that all the defendant's employee desired was settlement for the property damage claim to his automobile and that he would waive claim to his personal injuries. However, the paving company obtained a release which did not specify that it was for property damage only. The employee filed a claim for compensation. An award was denied because the Board claimed that the release spoke for itself and anything which the carrier for the paving company stated in a subsequent letter was not binding on the employer. What were the rights of the employee?

The court held that the opinion of the Board was incorrect. The employer must establish that the release was obtained honestly and the claimant knowingly executed the instrument. Since that issue was presented before the Board, the burden to show good faith and lack of fraud was upon the employer.

CONTINGENT LIABILITY

[Thompson-Starrett Co., Inc. *vs.* American Mut. Liability Ins. Co., 11 N. E. 2nd, 905.]

A general contractor for the erection of a building entered into a subcontract with an elevator company for the installation of the elevators. In that contract the elevator company covenanted to indemnify and save harmless the general contractor against liability by the following provision of the subcontract:

"Article XV. Sub-Contractor shall indemnify and save harmless the Owner, Architect and Contractor against any and all

claims and demands for damages to the property of any person, firm or individual and for personal injuries (including death) arising out of or caused, in whole or in part, by the execution of the Work, or caused, in whole or in part, by any fault or neglect of Sub-Contractor or its agents, servants and employees, whether the damages or injuries be sustained by any employee of Sub-Contractor, Contractor, Owner or Architect, or otherwise, and whether said claims or demands arise or are made under any provision of any workmen's compensation act or other law or statute, or otherwise."

Subsequently, the defendant insurance company issued to the elevator company, the subcontractor, a contractor's contingent liability policy. The elevator company apparently subcontracted some of the work to be performed under its subcontract with the general contractor. The insurance company thereafter issued a contingent liability endorsement which provided that the policy to which the endorsement was attached was extended to cover the liability of the general contractor as well as the owner of the property against loss from the liability imposed upon them for damages on account of bodily injuries including death resulting therefrom suffered by any person covering accidents occurring during the installation of elevators. The endorsement also provided:

"Nothing herein contained shall waive, vary, alter or extend any provision or condition of the undermentioned policy other than as above stated."

While working in the elevator shaft an employee of the elevator company was struck by a brick negligently dropped by an employee of the general contractor. The employee sued the general contractor and recovered a judgment. Thereafter, the general contractor attempted to collect up to the limit of the policy issued by the defendant insurance company. The theory of the general contractor was that the endorsement constitutes a complete contract of insurance between itself and the insurance company and that the language of the endorsement had the effect of abrogating the provision of the policy covering only the contingent liability of the general contractor for negligence of its subcontractors. Was the contention of the general contractor correct?

The court held that if an indorsement attached to a policy expressly provides that it is subject to all the terms, limitations and conditions of the policy, the policy and indorsement must be read together and an indorsement in such a case does not abrogate or nullify any provision of the policy unless so stated in the indorsement.

The subcontractor was insured by the policy against contingent liability for damages; that is, liability for damages growing out of the fault of its subcontractors for which it would not be primarily liable. After the indorsement became effective, it had the same protection and no other. The indorsement had no greater effect than to give the general contractor the same protection which the policy gave the insured; that is, the policy as stated in the indorsement is extended to cover similar liability for the general contractor. Under the expressed terms of the policy, protection was afforded to the insured elevator contractor for its own negligence or the negligence of its own employees. The policy was not intended to and did not constitute a general coverage. By the terms, the policy only protected the insured from a secondary liability growing out of the negligence of its subcontractors. Under the indemnity clause of the subcontract between the general contractor and the elevator company, the latter company was liable to the general contractor for any damage caused it by the negligence of the subcontractors of the elevator company. The policy did not protect the elevator company, the insured, against such liability to its general contractor. The purpose for which the indorsement was procured was to protect against such secondary liability. Therefore the insurance company was not liable to the general contractor.

Fidelity

[Massachusetts Bonding & Insurance Company *vs.* Hudspeth, 94 Fed. 2, 467.]

The defendant insurance company issued a fidelity bond to a hotel company and by the bond agreed to pay "such direct loss as the employer shall have sustained . . . through larceny or

embezzlement committed by any employee or employees named in the schedule attached hereto."

Subsequently the bond was endorsed to a new corporation, reading "Ward Garrison Hotel Corporation, Ormand Griffin, President." Thereafter the Ward Garrison Hotel Corporation filed a petition for reorganization under Section 77B and the plaintiff as trustee was placed in charge of the property. A renewal thereafter was issued. An audit of the books was subsequently made and the discovery was made that the auditor for the hotel was short over $4,000. The auditor was bonded for $3,000. When the records and books that were in possession of the auditor were examined, certain memoranda, checks and drafts were found, and I.O.U.'s signed by Ormand Griffin. The auditor had made a practice of paying cash from the cash box for Mr. Griffin without having deposited the cash in the bank or having made out a voucher for the disposal of the cash. Griffin often drew checks or drafts on a certain bank. The auditor had instructed the bank to notify her if Griffin's account had not sufficient funds to meet the checks, which frequently occurred. She would then furnish the money to the bank to cover the checks. The trustee for the hotel demanded payment on the bond but the insurance company contended there was no loss within the meaning of the bond because Griffin was an officer and therefore had knowledge. Furthermore, the bond did not cover the debtor in bankruptcy but inured only to the corporation. What were the rights of the trustee of the hotel?

The court held that the bond had been renewed after the petition for reorganization had been filed. Although the renewal stated "Ward Garrison Hotel Corporation, Ormand Griffin, President", these words were immaterial as the intention was to cover the hotel during reorganization. The contention that the employer had knowledge and therefore consented to the appropriation of these funds could not be sustained since knowledge of Griffin cannot be imputed to the corporation because he was a party to the fraud. The bond contained the provision that, "If the employer be a corporation, the act or knowledge of any officer or director thereof, not in collusion with such defaulting employee, shall be deemed the act or knowledge of the employer within the meaning hereof." This contractual exception prevented Griffin's

guilty knowledge from being imputed to the corporation. Even without the clause in the bond, the corporation could not be charged with notice where Griffin was acting for his own benefit or was a party to the fraud. Therefore, the insurance company was responsible to the trustee for the hotel.

FORGERY

[Quick Service Box Co., Inc. *vs.* St. Paul Mercury Indemnity Co., 95 F. 2d, 15.]

The insured had a forgery bond which indemnified the plaintiff against loss through the payment by any depositing bank of any check drawn by or purporting to be drawn by plaintiff at any of its offices upon which the "signature of the insured" or "the signature of any endorser" "shall have been forged" or which "shall have been raised or altered in any other respect."

The plaintiff's office manager had authority to countersign checks. He was not authorized to sign checks unless they were complete on the face, signed by either or both vice-presidents below the printed signature of the bank, drawn on certain specified banks and issued in connection with the insured's business. Furthermore, the bookkeeper had no authority to draw checks payable in cash in an amount exceeding $50 except for additional amounts for expenses of officers or employees. During his employment, the office manager presented blank checks to one of the two vice-presidents and obtained the signature of the vice-president to each of the checks. He completed the checks and wrote on the face of each check the word "cash" as payee, but without authority. He then countersigned each check below the signature of the company which was printed and that of the vice-president and wrote his own name on the back as endorser. He then presented the check to the bank for payment, received the proceeds and appropriated the funds to his own use. The cancelled vouchers came into the possession of the office manager after the checks were returned from the bank. On some of the checks he wrote over the word "cash" the names of various purported payees, erased his own name appearing on the back and substituted as

endorsers the names of various purported payees. On other checks he did not erase his endorsement or change any other part of the checks. The insurance company contended that there was no forging of the signature of the insured or of any endorser within the meaning of the bond. What were the rights of the insured?

The court held that while each check bore the printed name of the insured as drawer this printed signature was not legally effective as a signature until and unless signed by a vice-president and by the office manager. The latter had no right to draw the checks in blank and no authority to draw checks under the circumstances. Therefore, the acts of the manager were unlawful, unauthorized and done with intent to defraud. The fact was immaterial that the signature of the company was printed or written by the bookkeeper. The check came into effective existence as a purported signature of the company only when he signed his name and when he wrongfully did this act he gave apparent probity to a fraudulent signature. Each signature of the company thus completed and made effective was a forgery of the signature of the employer within the provision of the bond. It was immaterial that when the bookkeeper made or published the signature of the employer he signed his own name. There was nevertheless a forgery for if the signature is false in any material part and calculated to induce another to give credit to the instrument as genuine there is a forgery. One may under certain conditions have authority to sign certain names, yet if the person signs his name to a false document or to an unauthorized one the act is forgery. The insurance company was therefore liable on the bond.

Garage Liability

[Hultquist et al. *vs.* Novak (Ocean Accident & Guarantee Corporation, Garnishee), 278 N. W. 524.]

An owner of a filling station was insured against loss by reason of liability imposed by law for damages on account of accidental bodily injuries, including death, within the limits expressed in

the policy. Coverage applied only to such bodily injuries as were sustained or alleged to have been sustained as the result of an accident (a) occurring on or about the premises described in the policy while used or occupied by the defendant for the purpose of conducting the business or work described therein; or (b) caused by the defendant's employees while engaged elsewhere in the performance of their duties.

A minor who was subsequently injured went to the defendant's filling station to purchase some gasoline for the purpose of cleaning a tricycle, accompanied by another boy. The attendant gave him about a quart of gasoline which was put into a coffee can. While carrying the can, some of the liquid was spilled on the boy's trousers. He and his little friend took the small can of gasoline across the road to a vacant lot where they found two other cans into which they poured the gasoline. They then took the gasoline to the back yard of the injured boy's house two blocks from the filling station for the purpose of cleaning the tricycle as they had planned. Some more gasoline was spilled and since it was becoming dark, a match was struck to see what had happened. This ignited the vapor from the gasoline and the fire spread to the injured boy's clothing and he was severely burned.

The contention was made that since some of the gasoline was spilled on the boy's trousers at the filling station that the accident came within the provision of the policy "occurring on or about the premises." What were the rights of the plaintiff?

The court held that when the boy left the premises, no damage had yet resulted from the spilling of the gasoline. As applied to a filling station, the phrase "on or about" obviously does not cover private premises two blocks away.

Furthermore, the policy provided that "This policy shall not cover bodily injuries or death as follows:

(5) Caused by the consumption or use elsewhere than upon the premises used by the Assured of any article or product manufactured, handled or distributed by the Assured unless such article or product and the distribution thereof is specifically described in the Declaration and a premium provided therefor . . ." Since no premium was paid for coverage due to hazards caused by the use or consumption elsewhere than upon the premises of products

distributed therefrom, this exclusion also prevented recovery. Therefore, the insurance company was not responsible for the injury.

Health Insurance

[Romesburg *vs.* Federal Life Ins. Co., Supreme Court of Kansas, 76 Pa. R. 2d, 829.]

The insured purchased a disability policy. In September, 1922, the insured suffered an illness, and upon presentation of his claim the company commenced to pay him weekly payments and continued to do so until May, 1936. Payments were stopped because the company claimed no further liability under the policy.

The insured was suffering from diabetes. A witness testified that diabetes is not now curable and that the insured could not perform any acts of his business as an oil well caser, and that his condition would continue for the rest of his life.

The policy provided that disability would be paid while he was confined within the house by any bodily illness and "while convalescent following a confinement period of total disability, if continuously wholly disabled and prevented from performing any act pertaining to his occupation, but shall not necessarily be confined within the house, the company will pay a weekly indemnity so long as the insured lives and said non-confining illness and total disability continues."

The company refused to pay the claim on the grounds that the insured was no longer confined to his house and that he was not convalescent within the meaning of the policy. The various experts who testified without stating definitely what was meant by the word "convalescent," agreed that the insured was not convalescent for he was not making recovery. What were the rights of the insured?

The court held that there should be no limitation of the word "convalescent" to its strict meaning of recovery of health in its fullest sense. The word meant that period of time between the confining period of total disability, and the time the insured either died or so far recovered from his nonconfining illness that he was no longer totally disabled. Therefore, the insured was entitled to collect indemnity under the policy.

Merchant's Protective Bond

[Kimmel *vs.* United States Fidelity & Guaranty Co., 1 N. Y. S. 2d, 918.]

A Merchant's Protective Bond was issued to the plaintiff, which provided coverage up to $100 for loss "occasioned by holdup, as defined in Condition 1, inflicted upon the obligee (the plaintiff), or any of the obligee's employees, occurring upon and while said premises are open for business". Condition 1 of the contract defines "holdup" as "a felonious and forcible taking of property by violence inflicted upon the obligee or any of the obligee's employees, or by placing such persons in fear of violence."

The plaintiff was the owner of a small candy store. While the store was in sole charge of the plaintiff's wife, a man entered, ordered and obtained from her a bottle of ginger ale, and went into a telephone booth in the store. He did not drink the ale nor use the phone, but watched the plaintiff's wife as she was counting the plaintiff's money. She noticed this and became frightened and concealed the box containing the money.

The man left the phone booth, went to the sidewalk in front of the store and dropped the bottle of ale. He then returned and ordered a new bottle of ale. The plaintiff's wife complied, and then she fetched a broom in the store and left to sweep the sidewalk. A few moments later the man left the store and passed the plaintiff's wife while she was sweeping the sidewalk. Thereupon, she returned to the store and found that the money which she thought she had concealed was missing.

The insured claim that this loss was due to a holdup in accordance with the terms of the policy. What were the rights of the insured?

The court held that the assumption can be made that the plaintiff's wife was placed in fear of violence and that, furthermore, that the taking was felonious. However, there was no forcible taking within the meaning of the contract of coverage. The taking in this case constituted a pilferage or sneak theft. Therefore, the insured could not collect under the terms of the policy.

Mercantile Burglary

[Cohen *vs.* Globe Indemnity Co., 22 F. S. 553.]

The plaintiff who owned a jewelry store carried a safe burglary policy. Burglars entered his store through a hole cut in the ceiling of the store. The jeweler's safe was broken into and merchandise within the safe and outside the safe was stolen. The policy provided: "E. The Company shall not be liable for loss or damage . . . (2) unless books and account are regularly kept by the Insured and are kept in such manner that the exact amount of loss can be accurately determined therefrom by the Company; . . ."

The insured's books and records consisted primarily of a perpetual inventory in loose card form. Each card related to a specific item of merchandise in the plaintiff's stock, and contained a description of the item, its cost, and its stock number. In addition all of the cards made up after 1933, except those representing merchandise purchased over the counter, contained a notation of the date of purchase of the item and the name of the person from whom purchased. The perpetual inventory was kept by the plaintiff's wife, who was active in the business. She started the inventory prior to 1933. The prior records from which she made the present records did not disclose the dates of purchase or names of the persons from whom purchased, consequently this information did not appear on the cards relating to merchandise purchased prior to 1933. The plaintiff, however, produced in addition to the perpetual inventory a sales book showing account payable and paid, and a large number of invoices showing the purchase of many articles contained in the perpetual inventory. He also produced physical inventories taken in 1935, 1936, and 1937. In preparing these physical inventories each article in stock was checked against the perpetual inventory card.

The company claimed that since none of the early inventory cards showed the date of purchase or the name of the person from whom purchased, the books were not kept in such manner as to permit an accurate determination of the loss and consequently they could not support the plaintiff's claim. The plaintiff claimed that even if the earlier perpetual inventory cards were insufficient to comply strictly with the terms of the policy because they did

not contain the date of purchase or name of the person from whom purchased, the defendant was estopped in equity from objecting to them on this ground because the company's representative had in prior burglary loss examined and approved these very records and paid the loss and consequently knew of their condition when the policies in suit were issued and premiums were accepted by the company.

