ABSTRACT OF THE DISCUSSION OF PAPERS READ AT THE PREVIOUS MEETING

INDUSTRIAL RETIREMENT SYSTEMS BASED ON THE MONEY-PURCHASE PRINCIPLE—J. H. WOODWARD

VOL. VIII, PAGE 13.

WRITTEN DISCUSSION

MR. W. R. WILLIAMSON:

The manner of treatment followed in Mr. Woodward's paper recognizing the correlation of annuities, death benefits, disability protection and benefits to employees upon withdrawal, is one which will commend itself to actuaries familiar with the subject. There is a practical difficulty, however, involved in handling pensions in this fashion.

Mr. Woodward recognizes the widespread failure to provide for a competence in old age and correctly states the principle that income during the earning years shall be adequate for the entire lifetime.

Where, however, the employer assumes that he may properly withhold a portion of the wages from the employees in order to compel savings for old age, a rather dubious paternalism enters into the plan. It seems very doubtful that an employer can establish a pension system of this sort through the compulsory deduction of wages, while if the industry is one which can bear a heavy increase in real wages the withholding of the increase by the employer is equally open to criticism.

The admission that pensions are earned by the individual year by year makes Mr. Woodward's method of treatment rather imperative and definitely requires the setting aside of funds on an interest basis only, so that the wages held out of the employee's income to provide pensions may in event of termination of employment be given to him as a withdrawal allowance, or in event of his death may be given the family as a death benefit.

As a practical matter the proportion of entrants in any staff of employees who remain with the employer during a lifetime is very small. If the pensions are considered as a gratuity on the part of the employer he can with relative ease grant pensions to

such employees as may qualify by some rather rigid standard with a much smaller outlay than is required to install a so-called pension plan as outlined by Mr. Woodward. As Mr. Morris in his recent paper before the Life Actuarial Society suggested, the corporation which buys life annuities on a small number of pensioners actually cares for these life annuities on all individuals who qualify for them so long as the corporation desires to continue this method of special grants.

Moreover, among employees there may well be choice, individual initiative and special necessities calling for variation in the types of investment to be made and a plan which makes investment entirely a matter of acquiesence on the part of the employee may be undesirable in stimulating thrift on his part, while leaving the employer responsibilities for investment as a trustee, which will not be fully met.

Mr. Woodward's discussion is particularly timely at a period of retrenchment, for economies in individual expenditure are most carefully considered at such a time.

I should be interested to know whether Mr. Woodward's paper arises from an actual plan of this nature established under his supervision and if so what the experience of the employer has been in selling the general idea to the employees to be benefited thereby.

Although all the parts of the program have been considered by Mr. Woodward, I am inclined to believe that employers as a whole should adopt Group Life Insurance and Group Disability protection before extending the plan to Pensions, which is more expensive and much more difficult to present to employees. Probably the rapid growth of Group Life Insurance and subsequently Group Disability Insurance, while Pension plans have shown but little development over the same period, is due to a recognition among employers that the two insurance company plans will be of greater value to employers in improving morale among the employees than would pensions on the money-purchase plan.

When pensions cease to be merely pensions to employees retiring at old age after a life's service and become a new wholesale budget system for individuals, there is entailed a very heavy sales cost in presenting the case to the employees, and a very difficult sales proposal to carry out.

MR. M. M. DAWSON:

This paper is admirably worked out on sound actuarial principles and with very careful attention to details. It cannot fail to be of great service to all students of the subject, and particularly to those who accept the fundamental proposition that *for all purposes* retirement pensions on account of incapacity due to age may be considered deferred wages.

The moment that position is definitely accepted, with all that it implies, the various steps which Mr. Woodward has taken in his paper are logically called for.

In any case whether or not this principle be accepted, I should regard it unquestionable that if the employer of a small number of employees or even though there were a large number, yet in case his business were insecure and his ability to respond by no means assured, the plan and principle would be fairly applicable in case he wished to attempt granting such service pensions at all.

There would also be more reason for applying it to staff pensions, that is, the pensions of office and sales employees, than to pensions for all employees, because there is greater probability of permanency of employment. In such cases the employer might not perhaps object to setting up a fund toward providing pensions as regards each of his employees, not taking into account turn over, because the excess of the amount so provided would not be so very great.

On the contrary, however, as applied to the general list of employees of a manufacturing employer, for instance, the system as suggested would undoubtedly increase the cost to the employer from 300% to 400% at least above what would be the cost to provide pensions only for those who continued in his service until reaching the retirement age.

The fact that employers would certainly shy at this very greatly enlarged burden and would in practically all cases refuse to submit to it, strongly emphasizes the further fact that the employer does not think of these pensions as deferred wages for each bit of work that his employee has done for him and therefore as being fairly equivalent to an increase of each pay check.

That mode of thinking of it entirely omits what is the real thing in the employer's mind, to wit: that he is paying special compensation for the completion of a special job, which is service to him during all the working days of the employee after he has been admitted to his service. It is more like the price which is paid for a job, such as making a suit of clothes, than it is like an employment by the hour, day, week or month at fixed wages or salary.

Its origin gives emphasis to this. There are few men who are so constituted that they would turn out an old family servant, who had become infirm because of a lifetime of service, if it were at all possible to support such servant, and employers-even on a very large scale, are impelled by the same general motive when they grant service pensions. They think of it primarily as a special reward for long continued, faithful service in their employment and not in any sense as a mere equivalent of an increased wage throughout the entire employment, to which accordingly the employee was fairly entitled, even though he had retired from the service earlier.

It is to be borne in mind, also, that if the fundamental thesis, that for all purposes retirement pensions may be regarded as deferred wages, should be accepted, one of two things would follow, viz., either virtually all employers would refuse to grant such pensions or, per contra, virtually all employers would be compelled to provide them.

The former is the more probable of these, but if the latter should come into effect the result would either be a smart increase, averaging nearly or quite 10% in the average wage, or else a decrease of nearly the same percentage in the wage paid in cash which the employees would otherwise have received.

The most unpopular form of social insurance has been a compulsory contributory plan of old age provision. This has been true even when the employer contributes as much as the employee and the state adds its contribution, and every attempt to compel the employee to contribute the whole of it out of wages he would otherwise receive in cash has been most offensive to workmen.

This would, as regards wage and salary earners, were such a system of contributions, whether made openly by the employees or only in effect by the employees, being deferred wages, to get a

firm hold, amount to a system of compulsory old age provision, applied only to these, which would go far beyond anything that has ever been deemed wise or practicable. These pensions are usually in proportion to wages and not merely such as to provide a bare subsistence (unless the wage were very small or the term of service before retiring very short) and the new compulsion would really be that one must, by this means, provide a reasonably liberal income for himself in old age, in this way.

The theory which underlies compulsory old age pension plans is instead merely that provision should be made for the support, in an honorable manner, but for a bare support on a minimum scale, of those who become infirm by reason of age without having such a provision for their support. The theory upon which the compulsion is based is that it is the duty of those of us who are at producing ages to feed and clothe those who have done like duty in the past generation and who, through misfortune or self-sacrifice, as for instance in the support and education of children or grandchildren who may have died or become disabled, find themselves without the means of support.

We are already supporting them, but in our poor houses and private alms houses and in a manner which dishonors them. You would all be surprised, I know, to visit a poor house in any part of the country and to see how many of the inmates are there through no other cause whatever.

Other civilized countries have made this provision, Great Britain, Australia, New Zealand, Denmark, France, Germany, Austria and several others, and it would be a poor substitute for such provision in the United States that the service pensions granted by employers for long and faithful service with them should be so extended as to give this relief only for wage and salary earners and in amounts much larger than are requisite for support, by means of what would, on the deferred wage theory, be compulsory deductions from their pay, instead of drawing upon the entire wealth of the nation to provide bare, honorable support for those who reach old age without this provision. The true principle is to make the provision for the latter by proper public means and to encourage men and women to make better provision for themselves by systems of saving and of intelligent management of their own affairs.

At least that is the way it seems to me and I cannot believe that from a social insurance and social welfare standpoint the system of dealing with service retirement pensions as in all respects equivalent to deferred wages, would be a good one.

In practice it will also certainly work out as follows: that there will be a constant and insistent demand, as the amount of the individual's contributions increases, for some system of recognizing his rights on a cash basis, and the thing will inevitably prove, when attempted on a large scale, so great an annoyance and of so little benefit to an employer, that I think, so long as it is not compulsory or practically rendered so by general adoption—both of which things I deem most improbable—it is a system which would, after a few years, be abandoned.