The plaintiff's witness testified that the insurance company's representative was asked in reference to the previous loss settlement whether he cared to make any recommendation for the improvement of the system and he expressed himself as thoroughly satisfied with the manner in which the records were kept. Several months later the defendant issued the policies in suit and accepted the premiums thereon paid by the plaintiff.

What were the rights of the insured?

The court held that the date of purchase or the name of the person from whom the article was purchased which did not appear on the early inventory cards would have been helpful in checking the accuracy of the perpetual inventory. However, the three annual physical inventories which the plaintiff offered supplied an equivalent check on the perpetual inventory.

The evidence tended to establish that not only was the action of the defendant's representative in connection with the prior loss such as to lead the plaintiff to believe that his books and records complied with the provisions of the policies, but that the defendant by paying that loss had sanctioned these representations. A jury would be justified, if they believed the plaintiff's evidence, in finding that the defendant was estopped from objecting to the sufficiency of the early inventory cards.

Public Liability

[Commercial Standard Ins. Co. *vs.* McKinney, 114 S. W. 2d, 338.]

A road contractor carried a Contractors' and Manufacturers' Public Liability Policy, insuring him against claims for injuries to persons, or death of persons, resulting from his operations as a road contractor. The policy provided that there was no liability injuries or death "(2) Caused by the ownership, maintenance or

use of a vehicle of any description or of any draft or driving animal; or caused by any aircraft;".

The contractor was engaged in doing construction work on a highway, "scarifying" the road on a section three or four thousand feet long. The scarifier was being operated on the road, drawn by a caterpillar tractor. At the close of the day as the operators of the scarifier and tractor were preparing to park their two machines for the night, they were run into by a passenger bus. At the time and place of the accident the two machines were on the north side, the "wrong side", of the road without lights or any other danger sign to warn the public. Several persons traveling in the bus as passengers, were injured in the collision and commenced suit against the contractor. The insurance company denied liability. The contractor settled with the claimants and then made demands upon the insurance company for reimbursement. By statute, the word "vehicle" was defined as follows:

"(a) 'Vehicle means every device in, or by which any person or property is or may be transported or drawn upon a public highway, except devices moved only by human power or used exclusively upon stationary rails or tracks."

What were the rights of the contractor?

The court held that the language of the exclusion was broad enough without resort to the statutory definition to cover the situation; i.e., a vehicle of any description which must be construed to include a tractor. If this exception had been a covenant in the coverage instead of an exception to coverage, the contractor would have had cause of action. If, as a covenant of coverage, the company would have been liable, than as an exception to coverage, the company was relieved of liability. Therefore, the contractor could not recover.

Store Robbery

[Daiches *vs.* United States Fidelity & Guaranty Co., 93 F. 2d, 149.]

The plaintiff, who was a jeweler, sued on a policy of insurance protecting against loss and damage by robbery. The policy provided for coverage occurring "within the premises during the

hours beginning 7 o'clock a. m. and ending 12 o'clock p. m. while the custodian and at least one other employee of the assured are on duty therein."

In addition, there was a change in risk clause providing that if the assured is unable, because of an unforeseen contingency beyond his control to do and perform any of the things required by the declarations, thereby increasing the risk, the insurance should not be forfeited, but the amount of coverage should be reduced to the amount which the premium actually paid under the policy would have purchased for the actual risk under which the loss was sustained.

The plaintiff employed his nephew and also a watchmaker and a porter. These men had been working for the plaintiff for many years and each of them was required to report for duty at 7:45 each morning. On the morning of the robbery, the nephew arrived and opened the store alone at 7:45 a. m. In a few minutes the watchmaker arrived and thereupon the nephew opened the safe. The watchmaker, however, did not remain in the store but went across the street to a restaurant or cafe for his breakfast. While he was there, and not on duty, and the nephew was alone in the store, the robbery occurred.

The night preceding the robbery the porter was sick and had been taking medicine. On the following morning he hesitated about going to the store but finally did so. The porter arrived shortly after the robbery had occurred. Neither the plaintiff nor the nephew knew of the porter's sickness at the time of opening the store and safe. The company denied liability because there was not at least one other employee in addition to the custodian when the robbery occurred. The plaintiff claimed that this situation arose due to the illness of the porter which was an unforeseen contingency. What were the rights of the insured?

The court held, while neither the plaintiff nor the nephew knew of the porter's sickness at the time of opening the store and safe, the nephew did know at the time he opened the store and again after he had opened the safe that he was alone in the store. Furthermore, he knew that neither the watchmaker nor the porter was on duty and he made no effort to ascertain their whereabouts, or to keep the store and safe closed while he was alone on duty. Therefore, the facts did not present an unforeseen

contingency beyond the insured's control. The plaintiff through his agent, the nephew, either could have delayed opening the store and the safe until the watchmaker had had his breakfast, or could have required the latter to remain in the store without his breakfast until either the porter had arrived or another employee had been secured. Therefore, the whole situation was entirely within the plaintiff's control. Consequently, the insured could not collect for loss under the policy.

OBITUARY

CHARLES H. REMINGTON

1876 - 1938

Charles H. Remington, a charter member of the Casualty Actuarial Society, died at his home in Larchmont, New York, on March 21, 1938, following an illness of but a few days.

Mr. Remington was born in Cranston, Rhode Island, March 1, 1876. As a young man he began his business career in Hartford where he soon became interested in insurance. In 1901 he entered the Ætna Life Insurance Company as a clerk in the Accounting Department. He advanced steadily until he had become a Vice President in the Ætna Life Insurance Company and its Affiliates at the time he resigned in 1926. Mr. Remington then moved to New York, where he engaged in the real estate business, becoming President and Director of the New York State Holding Company. Shortly thereafter he became interested in patent insurance and headed the Patent Insurance Associates, being one of the pioneers of patent insurance in this country. In the past two years Mr. Remington was engaged in organizing the Pan American Casualty Company of Miami, Florida, which was about ready to enter the field at the time of his death.

Mr. Remington had a pleasing personality which brought him friends and recognition. He was interested in the business side of insurance rather than the actuarial side, and took little active part in the Casualty Actuarial Society. His long active association with the business of casualty insurance during its formative period establishes him as a pioneer in this field of insurance as well as in patent insurance in which he took leading rank.

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ABSTRACT FROM THE MINUTES OF THE MEETING
MAY 20, 1938

The semi-annual (fiftieth regular) meeting of the Casualty Actuarial Society was held at the Hotel Biltmore, New York, on Friday, May 20, 1938.

President Senior called the meeting to order at 10:30 A. M. (daylight saving time). The roll was called showing the following fifty-three Fellows and twenty-three Associates present:

FELLOWS

AULT
BARTER
BERKELEY
BLANCHARD
BROWN, F. S.
CAHILL
CAMERON
CARLSON
CLEARY
COMSTOCK
CONSTABLE
CRANE
DAVIES
DAVIS, E. M.
DORWEILER
EDWARDS
ELSTON
FONDILLER
GARRISON
GINSBURGH
GODDARD
GRAHAM, C. M.
GRAHAM, T. B.
GRAHAM, W. J.
HARDY
HAUGH
HOBBS
HULL
HUNT
KORMES
LAWRENCE
MARSHALL
MASTERSON
MATTHEWS
MAYCRINK
MCMANUS
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MOORE, G. D.
NICHOLAS
ORR
PERKINS
PERRYMAN
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SKELDING
SMICK
SMITH, C. G.
TARBELL
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HIPP
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KOLODITZKY
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MAGRATH
MARSH
MILLER, JOHN H.
PIPER, K. B.
POTOFSKY
SARASON
SMITH, A. G.
SPENCER
STOKE
UHL
WILLIAMSON

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

Mr. Senior read his presidential address.

The minutes of the meeting held November 18 and 19, 1937 were approved as printed in the *Proceedings*.

The Secretary-Treasurer (Richard Fondiller) read the report of the Council and upon motion it was adopted by the Society. The Librarian (Thomas O. Carlson) had made a comprehensive report upon the Library.

The President announced the death, since the last meeting of the Society, of Charles H. Remington, Fellow, and the memorial notice appearing in this Number, was thereupon read.

The new papers printed in this Number were read.

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

Informal discussion was participated in by a number of members and invited speakers upon the following topic:

"Proposed Revision of the New York Insurance Law."

directed principally to, but not limited by, the following sections:

1. Section 91.5—
   Relative to Declaration of Dividends by Stock Companies.
2. Section 95—
   Reserves of Casualty Companies.
3. Section 31.1—
   Limitation of Amount to be Written on a Single Risk.

The papers presented at the last meeting were discussed.

Upon motion, the meeting adjourned at 5 P. M., daylight saving time.

Representatives of Casualty Companies and Organizations Present

Marcus Abramson, Attorney, Association of Casualty and Surety Executives, New York.

John Barrows, Assistant to Comptroller, American Surety Company, New York.

John R. Blades, Insurance Advisor, New York.

R. H. CAPLAN, JR., Chief Accountant, Fireman's Fund Indemnity Company, New York.

JOHN F. COLLINS, Chief of Rating Bureau, New York Insurance Department, New York.

GEORGE A. DIERAUF, Secretary-Treasurer, Compensation Insurance Rating Board, New York.

WILLIAM F. DOWLING, Assistant Treasurer, Lumber Mutual Casualty Ins. Co., New York.

H. J. DRAKE, Counsel, Association of Casualty and Surety Executives, New York.

E. A. ERICKSON, Statistician, Utilities Mutual Insurance Company, New York.

HARRY W. GIBSON, Assistant Secretary, Interboro Mutual Indemnity Insurance Co., New York.

W. C. GOULD, Senior Examiner, New York Insurance Department, New York.

RAYMOND L. HARDESTY, Assistant Secretary and Statistician, New Amsterdam Casualty Company, Baltimore, Md.

ROY E. HATFIELD, Assistant Manager, Massachusetts Rating and Inspection Bureau, Boston, Mass.

GREGORY C. KELLY, General Manager, Pennsylvania Compensation Rating & Inspection Bureau, Philadelphia, Pa.

MYRTLE S. KELLY, Statistician, Pennsylvania Compensation Rating & Inspection Bureau, Philadelphia, Pa.

MARTIN W. LEWIS, President, Towner Rating Bureau, New York.

MILTON O. LOYSEN, Special Deputy Superintendent of Insurance of New York, New York.

EDGAR F. MULLER, Assistant Statistician, United States Fidelity & Guaranty Company, Baltimore, Md.

MIRIAM PEARL, Librarian, Compensation Insurance Rating Board, New York.

ARTHUR H. REEDE, Research Assistant, Harvard University, Cambridge, Mass.

HENRY REICHGOTT, Group Underwriter, Equitable Life Assurance Society, New York.

H. WALTER REYNOLDS, Counselor at Law, 36 West 44th Street, New York.

L. W. SCAMMON, Statistician, Massachusetts Rating & Inspection Bureau, Boston, Mass.

C. L. SCHLIER, Statistician, New Jersey Rating & Inspection Bureau, Newark, N. J.

F. B. SCHROETER, Zurich General Accident & Liability Insurance Company, New York.

JESSICA W. SCOTT, Assistant to President, Mutual Casualty Insurance Company, New York.

F. H. STRICKLAND, Vice President, New Amsterdam Casualty Company, Baltimore, Md.

M. B. SWERIG, Librarian, Insurance Society of New York, New York.

H. A. YAW, Secretary, Jamestown Mutual Insurance Company, Jamestown, New York.

N. A. ZEIGER, Research Engineer, Compensation Rating & Inspection Bureau, Newark, New Jersey.

B. H. ZIMELS, Vice President, Consolidated Taxpayers Mutual Insurance Company, Brooklyn, N. Y.

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ORGANIZED 1914

1938 YEAR BOOK

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(Addendum to Volume XXIV of the *Proceedings*)

Corrected to February 1, 1938 **No. 17**

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.

Prior to the organization of the Society comparatively little technical study was given to the actuarial and underwriting problems of most of the branches of casualty insurance. With the passage of legislation providing for workmen's compensation insurance in many states during 1912, 1913 and 1914, the need of actuarial guidance became more pronounced, and 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 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. After three years' work the Committee on Compensation and Liability Loss Reserves submitted a report which has been printed in *Proceedings* No. 35 and 36. The Committee on Remarriage Table after four years' work submitted a report including tables, printed in *Proceedings* No. 40. During the past year the Special Committee on Bases of Exposure after two years' work submitted a report printed in *Proceedings* No. 43. New "Recommendations for Study" were also completed, and appear in the same number.

There are two grades of membership in the Society: Fellows and Associates; while admission to either grade is in rare cases by election, in all other cases qualification is by examination, with the additional requirement of satisfactory experience in casualty insurance work. Examinations have been held every year since organization; they are held on the third Wednesday and following Thursday in 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 309, comprising 179 Fellows and 130 Associates. The annual meeting of the Society is held in New York in November and the semi-annual meetings are held in May, usually in Baltimore, Boston, Hartford or Philadelphia. The Society twice a year issues a publication entitled the *Proceedings* which contains original papers presented at the meetings of the Society. The *Proceedings* also contain discussions of papers, reviews of books and publications, current notes and legal notes. This Year Book is published annually by the Society and "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, 90 John Street, New York.

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ARTHUR E. THOMPSON

COMMITTEE OF MORTALITY FOR DISABLED LIVES

PAUL DORWEILER (CHAIRMAN)
RALPH M. MARSHALL
MARK KORMES

COMMITTEE ON ADVANCEMENT OF ASSOCIATES

F. STUART BROWN (CHAIRMAN)
THOMAS O. CARLSON
JAMES M. CAHILL

MEMBERSHIP OF THE SOCIETY, NOVEMBER 18, 1937

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.

Date Admitted	
*Nov. 21, 1930	AINLEY, JOHN W., The Travelers Insurance Company, 700 Main Street, Hartford, Conn.
*Nov. 13, 1931	AULT, GILBERT E., Assistant Actuary, Colonial Life Insurance Company, 921 Bergen Avenue, Jersey City, N. J.
May 23, 1924	BAILEY, WILLIAM B., Economist, The Travelers Insurance Company, 700 Main Street, Hartford, Conn.
*Nov. 20, 1924	BARBER, HARMON T., Assistant Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 18, 1932	BARTER, JOHN L., Assistant Secretary, Hartford Accident & Indemnity Co., Hartford, Conn.
*Nov. 13, 1931	BATHO, ELGIN R., Assistant Actuary, Equitable Life Insurance Company of Canada, Waterloo, Ontario, Canada.
†	BENJAMIN, ROLAND, Treasurer, Fidelity & Deposit Company of Maryland and American Bonding Company, Baltimore, Md.
*Nov. 22, 1934	BERKELEY, ERNEST T., Superintendent, Actuarial Department, Employers Liability Assurance Corporation, Boston, Mass.
†	BLACK, S. BRUCE, President, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, Mass.
Apr. 20, 1917	BLANCHARD, RALPH H., Professor of Insurance, School of Business, Columbia University, New York.
May 24, 1921	BOND, EDWARD J., JR., President, Maryland Casualty Company, Baltimore, Md.
May 19, 1915	BRADSHAW, THOMAS, Vice-President and General Manager, Massey-Harris Company, Limited, 915 King Street, Toronto, Canada; President, North American Life Assurance Company of Canada, Toronto, Canada.
†	BREIBY, WILLIAM, Vice-President, Pacific Mutual Life Insurance Company, Los Angeles, Cal.
*Nov. 18, 1927	BROWN, F. STUART, Comptroller, Fireman's Fund Indemnity Company, 116 John Street, New York.
Oct. 22, 1915	BROWN, HERBERT D., Glenora, Yates County, New York.
†	BUCK, GEORGE B., Consulting Actuary for Pension Funds, 150 Nassau Street, New York.
*Nov. 18, 1932	BURHANS, CHARLES H., Standard Accident Insurance Company, 640 Temple Avenue, Detroit, Mich.

FELLOWS

Date Admitted	
Apr. 20, 1917	BURHOP, WILLIAM H., Executive Vice-President, Employers Mutual Liability Insurance Company, Wausau, Wis.
*Nov. 23, 1928	BURLING, WILLIAM H., Assistant Actuary, The Travelers Insurance Company, 700 Main Street, Hartford, Conn.
*Nov. 19, 1929	CAHILL, JAMES M., The Travelers Insurance Company, 700 Main Street, Hartford, Conn.
*Nov. 18, 1932	CAMERON, FREELAND R., Assistant Manager, Automobile Department, American Surety Company, 100 Broadway, New York.
†	CAMMACK, EDMUND E., Vice-President and Actuary, Aetna Life Insurance Company, Hartford, Conn.
*Nov. 21, 1930	CARLSON, THOMAS O., Assistant Actuary, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York.
†	CARPENTER, RAYMOND V., Senior Actuary, Metropolitan Life Insurance Company, 1 Madison Avenue, New York.
*Nov. 13, 1936	CLEARY, ARTHUR E., Employers Liability Assurance Corp'n, 110 Milk Street, Boston, Mass.
*Nov. 15, 1918	COATES, BARRETT N., Coates and Herfurth, Consulting Actuaries, 582 Market Street, San Francisco, Calif.
*Nov. 17, 1922	COATES, CLARENCE S., Statistician, Lumbermen's Mutual Casualty Company, Mutual Insurance Bldg., Chicago, Ill.
Oct. 27, 1916	COGSWELL, EDMUND S., First Deputy Commissioner of Insurance, 100 Nashua Street, Boston, Mass.
Feb. 19, 1915	COLLINS, HENRY, Manager and Attorney, Ocean Accident & Guarantee Corporation and President, Columbia Casualty Company, 1 Park Avenue, New York.
*Nov. 23, 1928	COMSTOCK, W. PHILLIPS, Statistician, London Guarantee & Accident Company, 55 Fifth Avenue, New York.
*Nov. 22, 1934	CONSTABLE, WILLIAM J., Resident Secretary, Lumbermen's Mutual Casualty Company, 400 North Broad Street, Philadelphia, Pa.
*Nov. 22, 1934	COOK, EDWIN A., Assistant Secretary, Interboro Mutual Indemnity Insurance Company, 270 Madison Avenue, New York.
†	COPELAND, JOHN A., Consulting Actuary, Candler Building, Atlanta, Ga.
*Nov. 18, 1925	CORCORAN, WILLIAM M., Consulting Actuary, c/o S. H and Lee J. Wolfe, 116 John Street, New York.
†	COWLES, WALTER G., Vice-President, The Travelers Insurance Company, 700 Main Street, Hartford, Conn.
†	CRAIG, JAMES D., Vice-President, Metropolitan Life Insurance Company, 1 Madison Avenue, New York.
*Nov. 19, 1926	CRANE, HOWARD G., Treasurer, General Reinsurance Corporation, 90 John Street, New York.
*Nov. 18, 1932	DAVIES, E. ALFRED, Budget Supervisor, Liberty Mutual Insurance Company, 125 Berkeley Street, Boston, Mass.
*Nov. 18, 1927	DAVIS, EVELYN M., Woodward, Ryan, Sharp & Davis, Consulting Actuaries, 90 John Street, New York.
†	DAWSON, MILES M., Consulting Actuary and Counsellor at Law, 500 Fifth Avenue, New York.
†	DEARTH, ELMER H., 1156 Lincoln Avenue, St. Paul, Minn.

FELLOWS

Date Admitted	
†	DEKAY, ECKFORD C., President, Industrial Service Corporation, 84 William Street, New York.
*Nov. 17, 1920	DORWEILER, PAUL, Actuary, Aetna Casualty & Surety Company, Hartford, Conn.
May 19, 1915	DUNLAP, EARL O., Assistant Actuary, Metropolitan Life Insurance Company, 1 Madison Avenue, New York.
*Nov. 24, 1933	EDWARDS, JOHN, Casualty Actuary, Ontario Insurance Department, 91 Arundel Avenue, Toronto, Ontario, Canada.
*Nov. 17, 1922	ELSTON, JAMES S., Assistant Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 15, 1935	EPPINK, WALTER T., Vice-President, Merchants' Mutual Casualty Co., Casualty Insurance Building, Buffalo, New York.
†	FACKLER, EDWARD B., Consulting Actuary, Fackler & Company, 8 West 40th Street, New York.
†	FALLOW, EVERETT S., Actuary, Accident Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
†	FARRER, HENRY, National Security Fire Insurance Company, 99 John Street, New York.
Feb. 19, 1915	FELLOWS, CLAUDE W., President, Associated Indemnity Corporation, Associated Fire & Marine Insurance Co., Associated Insurance Fund, Inc., 332 Pine Street, San Francisco, Calif.
*Nov. 15, 1935	FITZHUGH, GILBERT W., Metropolitan Life Insurance Co., 1 Madison Avenue, New York.
Feb. 19, 1915	FLANIGAN, JAMES E., Agency Manager, Bankers Life Co., 225 Broadway, New York.
†	FLYNN, BENEDICT D., Vice-President and Actuary, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
Feb. 19, 1915	FONDILLER, RICHARD, Woodward and Fondiller, Consulting Actuaries, 90 John Street, New York.
†	FORBES, CHARLES S., Treasurer, Smyth, Sanford and Gerard, Inc., Insurance Brokers, 68 William Street, New York; Actuary, Service Mutual Liability Insurance Co., Park Square Building, Boston, Mass.
*Nov. 22, 1934	FULLER, GARDNER V., Secretary, National Council on Compensation Insurance, 45 East 17th Street, New York.
†	FRANKLIN, CHARLES H., Assistant to the President, Continental Casualty Co., 910 South Michigan Avenue, Chicago, Ill.
*Nov. 18, 1927	FREDERICKSON, CARL H., Actuary, Canadian Underwriters Association, 44 Victoria Street, Toronto, Canada.
Feb. 25, 1916	FROGGATT, JOSEPH, President, Joseph Froggatt & Co., Insurance Accountants, 74 Trinity Place, New York.
†	FURZE, HARRY, 42, Douglas Road, Glen Ridge, N. J.
Feb. 19, 1915	GARRISON, FRED S., Secretary, The Travelers Indemnity Co., 700 Main Street, Hartford, Conn.
*Nov. 20, 1924	GINSBURGH, HAROLD J., Assistant Vice-President, American Mutual Liability Insurance Co., 142 Berkeley Street, Boston, Mass.

FELLOWS

Date Admitted	
*Nov. 21, 1930	GLENN, J. BRYAN, Assistant Actuary, Railroad Retirement Board, Washington, D C.
May 19, 1915	GLOVER, JAMES W., Edward Olney Professor of Mathematics, University of Michigan, 620 Oxford Road, Ann Arbor, Mich.
*Nov. 13, 1931	GODDARD, RUSSELL P., The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
†	GOODWIN, EDWARD S., 750 Main Street, Hartford, Conn.
*Nov. 19, 1926	GRAHAM, CHARLES M., Assistant Actuary, State Insurance Fund, 625 Madison Avenue, New York.
Oct. 22, 1915	GRAHAM, THOMPSON B., Assistant Secretary, Metropolitan Life Insurance Co., 1 Madison Avenue, New York.
†	GRAHAM, WILLIAM J., Vice-President, Equitable Life Assurance Society, 393 Seventh Avenue, New York.
May 25, 1923	GRANVILLE, WILLIAM A., Director of Publications, Washington National Insurance Co., 610 Church Street, Evanston, Ill.
†	GREENE, WINFIELD W., Vice-President, General Reinsurance Corporation, 90 John Street, New York.
†	HAMILTON, ROBERT C. L., Comptroller, Hartford Accident & Indemnity Co., Hartford, Conn.
†	HAMMOND, H. PIERSON, Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
Oct. 27, 1916	HARDY, EDWARD R., Secretary-Treasurer, Insurance Institute of America, Inc., 80 John Street, New York.
Oct. 22, 1915	HATCH, LEONARD W., (Retired), 425 Pelham Manor Road, Pelham Manor, New York.
*Nov. 19, 1926	HAUGH, CHARLES J., Actuary, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York.
Nov. 17, 1920	HEATH, CHARLES E., Vice-President and Secretary, Standard Surety & Casualty Company of New York, 80 John Street, New York.
Nov. 21, 1919	HENDERSON, ROBERT, (Retired) Crown Point, Essex County, New York.
May 17, 1922	HERON, DAVID, Secretary and Chief Statistician, London Guarantee & Accident Co., Ltd., Phoenix House, King William Street, E.C. 4, London, England.
†	HILLAS, ROBERT J., (Retired) 2 Whippany Road, Morristown, N. J.
May 23, 1924	HOBBS, CLARENCE W., Special Representative of the National Association of Insurance Commissioners, National Council on Compensation Insurance, 45 East 17th Street, New York.
Oct. 22, 1915	HODGKINS, LEMUEL G., Secretary, Massachusetts Protective Association and Massachusetts Protective Life Assurance Co., Worcester, Mass.

FELLOWS

Date Admitted	
†	HOFFMAN, FREDERICK, L., Consulting Statistician, The Biochemical Research Foundation of The Franklin Institute, Philadelphia, Pa.
Oct. 22, 1915	HOLLAND, CHARLES H., Room 1406, 9 East 44th Street, New York.
*Nov. 22, 1934	HOOKER, RUSSELL O., Actuary, Connecticut Insurance Department, Hartford, Conn.
Nov. 18, 1932	HUEBNER, SOLOMON S., Professor of Insurance, University of Pennsylvania, Philadelphia, Pa.
†	HUGHES, CHARLES, Auditor and Actuary, New York Insurance Department, 80 Centre Street, New York.
Nov. 19, 1929	HULL, ROBERT S., Social Security Board, Bureau of Old Age Pensions, Washington, D. C.
†	HUNT, BURRITT A., Assistant Secretary, Accident and Liability Department, Aetna Life Insurance Co., Hartford, Conn.
†	HUNTER, ARTHUR, Vice-President and Chief Actuary, New York Life Insurance Co., 51 Madison Avenue, New York.
Nov. 18, 1921	HUTCHESON, WILLIAM A., Vice-President and Actuary, Mutual Life Insurance Co., 32 Nassau Street, New York.
Feb. 25, 1916	JACKSON, CHARLES W., Consulting Actuary, Woodward and Fondiller, 90 John Street, New York.
*Nov. 19, 1929	JACKSON, HENRY H., Actuary, National Life Insurance Co., Montpelier, Vt.
May 19, 1915	JOHNSON, WILLIAM C., Vice-President, Massachusetts Protective Association and Massachusetts Protective Life Assurance Co., Worcester, Mass.
Nov. 23, 1928	JONES, F. ROBERTSON, Secretary, Association of Casualty and Surety Executives; and Secretary-Treasurer, Bureau of Personal Accident and Health Underwriters, 60 John Street, New York.
*Nov. 19, 1926	KELTON, WILLIAM H., Assistant Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
†	KING, WALTER I., Ganse-King Estate Service, 1 Federal Street, Boston, Mass.
*Nov. 21, 1919	KIRKPATRICK, A. LOOMIS, Insurance Editor, Chicago Journal of Commerce, 12 East Grand Avenue, Chicago, Ill.
*Nov. 24, 1933	KORMES, MARK, Associate Actuary, Compensation Insurance Rating Board, Pershing Square Bldg., 125 Park Avenue, New York.
Nov. 23, 1928	KULP, CLARENCE A., Professor of Insurance, University of Pennsylvania, Logan Hall, 36th Street and Woodland Avenue, Philadelphia, Pa.
Feb. 19, 1915	LAIRD, JOHN M., Vice-President and Secretary, Connecticut General Life Insurance Co., 55 Elm Street, Hartford, Conn.
Nov. 13, 1931	LA MONT, STEWART M., Third Vice-President, Metropolitan Life Insurance Co., 1 Madison Avenue, New York.
*Nov. 24, 1933	LANGE, JOHN R., Chief Actuary, Wisconsin Insurance Department, State House, Madison, Wis.
Nov. 17, 1922	LAWRENCE, ARNETTE R., Special Deputy Commissioner of Banking and Insurance, 1203 Military Park Building, 60 Park Place, Newark, N. J.
†	LEAL, JAMES R., Vice-President and Secretary, Interstate Life and Accident Co., Interstate Building, 540 McCallie Avenue, Chattanooga, Tenn.

FELLOWS

Date Admitted	
†	LESLIE, WILLIAM, General Manager, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York.
*Nov. 20, 1924	LINDER, JOSEPH, Consulting Actuary, c/o S. H. and Lee J. Wolfe, 116 John Street, New York.
Nov. 18, 1921	LITTLE, JAMES F., Vice-President and Actuary, Prudential Insurance Co., Newark, N. J.
Nov. 23, 1928	LUNT, EDWARD C., Vice-President, Great American Indemnity Co., 1 Liberty Street, New York.
*Nov. 13, 1936	LYONS, DANIEL J., Chief Assistant Actuary, New Jersey Department of Banking and Insurance, Trenton, N. J.
†	MAGOUN, WILLIAM N., General Manager, Massachusetts Rating and Inspection Bureau, 89 Broad Street, Boston, Mass.
*Nov. 23, 1928	MARSHALL, RALPH M., Assistant Actuary, National Council on Compensation Insurance, 45 East 17th Street, New York.
*Nov. 18, 1927	MASTERSON, Norton E., Vice-President and Actuary, Hardware Mutual Casualty Co., Stevens Point, Wis.
*Nov. 19, 1926	MATTHEWS, ARTHUR N., The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
May 19, 1915	MAYCRINK, EMMA C., Examiner, New York Insurance Department, 80 Centre Street, New York.
*Nov. 16, 1923	MCCLURG, D. RALPH, Secretary and Treasurer, National Equity Life Insurance Co., Little Rock, Ark.
*Nov. 15, 1935	MCCONNELL, MATTHEW H., JR., Indemnity Insurance Company of North America, 1600 Arch Street, Philadelphia, Pa.
May 23, 1919	MCDOUGALD, ALFRED, Ellerslie, Beddington Gardens, Wallington Surrey, England.
*Oct. 31, 1917	MCMANUS, Robert J., Statistician, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
†	MICHELBACHER, GUSTAV F., Vice-President and Secretary, Great American Indemnity Co., 1 Liberty Street, New York.
†	MILLIGAN, SAMUEL, Second Vice-President, Metropolitan Life Insurance Co., 1 Madison Avenue, New York.
*Nov. 18, 1937	MILLS, JOHN A., Secretary and Actuary, Lumbermen's Mutual Casualty Co., and American Motorists Insurance Co., Mutual Insurance Bldg., Chicago, Ill.
†	MITCHELL, JAMES F., U. S. Manager, General Accident Fire and Life Assurance Corporation, Ltd., 414 Walnut Street, Philadelphia, Pa.
*Nov. 18, 1921	MONTGOMERY, VICTOR, President, Pacific Employers Insurance Co., 928 So. Figueroa Street, Los Angeles, Calif.
Nov. 19, 1926	MOONEY, WILLIAM L., (Retired), 4 Pleasant Street, West Hartford, Conn.
†	MOORE, GEORGE D., Comptroller, Standard Surety & Casualty Company of New York, 80 John Street, New York.
†	MOWBRAY, ALBERT H., Consulting Actuary, 806 San Luis Road, Berkeley, Calif.
*Nov. 17, 1920	MUELLER, LOUIS H., Director, Associated Insurance Fund, 332 Pine Street, San Francisco, Calif.

FELLOWS

Date Admitted	
†	MULLANEY, FRANK R., Vice-President and Secretary, American Mutual Liability Insurance Co., and Secretary, American Policyholders' Insurance Co., 142 Berkeley Street, Boston, Mass.
May 28, 1920	MURPHY, RAY D., Vice-President and Actuary, Equitable Life Assurance Society, 393 Seventh Avenue, New York.
†	NICHOLAS, LEWIS A., Assistant Secretary, Fidelity & Casualty Co., 80 Maiden Lane, New York.
*Nov. 15, 1935	OBERHAUS, THOMAS M., Actuarial Department, Mutual Life Insurance Co., 34 Nassau Street, New York.
†	OLIFIERS, EDWARD, Actuary and Managing Director, Previdencia do Sul, Caixa Postal 76, Porto Alegre, Brazil.
Nov. 18, 1927	O'NEILL, FRANK J., President, Royal Indemnity Co., and Eagle Indemnity Co., 150 William Street, New York.
†	ORR, ROBERT K., President, Wolverine Insurance Co., Lansing, Mich.
*Nov. 21, 1919	OUTWATER, OLIVE E., Actuary, Benefit Association of Railway Employees, 901 Montrose Avenue, Chicago, Ill.
Nov. 19, 1926	PAGE, BERTRAND A., Vice-President, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 18, 1921	PERKINS, SANFORD B., Assistant Secretary, Compensation and Liability Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
Nov. 15, 1918	PERRY, W. T., Deputy Manager, Ocean Accident and Guarantee Corporation, 36 Moorgate, London, E. C. 2, England.
*Nov. 21, 1930	PERRYMAN, FRANCIS S., Secretary, Royal Indemnity Co., and Eagle Indemnity Co., 150 William Street, New York.
Nov. 19, 1926	PHILLIPS, JESSE S., Chairman of Board, Great American Indemnity Co., 1 Liberty Street, New York.
*Nov. 24, 1933	PICKETT, SAMUEL C., Assistant Actuary, Connecticut Insurance Department, Hartford, Conn.
*Nov. 17, 1922	PINNEY, SYDNEY D., Associate Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 13, 1931	PRUITT, DUDLEY M., Actuary and Assistant Treasurer, Pennsylvania Indemnity Corporation, 1511 Walnut Street, Philadelphia, Pa.
May 13, 1927	REID, A. DUNCAN, President and General Manager, Globe Indemnity Co., 150 William Street, New York.
†	REMINGTON, CHARLES H., Room 2707, 90 John Street, New York.
May 23, 1919	RICHARDSON, FREDERICK, Deputy Chairman of the Board, General Accident Fire and Life Assurance Corporation, 414 Walnut Street, Philadelphia, Pa.
*Nov. 19, 1926	RICHTER, OTTO C., American Telephone & Telegraph Co., 195 Broadway, New York.
May 24, 1921	RIEGEL, ROBERT, Professor of Statistics and Insurance, University of Buffalo, Buffalo, New York.
*Nov. 16, 1923	ROEBER, WILLIAM F., General Manager, National Council on Compensation Insurance, 45 East 17th Street, New York.

FELLOWS

Date Admitted	
†	SCHEITLIN, EMIL, Treasurer, Globe Indemnity Co., 150 William Street, New York.
†	SENIOR, LEON S., General Manager, Compensation Insurance Rating Board, Pershing Square Bldg., 125 Park Avenue, New York.
*Nov. 18, 1937	SHAPIRO, GEORGE I., Examiner, New York Insurance Department, 80 Centre Street, New York.
*Nov. 13, 1931	SILVERMAN, DAVID, c/o S. H. & Lee J. Wolfe, 116 John Street, New York.
*Nov. 24, 1933	SINNOTT, ROBERT V., Hartford Accident and Indemnity Company, 690 Asylum Avenue, Hartford, Conn.
*Nov. 19, 1929	SKELDING, ALBERT Z., Actuary, National Council on Compensation Insurance, 45 East 17th Street, New York.
*Nov. 19, 1929	SKILLINGS, EDWARD S., c/o S. H. and Lee J. Wolfe, 116 John Street, New York.
*Nov. 18, 1932	SMICK, JACK J., National Council on Compensation Insurance, 45 East 17th Street, New York.
Apr. 20, 1917	SMITH, CHARLES G., Manager, State Insurance Fund, 625 Madison Avenue, New York.
*Nov. 24, 1933	ST. JOHN, JOHN B., Metropolitan Life Insurance Company, 1 Madison Avenue, New York.
Nov. 18, 1927	STONE, EDWARD C., U. S. General Manager and Attorney, Employers' Liability Assurance Corporation, Limited, and President, American Employers' Insurance Company, 110 Milk Street, Boston, Mass.
Feb. 25, 1916	STRONG, WENDELL M., Associate Actuary, Mutual Life Insurance Co., 32 Nassau Street, New York.
Oct. 22, 1915	STRONG, WILLIAM RICHARD, No. 4 "Sheringham," Cotham Road, Kew, Victoria, Australia.
*Nov. 17, 1920	TARBELL, THOMAS F., Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
†	THOMPSON, JOHN S., Vice-President and Mathematician, Mutual Benefit Life Insurance Co., 300 Broadway, Newark N. J.
†	TRAIN, JOHN L., President and General Manager, Utica Mutual Insurance Co., 185 Genesee Street, Utica, New York.
Nov. 17, 1922	TRAVERSI, ANTONIO T., Consulting Actuary and Accountant, London Bank Chambers, Martin Place, Sydney, Australia.
*Nov. 23, 1928	VALERIUS, NELS M., Accident & Liability Department, Aetna Life Insurance Co., Hartford, Conn.
*Nov. 21, 1919	VAN TUYL, HIRAM O., Chief Accountant, London Guarantee & Accident Co., 55 Fifth Avenue, New York.
*Nov. 17, 1920	WAITE, ALAN W., Assistant Secretary, Accident and Liability Department, Aetna Life Insurance Co., Hartford, Conn.
*Nov. 15, 1935	WAITE, HARRY V., Statistician, The Travelers Fire Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 18, 1925	WARREN, LLOYD A. H., Professor of Actuarial Science, University of Manitoba, 64 Niagara Street, Winnipeg, Manitoba, Canada.

FELLOWS

Date Admitted	
†	WHITNEY, ALBERT W., Consulting Director, National Conservation Bureau, Association of Casualty & Surety Executives, 60 John Street, New York.
*Nov. 15, 1935	WILLIAMS, HARRY V., Statistician, National Council on Compensation Insurance, 45 East 17th Street, New York.
*Nov. 13, 1931	WITTICK, HERBERT E., Secretary, Pilot Insurance Co., 199 Bay Street, Toronto, Canada.
†	WOLFE, LEE J., Consulting Actuary, 116 John Street, New York.
May 24, 1921	WOOD, ARTHUR B., President and Managing Director, Sun Life Assurance Company of Canada, Montreal, Canada.
*Nov. 17, 1920	YOUNG, CHARLES N., Engineering and Inspection Division, Eureka Casualty Company, 4007 Chester Avenue, Philadelphia, Pa.

ASSOCIATES

Those marked (*) have been enrolled as Associates upon examination by the Society.

Numerals indicate Fellowship examination parts credited.

Date Enrolled	
May 23, 1924	ACKER, MILTON, Manager, Compensation and Liability Department, National Bureau of Casualty and Surety Underwriters, 60 John Street, New York.
*Nov. 15, 1918	ACKERMAN, SAUL B., Professor of Insurance, New York University, 90 Trinity Place, New York.
Apr. 5, 1928	ALLEN, AUSTIN F., Executive Vice-President, Texas Employers Insurance Association and Employers Casualty Co., Dallas, Texas.
Nov. 15, 1918	ANKERS, ROBERT E., Secretary and Treasurer, Continental Life Insurance Co., Investment Building, Washington, D. C.
*Nov. 21, 1930	ARCHIBALD, A. EDWARD, Actuary, Volunteer State Life Insurance Company, Chattanooga, Tenn. (I, II.)
*Nov. 24, 1933	BARRON, JAMES C., General Reinsurance Corporation, 90 John Street, New York. (I, II, IV.)
*Nov. 23, 1928	BATEMAN, ARTHUR E., Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, Mass. (I, II.)
*Nov. 18, 1925	BITTEL, W. HAROLD, Associate Actuary, Woodward, Ryan, Sharp, & Davis, 90 John Street, New York.
Nov. 17, 1920	BLACK, NELLAS C., Statistician, Maryland Casualty Co., Baltimore, Md.
*Nov. 22, 1934	BOMSE, EDWARD L., National Bureau of Casualty & Surety Underwriters, 60 John Street, New York.
*Nov. 23, 1928	BOWER, PERRY S., Great West Life Assurance Company, Winnipeg, Manitoba, Canada.
*Nov. 15, 1935	BRERETON, CLOUDESLEY R., Dominion Department of Insurance, Ottawa, Ontario, Canada.
*Nov. 15, 1918	BRUNNQUELL, HELMUTH G., Assistant Actuary, The Northwestern Mutual Life Insurance Co., Milwaukee, Wis.
*Oct. 22, 1915	BUFFLER, LOUIS, Underwriting Supervisor, State Insurance Fund, 625 Madison Avenue, New York.
*Nov. 20, 1924	BUGBEE, JAMES M., Maryland Casualty Co., Baltimore, Md.
Mar. 31, 1920	BURT, MARGARET A., Office of George B. Buck, Consulting Actuary, 150 Nassau Street, New York.
*Nov. 13, 1936	CARLETON, JOHN W., Fireman's Fund Indemnity Co., 401 California Street, San Francisco, Calif. (I, II.)
Nov. 17, 1922	CAVANAUGH, LEO D., Executive Vice-President and Actuary, Federal Life Insurance Co., 168 N. Michigan Avenue, Chicago, Ill.
*Nov. 18, 1927	CHEN, S. T., Actuary, China United Assurance Society, 104 Bubbling Well Road, Shanghai, China.
*Nov. 18, 1927	CONROD, STUART F., Secretary and Actuary, Western Empire Life Assurance Co., Power Bldg., Winnipeg, Manitoba, Canada.
May 23, 1929	COWEE, GEORGE A., Vice-President, Liberty Mutual Insurance Co., 175 Berkeley Street, Boston, Mass.

ASSOCIATES

Date Enrolled	
*Nov. 24, 1933	CRAWFORD, WILLIAM H., Assistant Secretary, Commercial Casualty Insurance Company and Metropolitan Casualty Insurance Company of New York, 10 Park Place, Newark, N. J. (I, II.)
*Nov. 18, 1932	CRIMMINS, JOSEPH B., Metropolitan Life Insurance Co., 1 Madison Avenue, New York. (I, II.)
*Nov. 18, 1925	DAVIS, MALVIN E., Assistant Actuary, Metropolitan Life Insurance Co., 1 Madison Avenue, New York.
*Nov. 24, 1933	DAVIS, REGINALD S., Assistant Comptroller, State Compensation Insurance Fund, San Francisco, Calif. (I, II.)
May 25, 1923	ECONOMIDY, HARILAUS E., Senior Examiner, Board of Insurance Commissioners, Austin, Texas.
June 5, 1925	EGER, FRANK A., Secretary-Comptroller, Insurance Company of North America and Affiliated Companies, 1600 Arch Street, Philadelphia, Pa.
*Nov. 18, 1937	FARLEY, JARVIS, Assistant Treasurer, Massachusetts Indemnity Co., 632 Beacon Street, Boston, Mass.
*Nov. 16, 1923	FITZ, L. LEROY, Group Insurance Department, Equitable Life Assurance Society, 393 Seventh Avenue, New York. (I, II.)
*Nov. 18, 1927	FITZGERALD, AMOS H., Assistant Actuary, The Prudential Insurance Company of America, Newark, N. J. (I, II.)
*Nov. 16, 1923	FLEMING, FRANK A., Actuary, American Mutual Alliance, 60 East 42nd Street, New York.
Nov. 20, 1924	FROBERG, JOHN, Superintendent, California Inspection Rating Bureau, 114 Sansome Street, San Francisco, Calif.
*Nov. 13, 1936	FRUECHTEMEYER, FRED J., Liberty Mutual Insurance Co., 175 Berkeley Street, Boston, Mass. (I, II.)
*Nov. 19, 1929	FURNIVALL, MAURICE L., Assistant Actuary, Accident Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn. (I, II.)
Mar. 21, 1930	GALLON, RICHARD W., Vice-President, New Amsterdam Casualty Co., 227 St. Paul Street, Baltimore, Md.
*Nov. 22, 1934	GATELY, JOHN J., General Reinsurance Corporation, 90 John Street, New York. (I, II.)
*Nov. 18, 1932	GETMAN, RICHARD A., Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn. (I, II.)
*Nov. 17, 1922	GIBSON, JOSEPH P., JR., President and General Manager, Excess Underwriters, Inc., 90 John Street, New York.
*Nov. 16, 1923	GILDEA, JAMES F., The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
Nov. 19, 1929	GORDON, HAROLD R., Executive Secretary, Health & Accident Underwriters Conference, 176 West Adams Street, Chicago, Ill.
*Nov. 18, 1927	GREEN, WALTER C., Consulting Actuary, 120 South LaSalle Street, Chicago, Ill.
*Nov. 15, 1935	GUERTIN, A. N., Actuary, New Jersey Department of Banking and Insurance, Trenton, N. J. (I, II.)
*Nov. 18, 1921	HAGGARD, ROBERT E., Superintendent, Permanent Disability Rating Department, Industrial Accident Commission, State Building, San Francisco, Calif.
*Nov. 17, 1922	HALL, HARTWELL L., Associate Actuary, Connecticut Insurance Department, Hartford, Conn.

ASSOCIATES

Date Enrolled	
*Nov. 18, 1925	HALL, WILLIAM D., Actuary, National Automobile Underwriters Association, 1 Liberty Street, New York. (III, IV.)
*Nov. 13, 1936	HAM, HUGH P., British America Assurance Co., 807 Electric Railway Chambers, Winnipeg, Manitoba, Canada.
Mar. 24, 1932	HARRIS, SCOTT, Vice-President, Joseph Froggatt & Co., 74 Trinity Place, New York.
*Mar. 25, 1924	HART, WARD VAN BUREN, Assistant Actuary, Connecticut General Life Insurance Co., Hartford, Conn. (I, II.)
Nov. 21, 1919	HAYDON, GEORGE F., General Manager, Wisconsin Compensation Rating & Inspection Bureau, 715 N. Van Buren Street, Milwaukee, Wis.
Nov. 17, 1927	HIPP, GRADY H., Actuary, State Insurance Fund, 625 Madison Avenue, New York.
*Oct. 31, 1917	JACKSON, EDWARD T., Statistician, General Accident Fire & Life Assurance Corporation, 421 Walnut Street, Philadelphia, Pa.
Nov. 19, 1929	JACOBS, CARL N., President, Hardware Mutual Casualty Co., Stevens Point, Wis.
*Nov. 18, 1921	JENSEN, EDWARD S., Group Underwriter, Occidental Life Insurance Co., Los Angeles, Calif. (III, IV.)
Nov. 21, 1930	JONES, H. LLOYD, Deputy General Attorney, of Phoenix-London Group, Vice-President, Phoenix Indemnity Company, and Deputy United States Manager, London Accident & Guarantee Co., 55 Fifth Avenue, New York.
*Nov. 1935, 19	JONES, HAROLD M., Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, Mass. (I, II.)
*Nov. 21, 1919	JONES, LORING D., Assistant Manager, State Insurance Fund, 625 Madison Avenue, New York.
*May 24, 1935	KARDONSKY, ELSIE, Compensation Insurance Rating Board, Pershing Square Bldg., 125 Park Avenue, New York. (I, II, III.)
*Nov. 17, 1922	KIRK, CARL L., Assistant U. S. Manager, Zurich General Accident & Liability Insurance Co., 135 South LaSalle Street, Chicago, Ill.
*Nov. 15, 1935	KITZROW, E. W., Vice-President, Hardware Mutual Casualty Co., Stevens Point, Wis. (I, II.)
*Nov. 18, 1937	KOLODITZKY, MORRIS, State Insurance Fund, 625 Madison Avenue, New York.
*Nov. 18, 1937	LASSOW, WILLIAM, State Insurance Fund, 625 Madison Avenue, New York.
*Nov. 18, 1932	LEWIS, HOWARD A., 41 Huntington Street, Hartford, Conn.
*Nov. 13, 1931	MACKEEN, HAROLD E., The Travelers Insurance Co., 700 Main Street, Hartford, Conn. (I, II.)
Mar. 24, 1932	MAGRATH, JOSEPH J., Executive Assistant, Chubb & Sons, 90 John Street, New York.
*Nov. 18, 1925	MALMUTH, JACOB, Examiner, New York Insurance Department, 80 Centre Street, New York.
Mar. 24, 1927	MARSH, CHARLES V. R., Comptroller and Assistant Treasurer, Fidelity & Deposit Co. and American Bonding Co., Baltimore, Md.
*Nov. 13, 1936	MAYER, WILLIAM H., JR., Actuarial Department, Metropolitan Life Insurance Co., 1 Madison Avenue, New York.
*Nov. 17, 1922	MCIVER, ROSSWELL A., Actuary, Washington National Insurance Co., 610 Church Street, Evanston, Ill.

ASSOCIATES

Date Enrolled	
*Nov. 17, 1922	MICHENER, SAMUEL M., Assistant Actuary, Columbus Mutual Life Insurance Co., 580 East Broad Street, Columbus, Ohio, (I, II.)
*Nov. 13, 1931	MILLER, HENRY C., Comptroller, State Compensation Insurance Fund, 450 McAllister Street, San Francisco, Calif. (I, II.)
*Nov. 21, 1930	MILLER, JOHN H., Actuary, Monarch Life Insurance Co., Springfield, Mass. (I, II.)
*Nov. 19, 1926	MILNE, JOHN L., Actuary, Presbyterian Ministers' Fund for Life Insurance, 1805 Walnut Street, Philadelphia, Pa.
*Nov. 18, 1937	MINOR, EDUARD H., Actuarial Department, Metropolitan Life Insurance Company, 1 Madison Avenue, New York.
Nov. 17, 1922	MONTGOMERY, JOHN C., Secretary and Assistant Treasurer, Bankers Indemnity Insurance Co., 15 Washington Street, Newark, N. J.
May 25, 1923	MOORE, JOSEPH P., President, North American Accident Insurance Co., 275 Craig Street, W., Montreal, Canada.
*Nov. 21, 1919	MOTHERSILL, ROLAND V., Executive Vice-President and Secretary, Anchor Casualty Co., Anchor Insurance Building, 758 So. Mississippi River Boulevard, St. Paul, Minn. (III, IV.)
*Nov. 18, 1937	MYERS, ROBERT J., Office of the Actuary, Social Security Board, Washington, D. C.
*Nov. 19, 1929	MULLER, FRITZ, Director, Agrippina Life Insurance Stock Co., Berlin, W. 30 Mackensenstr. 16, Germany.
*Nov. 15, 1935	NELSON, S. TYLER, Utica Mutual Insurance Co., 185 Genesee Street, Utica, New York.
*Oct. 27, 1916	NEWELL, WILLIAM, Secretary, Assigned Risk Pool, 60 John Street, New York. (I, II.)
*Nov. 23, 1928	NEWHALL, KARL, Group Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 18, 1925	NICHOLSON, EARL H., Actuary, Equitable Reserve Association, Neenah, Wis.
May 23, 1919	OTTO, WALTER E., President, Michigan Mutual Liability Co., 163 Madison Avenue, Detroit, Mich.
*Nov. 19, 1926	OVERHOLSER, DONALD M., 803 East 35th Street, Brooklyn, N. Y.
Nov. 20, 1924	PENNOCK, RICHARD M., Actuary, Pennsylvania Manufacturer, Association Casualty Insurance Co., Finance Building, Philadelphia, Pa.
Nov. 19, 1929	PHILLIPS, JOHN H., Vice-President and Actuary, Employers' Mutual Liability Insurance Co., Wausau, Wis.
*Nov. 17, 1920	PIKE, MORRIS, Vice-President and Actuary, Union Labor Life Insurance Co., 570 Lexington Avenue, New York.
Mar. 24, 1927	PIPER, JOHN W., Superintendent of Statistical Department, Hartford Accident & Indemnity Co., 690 Asylum Avenue, Hartford, Conn.
*Nov. 23, 1928	PIPER, KENNETH B., Secretary-Actuary, Life Dept. Provident Life and Accident Insurance Co., Chattanooga, Tenn. (I, II.)
*Nov. 18, 1927	POISSANT, WILLIAM A., The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 17, 1922	POORMAN, WILLIAM F., Vice-President and Actuary, Central Life Assurance Society, Fifth and Grand Avenues, Des Moines, Iowa. (I, II.)
*Nov. 13, 1936	POTOFSKY, SYLVIA, State Insurance Fund, 625 Madison Avenue, New York.

ASSOCIATES

Date Enrolled	
Nov. 17, 1922	POWELL, JOHN M., President, Loyal Protective Insurance Co. and Loyal Life Insurance Co., 38 Newbury Street, Boston, Mass. (I, II.)
*Nov. 15, 1918	RAYWID, JOSEPH, President, Joseph Raywid & Co., Inc., 90 William Street, New York.
Nov. 19, 1932	RICHARDSON, HARRY F., Secretary-Treasurer, National Council on Compensation Insurance, 45 East 17th Street, New York.
*Nov. 18, 1932	ROBERTS, JAMES A., Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn. (I, II.)
*Nov. 21, 1919	ROBBINS, RAINARD B., Vice-President and Secretary, Teachers Insurance and Annuity Association, 522 Fifth Avenue, New York. (I, II.)
*Nov. 18, 1927	SARASON, HARRY M., Assistant Actuary, General American Life Insurance Co., 1501 Locust Street, St. Louis, Mo.
Nov. 16, 1923	SAWYER, ARTHUR, Globe Indemnity Co., 150 William Street, New York.
*Nov. 20, 1930	SEVILLA, EXEQUIEL S., Actuary, National Life Insurance Co., P. O. Box 2856, Manila, Philippine Islands.
*Nov. 20, 1924	SHEPPARD, NORRIS E., Lecturer in Mathematics and Mechanics, University of Toronto, Toronto, Canada. (I, II.)
Nov. 15, 1918	SIBLEY, JOHN L., Assistant Secretary, United States Casualty Co., 60 John Street, New York.
*Nov. 18, 1921	SMITH, ARTHUR G., Assistant General Manager and Actuary, Compensation Insurance Rating Board, Pershing Square Bldg., 125 Park Avenue, New York.
*Nov. 19, 1926	SOMERVILLE, WILLIAM F., Assistant Secretary, St. Paul Mercury Indemnity Co., St. Paul, Minn. (I, II.)
*Nov. 18, 1925	SOMMER, ARMAND, Assistant to Vice-President, Continental Casualty Co., 910 So. Michigan Avenue, Chicago, Ill.
*Nov. 18, 1927	SPEERS, ALEXANDER A., Secretary and Actuary, Michigan Life Insurance Co., Detroit, Mich.
*Nov. 15, 1918	SPENCER, HAROLD S., Aetna Life Insurance Co., Hartford, Conn.
Nov. 20, 1924	STELLWAGEN, HERBERT P., Vice-President, Indemnity Insurance Company of North America, 1600 Arch Street, Philadelphia, Pa.
*Nov. 16, 1923	STOKE, KENDRICK, Actuary, Michigan Mutual Liability Company, 163 Madison Avenue, Detroit, Mich.
*Nov. 21, 1930	SULLIVAN, WALTER F., Associated Indemnity Corporation, 332 Pine Street, San Francisco, Calif. (I.)
Mar. 23, 1921	THOMPSON, ARTHUR E., Chief Statistician, Globe Indemnity Co., 150 William Street, New York.
*Nov. 21, 1919	TRENCH, FREDERICK H., Manager, Underwriting Department, Utica Mutual Insurance Co., 185 Genesee Street, Utica, N. Y. (I, II.)
*Nov. 20, 1924	UHL, M. ELIZABETH, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York. (I, II.)
May 23, 1919	WARREN, CHARLES S., Secretary, Massachusetts Automobile Rating and Accident Prevention Bureau, 89 Broad Street, Boston, Mass.
Nov. 18, 1925	WASHBURN, JAMES H., Actuary, Joseph Froggatt & Co., Inc., 74 Trinity Place, New York.
*Nov. 18, 1921	WATERS, LELAND L., Secretary-Treasurer, National Assurance Corporation, Lincoln, Neb. (I, II.)

ASSOCIATES

Date Enrolled	
*Nov. 18, 1932	WEINSTEIN, MAX S., Examiner, New York Insurance Department, 80 Centre Street, New York.
*Nov. 18, 1921	WELCH, EUGENE R., Associated Indemnity Corporation, 332 Pine Street, San Francisco, Calif.
*Nov. 18, 1925	WELLMAN, ALEXANDER C., Vice-President and Actuary, Protective Life Insurance Co., Birmingham, Ala.
*Nov. 21, 1930	WELLS, WALTER I., Supervisor of Applications, Massachusetts Protective Association, Worcester, Mass. (I, II.)
Mar. 21, 1929	WHEELER, CHARLES A., Chief Examiner of Casualty Companies, New York Insurance Department, 80 Centre Street, New York.
*Nov. 18, 1927	WHITBREAD, FRANK G., Assistant Actuary, Great West Life Assurance Co., Winnipeg, Manitoba, Canada.
*Oct. 22, 1915	WILLIAMSON, WILLIAM R., Actuarial Consultant, Social Security Board, Washington, D. C.
*Oct. 22, 1915	WOOD, DONALD M., Childs & Wood, General Agents, Royal Indemnity Company, 175 W. Jackson Blvd., Chicago, Ill.
*Nov. 18, 1937	WOOD, DONALD M., JR., Childs & Wood, 175 West Jackson Blvd., Chicago, Ill.
*Nov. 18, 1927	WOOD, MILTON J., Assistant Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Oct. 22, 1915	WOODMAN, CHARLES E., Assistant Manager, Ocean Accident & Guarantee Corporation and Comptroller, Columbia Casualty Co., 1 Park Avenue, New York.
*Nov. 22, 1934	WOODWARD, BARBARA H., Examiner, New York Insurance Department, 80 Centre Street, New York.
*Nov. 18, 1925	WOOLERY, JAMES M., Actuary, Protective Life Insurance Co., Birmingham, Ala.
*Nov. 17, 1922	YOUNG, FLOYD E., Actuary, Montana Life Insurance Co., Helena, Montana.

SCHEDULE OF MEMBERSHIP, NOVEMBER 18, 1937

	Fellows	Associates	Total
Membership, November 13, 1936	182	129	311
Additions:			
By election	..	..	..
By examination	2	6	8
	184	135	319
Deductions:			
By death	5	2	7
By withdrawal	..	1	1
By transfer from Associate to Fellow	..	2	2
Membership, November 18, 1937	179	130	309

EX-PRESIDENTS AND EX-VICE-PRESIDENTS

EX-PRESIDENTS

	Term
*I. M. Rubinow	1914-1916
James D. Craig	1916-1918
*Joseph H. Woodward	1918-1919
Benedict D. Flynn	1919-1920
Albert H. Mowbray	1920-1922
*Harwood E. Ryan	1922-1923
William Leslie	1923-1924
G. F. Michelbacher	1924-1926
Sanford B. Perkins	1926-1928
George D. Moore.	1928-1930
Thomas F. Tarbell	1930-1932
Paul Dorweiler	1932-1934
Winfield W. Greene	1934-1936

EX-VICE-PRESIDENTS

	Term
Edmund E. Cammack	1922-1924
Ralph H. Blanchard	1924-1926, 1934-1936
*Roy A. Wheeler	1930-1932
William F. Roeber	1932-1934
Charles J. Haugh	1934-1936

*Deceased

DECEASED FELLOWS

Date of Death	
Aug. 22, 1937	BROSMITH, WILLIAM, Vice-President and General Counsel, The Travelers Insurance Company and The Travelers Indemnity Company, Hartford, Conn.
June 4, 1934	BUDLONG, WILLIAM A., Superintendent of Claims, Commercial Travelers Mutual Accident Association, Utica, N. Y.
Mar. 30, 1935	BURNS, F. HIGHLAND, Chairman of the Board, Maryland Casualty Co., Baltimore, Md.
Feb. 4, 1920	CASE, GORDON, Office of F. J. Haight, Consulting Actuary, Indianapolis, Ind.
July 23, 1921	CONWAY, CHARLES T., Vice-President, Liberty Mutual Insurance Co., Boston, Mass.
Jan. 20, 1922	CRAIG, JAMES MCINTOSH, Actuary, Metropolitan Life Insurance Co., New York.
Sept. 2, 1921	CRUM, FREDERICK S., Assistant Statistician, Prudential Insurance Co., Newark, N. J.
June 21, 1931	DAWSON, ALFRED BURNETT, Consulting Actuary, New York.
Jan. 18, 1929	DEUTSCHBERGER, SAMUEL, Actuary, New York Insurance Department, New York.
July 9, 1922	DOWNEY, EZEKIEL HINTON, Compensation Actuary, Pennsylvania Insurance Department, Harrisburg, Pa.
Oct. 30, 1924	FACKLER, DAVID PARKS, Consulting Actuary, New York.
July 25, 1931	FRANKEL, LEE K., Second Vice-President, Metropolitan Life Insurance Co., New York.
Aug. 22, 1925	GATY, THEODORE E., Vice-President and Secretary, Fidelity & Casualty Co., New York.
April 15, 1937	GRAHAM, GEORGE, Executive Vice-President, Manhattan Life Insurance Company, New York.
Oct. 28, 1936	GOULD, WILLIAM H., Consulting Actuary, New York.
Mar. 18, 1932	HINSDALE, FRANK WEBSTER, Secretary, Workmen's Compensation Board, Vancouver, B. C., Canada.
Jan. 22, 1937	HODGES, CHARLES E., Chairman of the Board, American Mutual Liability Insurance Company, Boston, Mass.
Mar. 10, 1924	HOOKSTADT, CARL, Expert, U. S. Bureau of Labor Statistics, Washington, D. C.
Feb. 11, 1928	KEARNEY, THOMAS P., Manager, State Compensation Insurance Fund, Denver, Col.
Oct. 15, 1918	KIME, VIRGIL MORRISON, Actuary, Casualty Departments, The Travelers Insurance Co., Hartford, Conn.
Aug. 3, 1933	KOPF, EDWIN W., Assistant Statistician, Metropolitan Life Insurance Co., New York.
Dec. 9, 1927	LANDIS, ABB, Consulting Actuary, Nashville, Tenn.
Nov. 29, 1933	MEAD, FRANKLIN B., Vice-President, The Lincoln National Life Insurance Co., Fort Wayne, Ind.
Mar. 27, 1931	MELTZER, MARCUS, Statistician, National Bureau of Casualty & Surety Underwriters, New York.
Jan. 18, 1936	MILLER, DAVID W., Garden City, Long Island, New York.
June 8, 1937	MOIR, HENRY, Chairman of Finance Committee and Director, United States Life Insurance Company, New York.
Aug. 20, 1915	MONTGOMERY, WILLIAM J., State Actuary, Boston, Mass.

DECEASED FELLOWS—Continued

Date of Death	
Dec. 19, 1929	MORRIS, EDWARD BONTECOU, Actuary, Life Department, The Travelers Insurance Co., Hartford, Conn.
Oct. 12, 1937	OTIS, STANLEY, Counsellor at Law, Manager, Otis Service, New York.
July 24, 1915	PHELPS, EDWARD B., Editor, The American Underwriter, New York.
July 30, 1921	REITER, CHARLES GRANT, Assistant Actuary, Metropolitan Life Insurance Co., New York.
Sept. 1, 1936	RUBINOW, ISAAC M., Secretary, Independent Order of B'nai B'rith, Cincinnati, Ohio.
Nov. 2, 1930	RYAN, HARWOOD ELDRIDGE, Consulting Actuary, New York.
Feb. 26, 1921	SAXTON, ARTHUR F., Chief Examiner of Casualty Companies, New York Insurance Department, New York.
May 9, 1920	STONE, JOHN T., President, Maryland Casualty Co., Baltimore, Md.
July 19, 1934	SULLIVAN, ROBERT J., Vice-President, The Travelers Insurance Co., and The Travelers Indemnity Co., Hartford, Conn.
May 25, 1935	THOMPSON, WALTER H., Kemper Insurance Organization, Chicago, Illinois.
Feb. 25, 1933	TOJA, GUIDO, Director General, Institute Nazionale Delle Assicurazioni, Rome, Italy.
May 8, 1935	WELCH, ARCHIBALD A., President, Phoenix Mutual Life Insurance Co., Hartford, Conn.
Aug. 26, 1932	WHEELER, ROY A., Vice-President and Actuary, Liberty Mutual Insurance Co., Boston, Mass.
Dec. 31, 1927	WOLFE, S. HERBERT, Consulting Actuary, New York.
May 15, 1928	WOODWARD, JOSEPH H., Consulting Actuary, New York.
Oct. 23, 1927	YOUNG, WILLIAM, Actuary, New York Life Insurance Co., New York.

DECEASED ASSOCIATES

Date of Death	
Feb. 10, 1920	BAXTER, DON. A., Deputy Insurance Commissioner, Michigan Insurance Department, Lansing, Mich.
Mar. 8, 1931	HALL, LESLIE LE VANT, Secretary-Treasurer, National Bureau of Casualty & Surety Underwriters, New York.
Dec. 20, 1920	LUBIN, HARRY, Assistant Actuary, State Industrial Commission, New York.
May. 8, 1937	VOOGT, WALTER G., Treasurer and Director, Associated Indemnity Corporation and Associated Fire and Marine Insurance Company, San Francisco, Cal.
Feb. 23, 1937	WATSON, JAMES J., President and General Manager, Allied Underwriters Corporation, Dallas, Texas.
June 11, 1930	WILKINSON, ALBERT EDWARD, Actuary, Standard Accident Insurance Co., Detroit, Mich.

STUDENTS

This list includes candidates who have passed one or more parts of the Associateship Examinations during the last three years.

Those who are listed as having passed all four parts have not yet been enrolled as Associates of the Society by reason of the terms of examination rule IV which reads:

> "Upon the candidate having passed all four parts, he will be enrolled as an Associate, provided he presents evidence of at least one year of experience in actuarial, accounting or statistical work in casualty insurance offices, or in the teaching of casualty insurance science at a recognized college or university, or other evidence of his knowledge of actuarial, accounting or statistical work as is satisfactory to the Council."

Upon the completion of the requirements of the Council in respect to each of these candidates, they will be enrolled as Associates.

The numerals after each name indicate the parts of Associateship Examinations passed.

AGUELE, ANDREW, Thierfield & Hirsch, Inc., 950 Hart Street, Brooklyn, N. Y. (I.)

ARNOLD, KENNETH J., 28 East Raleigh Avenue, West New Brighton, New York. (II.)

ARTHUR, CHARLES R., Manufacturers Life Insurance Co., 100 Bloor Street, E., Toronto, Ontario, Canada. (I, II, III, IV.)

BAILEY, ROBERT C., Sovereign Life Assurance Co., Winnipeg, Manitoba, Canada. (I, II, III, IV.)

BAKER, ROBERT W., Manufacturers Life Insurance Co., 100 Bloor Street, E., Toronto, Ontario, Canada. (I, II, III, IV.)

BART, ROBERT D., (American) Lumbermen's Mutual Casualty Company, Mutual Insurance Building, Chicago, Illinois. (II.)

BATHO, BRUCE, Franklin Life Insurance Co., Springfield, Ill. (I, II, III, IV.)

BELL, CODIE D., Benefit Association of Railway Employees, 901 Montrose Avenue, Chicago, Ill. (I, II, IV.)

BOYER, HENRY F., 1241 Illinois Ave., Pittsburgh, Pa., (II, III.)

BROCK, STANLEY E., Ontario Equitable Life & Accident Insurance Co., Waterloo, Ontario, Canada. (I, II, III, IV.)

BUCKMAN, ALFRED L., Occidental Life Insurance Company, 756 S. Spring Street, Los Angeles, Cal. (I, II, III, IV.)

CAMERON, WALTER G., Firemen's Fund Indemnity Company, 401 California Street, San Francisco, Cal. (II.)

CAMPBELL, GEORGE C., Metropolitan Life Insurance Co., One Madison Avenue, New York. (I, II, III, IV.)

CANNON, LESLIE A., Great West Life Assurance Co., Winnipeg, Manitoba, Canada. (I, II, III, IV.)

CHILDRESS, CECIL, Virginia Auto Mutual Insurance Co., State Planters Bank Bldg., Richmond, Va. (II.)

CHODORCOFF, WILLIAM, Assistant Mathematician, Prudential Insurance Company, Newark, New Jersey. (I, II, III, IV.)

CODY, DONALD D., Equitable Life Assurance Society, 393 7th Avenue, New York. (I, III, IV.)

COHEN, SYDNEY L., Office of S. H. and Lee J. Wolfe, 116 John Street, New York. (I.)

DANIELS, ARTHUR C., Office of Fackler & Company, 8 West 40th Street, New York. (I, II, III, IV.)

STUDENTS

DAVIS, ELMER W. L., The Columbian National Life Insurance Company, 77 Franklin Street, Boston, Mass. (IV.)

DIORIO, GENE, 1504 60th Street, Brooklyn, N. Y. (I.)

ELLIOTT, GEORGE B., Senior Actuarial Statistician, State Workmen's Insurance Fund, Harrisburg, Pa. (I, II, IV.)

EMERSON, JOHN F., Hartford Accident & Indemnity Company, 720 California Street, San Francisco, Cal. (I, II.)

ENGLAND, ARTHUR W., Office of Coates and Herfurth, Consulting Actuaries, 114 Sansome Street,; San Francisco, Calif. (I, II, III, IV.)

FELDMAN, ISRAEL, Metropolitan Life Insurance Co., Ottawa, Ontario, Canada. (I, II, III, IV.)

FOOTE, JEAN VIVIAN, 42 Hochelaga Street, W., Moose Jaw, Sask., Canada. (I, II, III, IV.)

GODDARD, DAVID G., The Travelers Insurance Co., Hartford, Conn. (I, II, III, IV.)

GOULD, WILLIAM, Actuarial Division, Metropolitan Life Insurance Co., One Madison Avenue, New York. (I, II, III, IV.)

GROSSMAN, ELI, United States Life Insurance Company, 101 Fifth Avenue, New York. (I, II, III, IV.)

GURALNICK, LILLIAN, State Insurance Fund, 625 Madison Avenue, New York. (II.)

HELPHAND, BEN, Student, University of Iowa, Iowa City, Iowa. (I.)

HIBBARD, DONALD L., Group Insurance Department, Equitable Life Assurance Society, 393 Seventh Avenue, New York. (I, II, III, IV.)

HILL, H. EDWARD, Pennsylvania Indemnity Corporation, 260 So. Broad Street, Philadelphia, Pa. (II.)

HUNTON, T. F., Canadian Underwriters Association, 44 Victoria Street, Toronto 2, Ontario, Canada. (I, III, IV.)

JOFFE, SAMUEL W., 1951 North 32nd Street, Philadelphia, Pa. (I, II, IV.)

JOHNSON, ROGER A., JR., Compensation Insurance Rating Board, 125 Park Avenue, New York. (II, III.)

JONES, CHARLES H., Metropolitan Life Insurance Company, One Madison Avenue, New York. (I, II, III, IV.)

KEALE, HENRY F., Teachers' Retirement System, 139 Center Street, New York. (I.)

KLEINBERG, SAMUEL L., 813 Park Avenue, Brooklyn, N. Y. (I, II, III, IV.)

KNOWLES, FREDERICK, Montreal Life Insurance Co., 625 Burnside Place, Montreal, Canada. (I, II, III, IV.)

KWASHA, HERMAN, The Travelers Insurance Company, Hartford, Conn. (I, II, III IV.)

LAING, CHARLES B., Prudential Insurance Company, Newark, N. J. (I, II, III, IV.)

LAIRD, W. DARRELL, Great West Life Assurance Co., Winnipeg, Manitoba, Canada. (I, II, III, IV.)

LEARSON, RICHARD J., Associate Actuary, Western & Southern Life Insurance Co., Cincinnati, Ohio. (I, II, III, IV.)

LEHANE, LEO J., Central Life Insurance Co., Chicago, Ill. (I, II, III, IV.)

LESHANE, ALBERT H., Employers Liability Assurance Corporation, 110 Milk Street, Boston, Mass. (II.)

LEVINE, JACOB, Office of S. H. & Lee J. Wolfe, 116 John Street, New York. (II.)

LEWIS, BARNETT, 372 St. John Avenue, Winnipeg, Canada. (I, II, III, IV.)

LEWIS, JOHN H., Lumber Mutual Casualty Insurance Company of New York, 41 East 42nd Street, New York. (II.)

LEWIS, RAYMOND W., 1921 Park Road, Washington, D. C. (I, II, IV.)

STUDENTS

LINCOLN, CHARLES G., 51 North Quaker Lane, West Hartford, Conn. (I, III.)

LIVINGSTON, GILBERT R., National Bureau of Casualty and Surety Underwriters, 60 John Street, New York. (I, II.)

LLOYD, WILLIAM M., The Travelers Insurance Co., Hartford, Conn. (I, II.)

LOADMAN, ARTHUR E., 665 Elgin Avenue, Winnipeg, Manitoba, Canada. (I, II, III, IV.)

LOCKE, HENRY D., Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, Mass. (II.)

LOUIS, P. H., United States Life Insurance Company, 101 Fifth Avenue, New York. (I, II, IV.)

MARKS, MAXWELL, 8733 23rd Avenue, Brooklyn, N. Y. (I.)

MCCORMICK, W. S., Aetna Life Insurance Company, Hartford, Conn. (II.)

MELLOR, VINCENT, General Reinsurance Corporation, 90 John Street, New York. (II.)

MILES, JAMES R., Underwriter, Manufacturers' Casualty Insurance Co., 919 Walnut Street, Philadelphia, Pa. (I, II.)

MOORE, HAROLD P. H., Great West Life Assurance Co., Winnipeg, Manitoba, Canada. (I, II, III, IV.)

MULLANS, G. ROBERT, The Travelers Insurance Company, Hartford, Conn. (I, II, III, IV.)

MUTH, A. F., Actuarial Department, London Life Insurance Co., London, Canada. (I, II, III, IV.)

MYERS, GLEN W., Assistant Actuary, Federal Life Insurance Co., 168 North Michigan Avenue, Chicago, Ill. (I, II.)

O'KEEFE, RICHARD E., Metropolitan Life Insurance Company, One Madison Avenue, New York. (I, II, III, IV.)

ORLOFF, CONRAD, Marsh & McLellan, Inc., 164 W. Jackson Boulevard, Chicago, Ill. (I, II, III, IV.)

PRASOW, ROSE, Actuarial Department, Confederation Life Association, Toronto, Ontario, Canada. (I, II, III, IV.)

RINTOUL, JOHN W., Canada Life Assurance Co., Toronto, Ontario, Canada. (I, II, III, IV.)

ROBERTSON, ARTHUR G., Government Insurance Department, Ottawa, Ontario, Canada. (I, II, III, IV.)

ROOD, HENRY F., Lincoln National Life Insurance Company, Fort Wayne, Ind. (I, II, III, IV.)

SAYER, EDWARD D., General Reinsurance Corporation, 90 John Street, New York. (I, II.)

SCHWARTZ, RICHARD T., Actuarial Department, New York Life Insurance Co., 51 Madison Avenue, New York. (I, II, III, IV.)

SMITH, ROSEMARY A., Statistical Bureau, Metropolitan Life Insurance Co., One Madison Avenue, New York. (II.)

SMITH, SEYMOUR E., The Travelers Insurance Company, Hartford, Conn. (I, II.)

SPELLER, S. I., Illinois Bankers Life Assurance Co., Monmouth, Ill. (I, II, III, IV.)

SUTHERLAND, HENRY M., Sun Life Assurance Company, Montreal, Canada. (I, II, III, IV.)

THOMPSON, EMERSON W., The Travelers Insurance Company, Hartford, Conn. (I, II, III, IV.)

UHLIG, GUSTAV H., JR., Liberty Mutual Insurance Company, 10 East 40th Street, New York. (III.)

UHTHOFF, D. R., National Council on Compensation Insurance, 45 East 17th Street, New York. (II.)

STUDENTS

URBANEK, JOSEPH P., 35 St. Nicholas Terrace, New York. (I.)

URDAHL, VALESKA, Federal Life Insurance Co., 168 North Michigan Avenue, Chicago, Ill. (I.)

WALL, DEAN, Actuarial Department, General American Life Insurance Co., St. Louis, Mo. (I, II, III, IV.)

WALRATH, ARTHUR J., 7 Kellogg Street, Windsor, Conn. (II.)

WALSH, JAMES V., The Travelers Insurance Company, Hartford, Conn. (I, II.)

WANNER, FRANKLIN D., Kemper Insurance Organization, 4750 Sheridan Road, Chicago, Ill. (I.)

WARD, ROBERT G., Columbian National Life Insurance Co., Boston, Mass. (I, II, III, IV.)

WARTELL, BEN, 2430–63rd Street, Brooklyn, N. Y. (I.)

WEINFLASH, BERNARD, 613 Wilson Avenue, Brooklyn, N. Y. (II.)

WHITE, AUBREY, 97 Chaplin Crescent, Toronto, Ontario, Canada. (I, II, III, IV.)

WILSON, JOHN F., Manufacturers Life Insurance Co., Toronto, Ontario, Canada. (I, II, III, IV.)

WITTLAKE, J. CLARKE, Actuarial Department, Business Men's Assurance Co., Kansas City, Mo. (I, III, IV.)

WOLFE, HERBERT, 314 Pulaski Street, Brooklyn, N. Y. (I, II, III.)

WOLF, LEROY J., 2150 Bedford Avenue, Brooklyn, N. Y. (I, III, IV.)

WOLFMAN, MAURICE, Office of Harry S. Tressel, 10 South LaSalle Street, Chicago, Ill. (I, II, III, IV.)

WOOD, ERIC H., Equitable Life Assurance Society, 393 Seventh Avenue, New York. (I, II, III.)

WOODDY, JOHN G., Lumbermen's Mutual Casualty Co., 4750 Sheridan Road, Chicago, Ill.. (I, II.)

WRIGHT, WILLIAM W., 1831 Jefferson Place, N. W., Washington, D. C. (II.)

YAGMAN, BERNARD, 130 Wadsworth Avenue, New York. (III.)

YATES, J. ARNOLD, The Travelers Insurance Company, Hartford, Conn. (I, II, III, IV.)

YOUNG, WALTER, Prudential Insurance Company, Newark, New Jersey. (I, II, III, IV.)

ZINMAN, ESTHER, State Insurance Fund, 625 Madison Avenue, New York. (II.)

ZOCH, RICHMOND T., United States Weather Bureau, Washington, D. C. (I, II, III, IV.)

CONSTITUTION

(As Amended November 23, 1928)

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 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 Society shall take no partisan attitude, by resolution or otherwise, upon any question relating to casualty or social 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 members and those who may be duly admitted to Fellowship as hereinafter provided. Any Associate of the Society may apply to the Council for admission to Fellowship. If the application shall be approved by the Council with not more than three negative votes the Associate shall 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.

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 a casualty insurance organization or has had such other practical experience in casualty or social insurance as in the opinion of the Council renders him qualified for Associateship.

Article IV.—*Officers and Council.*

The officers of the Society shall be a President, two Vice-Presidents, a Secretary-Treasurer, an Editor, and a Librarian. 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 and the Librarian 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 13, 1936)

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 of the Council.

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.

ARTICLE IV.—*Dues.*

The dues shall be ten dollars for Fellows payable upon entrance and at each annual meeting thereafter, except in the case of Fellows not residing in the United States, Canada, or Mexico, who shall pay five dollars at the time stated. The dues shall be five dollars for Associates payable upon entrance and each annual meeting thereafter until five such payments in all shall have been made; beginning with the sixth annual meeting after the admission of an Associate as such the dues of any Associate heretofore or hereafter admitted shall be the same as those of a Fellow. 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.

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, and upon payment of arrears of dues.

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.

EXAMINATION REQUIREMENTS

SYLLABUS OF EXAMINATIONS

Effective 1934 and thereafter

SUBJECTS

ASSOCIATESHIP:

PART I

Section 1. *Advanced algebra*

Section 2. *Compound interest and annuities certain*

PART II

Section 3. *Descriptive and analytical statistics*

Section 4. *Elements of accounting, including double-entry bookkeeping*

PART III

Section 5. *Finite differences*

Section 6. *Differential and integral calculus*

PART IV

Section 7. *Probabilities*

Section 8. *Elements of the theory of life contingencies; life annuities; life assurances*

FELLOWSHIP:

PART I

Section 9. *Policy forms and underwriting practice in casualty insurance*

Section 10. *Investments of insurance companies*

PART II

Section 11. *Insurance law and legislation*

Section 12. *Economics of insurance*

PART III

Section 13. *Calculation of premiums and reserves for casualty (including social) insurance*

Section 14. *Advanced practical problems in casualty (including social) insurance statistics*

PART IV

Section 15. *Advanced problems and practical methods of casualty insurance accounting*

Section 16. *Advanced problems in underwriting, administrative and service elements of casualty (including social) insurance*

To assist students in preparation for the examinations, Recommendations for Study have been prepared. This lists the texts, readings and technical material which must be mastered by the candidates. Textbooks are loaned to registered students by the Society. By "registered students" is meant candidates who have signified their willingness to take the examinations by the payment of their examination fees.

RULES REGARDING EXAMINATIONS FOR ADMISSION TO THE SOCIETY

(As Amended November 14, 1935)

The Council adopted the following rules providing for the examination system of the Society:

1. Examinations will be held on the third Wednesday and following Thursday during the month of May in each year in such cities as will be convenient for three or more candidates.

2. 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. The examination fee is $2.00 for each part, with a minimum of $5.00 for each year in which the candidate presents himself; thus for one or two parts, $5.00, for three 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. The examination for Associateship consists of four parts. No candidate will be permitted to present himself for any part of the examination unless he has previously passed, or shall concurrently present himself for and submit papers for, all preceding parts. If a candidate takes two or more parts in the same year and passes in one and fails in the other, he will be given credit for the part passed. Upon the candidate having passed all four parts he will be enrolled as an Associate, provided he presents evidence of at least one year of experience in actuarial, accounting or statistical work in casualty insurance offices or in the teaching of casualty insurance science at a recognized college or university, or other evidence of his knowledge of actuarial, accounting or statistical work as is satisfactory to the Council.*

* Candidates who have had no insurance experience, or whose experience is limited exclusively to life insurance companies, or who have not had one year of casualty insurance experience, will not be enrolled as Associates after passing all four Parts, until they have had one year of casualty insurance experience; however, candidates not having one year of casualty insurance experience may, in accordance with a ruling of the Committee on Admissions, be enrolled as Associates upon passing the examination for Fellowship Parts I and II.

EXAMINATION REQUIREMENTS

5. The examination for Fellowship is divided into four parts. No candidate will be permitted to present himself for any part of the examination unless he has previously passed, or is then also presenting himself for all preceding parts. If a candidate takes two or more parts in the same year and passes in one and fails in the others, he will be given credit for the part passed.

6. As an alternative to the passing of Parts III and IV of the Fellowship Examination, a candidate may elect to present an original thesis on an approved subject relating to casualty or social insurance. Such thesis must show evidence of ability for original research and the solution of advanced problems in casualty insurance comparable with that required to pass Parts III and IV of the Fellowship Examination, and shall not consist solely of data of an historical nature. Candidates electing this alternative should communicate with the Secretary-Treasurer and obtain through him approval by the Examination Committee of the subject 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 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 third Wednesday in May of the year in which they are to be considered. Where Parts I and II of the Fellowship examination are not taken during the same year, no examination fee will be required in connection with the presentation of a thesis. All theses submitted are, if accepted, to be the property of the Society and may, with the approval of the Council, be printed in the *Proceedings*.

EXAMINATION REQUIREMENTS

Waiver of Examinations for Associate

The examinations for Associate will be waived under Article III of the Constitution only in case of those candidates who meet the following qualifications and requirements:

1. The candidate shall be at least thirty-five years of age.
2. The candidate shall have had at least ten years' experience in casualty actuarial or statistical work or in a phase of casualty insurance which requires a working knowledge of actuarial or statistical procedure or in the teaching of casualty insurance principles in colleges or universities. Experience limited exclusively to the field of accident and health insurance shall not be admissible.
3. For the two years preceding date of application, the candidate shall have been in responsible charge of the actuarial or statistical department of a casualty insurance organization or of an important division of such department or shall have occupied an executive position in connection with the phase of casualty work in which he is engaged, or, if engaged in teaching, shall have attained the status of a professor.
4. The candidate shall have submitted a thesis approved by the Examination Committee. Such thesis must show evidence of original research and knowledge of casualty insurance and shall not consist solely of data of an historical nature. Candidates electing this alternative should communicate with the Secretary-Treasurer and obtain through him approval by the Examination Committee of the subject 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 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 has practically all of the books listed in the Recommendations for Study, as well as others on casualty actuarial matters. Registered students may have access to the library by receiving from the Society's Secretary 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 Mabel B. Swerig, Librarian of the Insurance Society of New York, 100 William Street, New York City.

1937 EXAMINATIONS OF THE SOCIETY

MAY 19 AND 20, 1937

EXAMINATION COMMITTEE

RALPH M. MARSHALL - - - GENERAL CHAIRMAN

IN CHARGE OF ASSOCIATESHIP EXAMINATIONS

MARK KORMES, CHAIRMAN
RUSSELL P. GODDARD
ROBERT V. SINNOTT
HARRY V. WILLIAMS, JR.

IN CHARGE OF FELLOWSHIP EXAMINATIONS

JAMES M. CAHILL, CHAIRMAN
NELS M. VALERIUS
DAVID SILVERMAN

EXAMINATION FOR ADMISSION AS ASSOCIATE

PART I

1. (a) Solve $2^{2x+1} - 2^{x+4} + 2^5 = 0$.

   (b) Find an arithmetical progression whose first term is unity such that the second, tenth and thirty-fourth terms form a geometric progression.

2. (a) Establish the greatest value of $\frac{x+2}{2x^2+3x+6}$ for real values of x.

   (b) A number of men were engaged to do a piece of work which would have occupied them twenty-four hours if they had all commenced at the same time. Instead of commencing together, one man started alone; an hour later, a second man joined him; at the end of the second hour, a third joined; and so on, until all were working. All continued until the work was finished. If they all worked at the same rate and the first man worked eleven times as long as the last, how long did it take to do the work and how many men were employed?

3. (a) A bag contains nine counters marked 1 to 9. How many possible different numbers, each of nine digits, is it possible to form, utilizing five counters from the bag combined with four other counters each marked "0", providing none of the numbers so formed may begin with zero?

   (b) How many different numbers can be divided into 17,640 without leaving a remainder, excluding itself and 1?

4. (a) Solve $x^{2 \log_{10} x} = 10x$.

   (b) Prove (by induction) that the sum of the first n terms of the series

$$\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \cdots\cdots$$

   is $\dfrac{n}{n+1}$

5. (a) Prove $\dfrac{1}{a_{\overline{n}|}} - \dfrac{1}{s_{\overline{n}|}} = i$.

   (b) Calculate the accumulated amount of \$100 a month, payable at the end of each month for twelve months at 6% a year simple interest and also at 6% interest compounded annually. Explain the difference in results obtained.
   Given $s^{(12)}_{\overline{1}|}$ at $6\% = 1.0272107$.

6. An automobile truck costing \$2,400 and lasting five years at the end of which time it has a second hand value of \$400 is to be replaced by means of a sinking fund accumulated at 4% from annual payments during the five years. At the beginning of the fourth year the truck is destroyed by accident with a junk value of \$50. What amount of money must be added to the sinking fund and junk value to purchase a new truck at \$2,400?
   Given $a_{\overline{5}|}$ at $4\% = 4.452$
   $a_{\overline{3}|}$ at $4\% = 2.775$.

7. Under the Unemployment Insurance Act of a certain state, a deduction from salary equal to 1% the first year, 2% the second year, and 3%, 4% and 5% in succeeding years is made. Considering that the deduction is made in one lump sum at the end of each year, find the present value of such deductions for the first five years for a man earning \$2,000 per year.
   Given $a_{\overline{5}|}$ at $4\% = 4.452$.

8. At what price must a bond be purchased on January 1, 1937, to pay 5% nominal convertible semi-annually, if its par value is \$100, dividends are payable January 1st and July 1st at 4% nominal, and it matures in four years at \$110?
   What will be its book value on January 1, 1938 and July 1, 1938?
   Given $v^8 = .82075$ (at $2\frac{1}{2}\%$).

PART II

1. (a) Distinguish between mean deviation and standard deviation and compute each from the following data:

$$\begin{array}{rl} m & 2,\ 3,\ 7,\ 9,\ 10,\ 12,\ 13 \\ \text{frequency} & 1,\ 1,\ 3,\ 5,\ \ 2,\ \ 1,\ \ 1 \end{array}$$

   (b) What is meant by normal frequency distribution, probable error and kurtosis?

2. (a) Locate approximately the mode of an asymmetrical frequency distribution for which the mean is 23.4 and the median 21.2. Draw a graph of the curve indicating these points.

   (b) State the value of graphic representation of statistical data and discuss the use and advantages of semi-logarithmic charts.

3. Compile a series of index numbers for the total yearly production of a concern engaged in manufacturing automobiles, refrigerators and mechanical stokers. The production in units has been:

Year	No. of Automobiles	No. of Refrigerators	No. of Stokers
1930	12,000	400	110
1931	10,500	1,050	410
1932	9,050	1,612	804
1933	11,200	2,091	1,102

The wholesale value of goods produced in 1932 indicated automobiles $4,525,000, refrigerators $161,200 and stokers $160,800.

4. A certain corporation enjoyed profits shown below. By the method of least squares fit a straight line and predict profits for calendar year 1937.

Cal. Year	Profits (In Millions)	Cal. Year	Profits (In Millions)	Cal. Year	Profits (In Millions)
1928	$2,5	1931	$5,3	1934	$7,4
1929	3,2	1932	6,1	1935	8,2
1930	4,5	1933	6,7	1936	9,3

5. (a) John Allen, an individual; Jones & Smith, a copartnership, Jones having a two-thirds interest; and the P. & G. Corporation (with 1,200 shares at $10 each) find upon closing their books for the year 1936 that they each have assets

amounting to $100,000 and liabilities to $80,000. Indicate the method of showing the proprietorship for these three types of business organizations.

(b) A company's balance sheet has been made up as of December 31, 1936 showing the following items:

ASSETS		LIABILITIES	
Cash	$ 6,000	Accounts Payable	$ 15,000
Book Balance	12,000	Capital	150,000
Stock on Hand	150,000	Surplus	28,000
Accounts Receivable	25,000		
	$193,000		$193,000

Immediately after the publication of the above statement the firm's lawyer advised that he has collected an $8,000 damage suit. The collection fee was 50% which amount was paid to the lawyer by check. Make entries placing the collection of the suit on books. How will this affect the above balance sheet?

6. The X Corporation held in its investment account a mortgage on a piece of city real estate for $100,000. In 1932 the owner of the real estate found it difficult to meet his taxes amounting to $2,500. Since the X Corporation did not wish to take over the property, it paid the taxes, regarding the $2,500 as a loan receivable from the owner of the property. In 1933 the X Corporation decided to foreclose. Foreclosure expenses amounted to $500. Taxes, of $2,500, for 1933 were paid by the X Corporation before foreclosure proceedings were started. It was the policy of the X Corporation to capitalize in the real estate account all charges accumulated against the loan. Show the entries necessary on the books of the X Corporation for the years 1932 and 1933.

7. The following are the balances of the general ledger of John Adams on December 31, 1936. Prepare a Trial Balance and a Profit and Loss Statement.

General Expense	$ 960	Accounts Payable	$1,400
Insurance	300	Notes Payable	1,200
Salaries	1,500	Equipment	640
Purchases	12,000	Mdse. Inventory 12/31/35	1,200
Sales	16,000	Accounts Receivable	3,900
Furniture	1,000	Notes Receivable	1,400
Capital	5,100	Cash	800

Merchandise inventory on December 31, 1936 shows \$8,400; Depreciation of Furniture \$120; Depreciation of Equipment \$40; Unexpired Insurance \$140.

8. The following balances are already on the ledger:

Cash	\$1,200	Proprietor	\$7,600
Equipment	250	Accounts Payable	2,250
Salaries	300		
Purchases	4,500		
Accounts Receivable	3,000		
Insurance	100		
Inventory 12/31/35	500		
	\$9,850		\$9,850

Make journal entries for the following transactions and post these entries. Prepare a Balance Sheet.

Merchandise is bought on account for \$2,000; \$240 is received for accounts receivable; rent is paid for one month of \$75.

Merchandise is sold for \$500 cash. Postage and stationery are purchased for \$50 cash. Salaries are paid for one week, \$36; cash is paid on accounts payable \$2,000. Merchandise is sold on account for \$1,000. Accounts receivable are paid \$1,500 cash. The inventory of merchandise at the end of 1936 is \$5,500. Prepaid insurance is \$75. Salaries liability is \$36.

PART III

1. (a) Prove that

$$u_4 = u_3 + \Delta u_2 + \Delta^2 u_1 + \Delta^3 u_1.$$

(b) It is asserted that a quantity which varies from day to day is a rational and integral function of the day of the month of less than the sixth degree and that its values on the first eight days of the month are: 20, 23, 26, 27, 25, 20, 13, 6. Examine whether or not these assertions are consistent. If so, find the degree of the function and its value on the sixteenth of the month.

2. Given $u_0 = 1876$, $u_1 = 777$, $u_3 = 19$ and $u_5 = -19$. Find u_2 and u_4 and write the algebraic expression for u_x.

3. Having given the following values of annuities, find by interpolation the value of $a_{\overline{43}|}$ at $3\frac{1}{4}\%$.

	3%	$3\frac{1}{2}\%$	4%
$a_{\overline{40}|}$	17.176	16.104	15.136
$a_{\overline{42}|}$	16.564	15.568	14.664
$a_{\overline{44}|}$	15.920	15.000	14.160

4. By the use of the method of finite differences, obtain the sum of n terms of the series

$$1.1 + 3.3 + 5.3^2 + 7.3^3 + \cdots\cdots.$$

5. (a) Find $\frac{d^2y}{dx^2}$ if $x = t^2 - 4t$; $y = \frac{t^4}{4} - 8t$.

   (b) The rate of consumption of coal by a locomotive varies as the square of the speed; at a speed of 16 miles per hour the consumption of coal per hour is 2 tons. If the price of coal is \$5.00 per ton and other expenses of running the train are \$5.625 per hour, find the least cost of a journey of 100 miles.

6. (a) Evaluate $\int \frac{x^3}{(x^2+1)^3}\,dx$.

   (b) Using a series development compute the value of $e^{1.1}$.

7. A book has pages which are "a" inches wide. A page is to be folded so that the corner just touches the inside edge of the book. Find where the page should be folded so that the length of the crease shall be the minimum.

8. Find the area bounded by the curves

$$4y = x^3 \text{ and } y = x^3 - 3x.$$

PART IV

1. (a) The chance of one event happening is the square of the chance of the second event, but the odds against the first are the cube of the odds against the second. Find the chance of each.

(b) There are 3 bags each containing 6 white balls and 3 black balls; and 2 bags each containing 1 white ball and 4 black balls. A black ball is drawn. Find the probability that it came from the second group of bags.

2. A bag contains 10 counters numbered from 1 to 10. A person draws two counters. If the sum of the numbers drawn is even, he pays that number of dollars; if odd, he receives that number of dollars, but must pay a winner's fee of two dollars. What is his expectation?

3. (a) A die whose sides are marked from 1 to 6 inclusive is thrown five times in succession. Find the probability that the product of the numbers appearing in the five throws is 432.

(b) If on an average 9 ships out of 10 return safely to port, what is the chance that out of five ships expected at least three will arrive?

4. A bag contains n blue balls and the same number of green balls. If they are withdrawn one by one and not replaced what is the chance that successive draws will alternate in color?

5. (a) Prove that $a_x = vp_x\,(1 + a_{x+1})$.

(b) Explain verbally and reduce to an expression in terms of p the following symbols

(1) ${}_{n|}q_x \cdot {}_np_y$ and (2) ${}_{n|}q_{\overline{xy}}$.

6. Find in terms of p_x the probability that out of five lives all aged x, one designated life, A, will die during the first year and that it will be the first one to die.

7. A policy is written for a man aged 32 promising the following benefits:

(a) Term insurance of \$5,000 for 28 years.

(b) A life annuity of \$1,000 payable annually, first payment due at age 60.

It is agreed that the premium shall be paid annually for 28 years. Find the net annual premium.

Given $N_{32} = 641{,}000$ $\quad M_{32} = 13{,}000$
$\quad N_{60} = 94{,}000$ $\quad M_{60} = 6{,}300.$

8. Explain briefly the "Accounting" or "Accumulation" method used in the valuation of life insurance policies. Give reasons for the use of this method and determine the value, at the end of each of the first three years, of a $1,000 whole life policy issued at age 18 at an annual net level premium of $10.

Given $u_{18} = 1.050$ $\quad k_{18} = 6.500$
$\quad u_{19} = 1.051$ $\quad k_{19} = 6.714$
$\quad u_{20} = 1.052$ $\quad k_{20} = 7.144.$

EXAMINATION FOR ADMISSION AS FELLOW

PART I

1. (a) Describe briefly the methods provided by the Workmen's Compensation Manual for insuring the liability imposed by the Illinois Occupational Diseases Act.
   (b) Name and describe three kinds of surety bonds. For each of these bonds, explain whether you would waive collateral security.

2. (a) Explain Protective Liability insurance. What is the premium basis for Contractors' Protective Liability insurance?
   (b) Outline briefly the coverages provided under the following lines of casualty insurance:
   (1) Fidelity Bond
   (2) Plate Glass
   (3) Outage
   (4) Elevator Collision

3. (a) What principal exclusions apply when the policy covering Bodily Injury for an automobile repair shop is written on the payroll basis?

(b) How is the premium determined for Automobile Bodily Injury coverage on a trailer or semi-trailer which is:

(1) Equipped as living quarters.

(2) Attached only to an automobile of the private passenger type with body unaltered, and not used at any time for wholesale or retail delivery or for the carrying of persons.

4. (a) What different types of loss may be covered under a Steam Boiler policy?

(b) Explain the insuring clause of the standard Bank Burglary and Robbery policy.

5. (a) Indicate briefly the principal types of benefits afforded by various forms of Accident insurance and state what are ordinarily considered to be units of insurance in this line.

(b) Distinguish between the following forms of reinsurance:

(1) Facultative
(2) Open Treaty
(3) Fixed Treaty

6. (a) State fully arguments for and against revision of the insurance laws to permit casualty companies to purchase real estate for investment purposes.

(b) Because of the present status of the market in high-grade securities, there has been discussion of the need and advisability of relaxing investment regulation of insurance companies so that the companies will be more free to seek investments of adequate return. Discuss this proposal with regard to its cogency for life, fire and casualty companies.

7. (a) Do you consider the exemption of casualty insurance companies from the Federal Undistributed Profits Tax to be favorable or unfavorable to an investor in the stock of a casualty company? Explain your answer fully and give reasons why an insurance company should be exempt whereas an investment trust is not.

(b) In the Annual Statements of casualty insurance companies as of December 31, 1936 must bonds be included at the values shown in the Association Book on Valuation of Securities? Explain.

8. (a) If you, as investment counsel of a multiple line casualty company, considered currency inflation to be probable, what steps, if any, would you take to protect your company?

(b) Which of the following forms of investment may be used by casualty companies operating in New York State: (Comment if necessary.)

(1) Collateral loans
(2) Preferred Stocks
(3) Policy loans
(4) Equipment Trust Certificates
(5) Farm Mortgages

PART II

1. (a) Define the following:

(1) Warranty
(2) Representation
(3) Tort

(b) The elective form of many Compensation laws has been called an "amiable subterfuge". Explain briefly the thought underlying this appellation.

2. (a) What elements are ordinarily necessary to constitute a valid written contract of insurance?

(b) What does the rule of privity of contract mean? What significance would it have in the defense of claims against a manufacturer of consumers' goods insured under Product Liability?

3. (a) In your opinion, would a state law authorizing the Commissioner of Insurance to make classifications of risks and to establish rates be constitutional? Discuss.

(b) It is a generally accepted legal principle that insurance is not commerce. Why has this principle been of major importance as respects the supervision and regulation of casualty companies in the United States? Discuss fully.

4. (a) In a fidelity bond it is stipulated that the assured must promptly communicate to the insurer any information he may have acquired of dishonest acts by an employee whose fidelity is insured. A cashier of an insured banking corporation knew of dishonest acts on the part of a teller but did not report it to his superiors. When a claim was brought for later peculations of the teller, the policy provision was brought up as a defense. Discuss the probable outcome of the case.

(b) Explain the operation and justification of reciprocal or retaliatory state insurance tax laws.

5. (a) Discuss briefly the dependence of modern society on modern facilities for the transfer and combination of risks, giving some indication of the relative importance of various fields of insurance in this connection.

(b) Define the following:

(1) Risk
(2) Insurance
(3) Hedging

6. (a) Describe three types of compulsory or financial responsibility automobile insurance laws and regulations.

(b) What states have enacted Security Fund legislation to assure the payment of Workmen's Compensation benefits in the event of the future insolvency of any insurance company licensed in the state? Discuss, citing the advantages and disadvantages of this type of legislation.

7. Discuss the comparative safety of the contributions made by the future beneficiaries under the Old Age Benefit section of the Federal Social Security Act with that of other methods which are available in the United States for providing an income during old age.

8. Comment upon the practicability of the proposed program that the Federal Government write crop insurance for wheat producers. Do you consider this to be a desirable development for the welfare of the entire United States? Would this constitute an encroachment into the field of insurance companies?

PART III

1. (a) What elements are included in the loss projection factors used in the manual rate making method of the National Council on Compensation Insurance to convert the actual losses to the appropriate rate level?

   (b) Derive a formula for calculating the revised off-balance of the Experience Rating Plan which results from the introduction of a factor of $(1 + f)$ in the printed manual rates for Workmen's Compensation. The formula should be expressed in terms of the original off-balance of the Experience Rating Plan, the average credibility of experience rated risks (z), and the factor $(1 + f)$ as defined above.

2. (a) Outline the essential details of the Retrospective Rating Plan which is available for Workmen's Compensation risks in Connecticut and other non-rate-regulated states.

   (b) For what elements is provision included in the Basic Premium of the Retrospective Rating Plan?

3. (a) Define deductible coverage and excess coverage as applied in the case of the various Liability lines, other than Automobile.

   (b) Outline a method for deriving the rates for deductible coverage for these lines of insurance.

4. Enumerate the various steps necessary in calculating the manual rate for Bodily Injury coverage for a private passenger automobile in a given territory.

5. Compare the Experience Rating Plans currently in use for Automobile Bodily Injury and for Manufacturers' and Contractors' Public Liability in the following respects:
   (1) Experience period
   (2) Policy year weights
   (3) Split of experience to normal and excess divisions
   (4) Treatment of excess limits experience
   (5) Credibility
   (6) Method of applying the experience modification in the event of variation in the policy limits at different locations

6. How is provision made in the Annual Statement for outstanding claim adjustment expense in connection with outstanding losses for Workmen's Compensation? What method would you employ in calculating such reserves for your company?

7. (a) Discuss briefly the general aspects of tables of policy limit factors for per person and per accident limits in insurance covering liability for bodily injury.
   (b) Describe briefly the "money purchase" plan of providing for industrial retirement pensions.

8. Discuss a proposal to adopt a unit reporting plan for Automobile Bodily Injury and Property Damage insurance experience, commenting upon its advantages and disadvantages. Indicate the minimum information which could be required for statistical purposes on the reporting card.

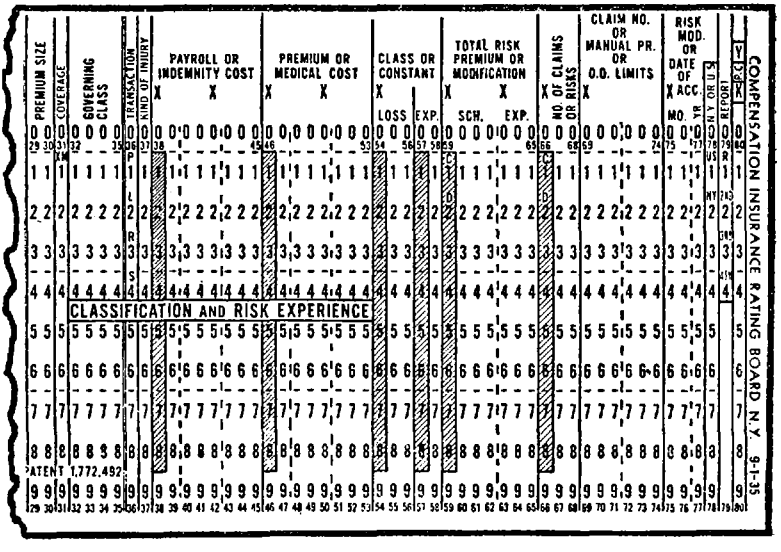
PART IV

1. (a) Name three items of assets listed as "Assets Not Admitted" in the Annual Statement and state why they are so listed.
   (b) If you were called upon to justify with supporting data the derivation of the gross rates being charged for Commercial Accident, Compensation, and Automobile Bodily Injury insurance, to what rating organizations or public filings of the carriers would you make reference?

2. (a) What schedules of the Annual Statement provide indications of the adequacy of reserves being set up from year to year?

   (b) It is found that the company's claim adjusters' individual estimates for Liability are somewhat deficient in total as compared with ultimate losses. A special judgment reserve is added to the total reserve indicated by the case estimates to reflect the expected ultimate loss cost. Would you carry this reserve in Schedule P in the space for "voluntary additional reserves for unpaid losses" or elsewhere in the Schedule? Give reasons for your answers.

3. A portion of the card used by the New York Compensation Insurance Rating Board for classification and risk experience in assembling data for manual rate making, for loss constant determination, and for individual risk experience rating is reproduced below. The column headed "Transaction" is punched so as to indicate whether a particular card is a "Premium", "Loss", or "Risk" (full term or short term) card. Explain the information punched and the purpose thereof for each of the three "Transactions".



4. (a) Define "standard premium" in connection with the Retrospective Rating Plan. Would you recommend the use of the standard premium or the written premium in reporting the experience of compensation risks written under the Retrospective Rating Plan in each of the following reports:

(1) Unit Statistical Plan
(2) Loss Ratio Call
(3) New York Casualty Experience Exhibit
(4) Schedule W
(5) Schedule P

Explain your answer briefly.

(b) In commercial practice it is considered to be poor accounting to deduct a liability from an asset of similar type, such as deducting accounts payable from accounts receivable. In view of this, explain why the Annual Statement requires that reinsurance premiums payable be deducted from premiums in course of collection in preparing the balance sheet.

5. Make a diagram showing the operating departments, with titles descriptive of their functions, and their relative positions which you would consider to be appropriate for a fairly large multiple line casualty company.

6. (a) Would there be any merit to the suggestion that the principle of retrospective rating be applied to:

(1) Automobile Bodily Injury
(2) Burglary

Give reasons for your answers.

(b) What type of reinsurance, if any, would you suggest for the following lines insured by a fairly large casualty company:

(1) Automobile Bodily Injury
(2) Workmen's Compensation
(3) Fidelity and Surety
(4) Accident and Health

Give reasons for your answers.

7. Outline briefly a method whereby casualty companies could determine an expense fee per compensation policy to be based upon the average figures of several carriers, these figures to be arrived at in accordance with principles of cost accounting.

8. (a) Discuss the difficulties and relative advantages of a proposal to eliminate the frontage charge in Owners', Landlords' and Tenants' insurance, covering all of the liability on the basis of area charges only. What adjustments in classifications and rating procedure would be required by such a change?

   (b) In a certain state, the method of determining the average weekly wage for Compensation purposes has been changed so that whereas the daily wage as determined was formerly multiplied by 5½ to determine the weekly wage, the daily wage as determined in the same way is now multiplied by 6 to determine the weekly wage.

      (1) Describe briefly how you would make an actuarial estimate of the relative increase in total Compensation cost in the state.

      (2) Make a judgment estimate of the effect in a state where the weekly benefit is 50% of weekly wages, the weekly minimum and maximum benefits are $5.00 and $20.00, other indemnity features are fairly liberal, medical is unlimited, and the average wage per week as estimated from various sources is $23.00. Explain the basis of your estimate.

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JAMES S. ELSTON, Editor

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