The things which I have said have not the least bearing against the paper as a careful analysis of the subject from that standpoint and as embracing most thoroughgoing and valuable suggestions for the utilization of the plan, if that standpoint is taken, but while I recognize that all such service pension systems may, for actuarial purposes, be thought of and worked with as mathematically constituting deferred wages, I am of the opinion that there is a fundamental mistake involved in thinking of these plans as amounting in all respects to deferred wages.

MR. G. B. BUCK:

The purpose of this paper is stated to be that of stimulating a discussion of the principles to be followed in formulating an industrial retirement system and of emphasizing the advantages of systems based on the so-called "money-purchase principle." The lack of adequate and reliable information on the subject of the principles to be observed in the establishment of industrial pensions makes the paper very valuable not only to the actuary but to the employer and employee who is contemplating the establishment of a plan. The majority of our industrial pension plans have been founded upon principles which in the main are unsound, and employers in establishing pension plans are prone to lean upon precedents rather than to analyze the basic principles involved. If they can be influenced to think along the lines outlined by Mr. Woodward a great step forward will be taken in the settlement of the problem of industrial pensions.

The method of providing pensions on the "money-purchase principle" is one which lends itself kindly to the establishment of a retirement system that can be either underwritten by an insurance carrier or operated by the company itself. Its general adoption throughout industrial and governmental employment would mean an appreciable step forward in the settlement of the problem of old age dependency because it would permit an employee to begin work with one employer, leave and enter the service of another, and thus progress through his years of activity without losing his years of credit toward an old age or disability pension. This could be effected by permitting him to transfer the reserve on his benefit between the systems, a practice which has already been adopted by the State of New York in respect to the employees of various cities and the state service.

The active entrance of the insurance companies into the field of pensions would have a very salutary effect on the pension funds of this country, both industrial and municipal. The fact that pensions do cost money and that they cannot be treated lightly may thus be brought home to both employer and employee. When a pension policy can be readily purchased from the insurance companies its value will be more generally known. When the premiums which an insurance company will be compelled to charge are compared with the relatively small amounts which some employers think their funds are costing, many employers will make inquiry into the true financial condition of these funds.

The average employer fails to realize the liabilities involved in the establishment of a pension plan. He assumes that he is protected by a statement to the employee that no legal obligation is assumed by the company and that the plan can be changed or discontinued at will. For this reason he feels safe in drifting along and paying the maturing pension claims without taking into account the accruing liabilities. It would seem that he is being misled by the illusive character of his liabilities because we cannot believe on the one hand, that he knows of these liabilities but does not care to put them on his books, or, on the other hand, that he intends to repudiate them and fool the employees who are not in a position to ascertain the facts and who come to rely on the expected pensions for their old age.

Mr. Woodward's comments on the use of the rate of labor turnover and the use of the salary scale are appropriate when applied to any system underwritten by an insurance company and to the self-insurer, unless the annual rate of payment to the fund by the self-insurer as determined by the use of a conservative withdrawal rate and rate of salary change is checked and adjusted by means of periodic investigations and valuations. I would hesitate to subscribe to the statement that the use of a conservative lapse rate or that the proper use of a salary scale is not compatible with the operation of a sound retirement system in accordance with actuarial principles. I believe that a company can operate a sound fund which will work successfully and in which both the lapse rate and the salary scale may be used if the proper periodic actuarial valuations and adjustments such as an insurance company would make are employed. I have had occasion to demonstrate in dollars and cents the manner in which a fund of this kind would weather some of the most unfavorable changes in the lapse rate and the salary trend which could be expected. The organizations which have met with difficulties on account of their pension funds are the organizations which make no actuarial valuations or checks to test the solvency of their plans, and funds of this kind should be regarded with suspicion regardless of whether the benefits are based upon salary.

If a set of the mortality and service tables employed are available together with a comparison of the actual and expected experience, a valuation balance sheet and a tabulation of the number and salaries of the active members classified by age and length of service, *i. e.*, data similar to that which an insurance company is required to have each year in respect to its policyholders, I think that the financial condition of the fund may be definitely determined and that the solvency of any properly constructed funds should not be questioned simply because they used a salary scale, a withdrawal rate, or both. Without these data being available there may be cause for distrust in connection with any pension or retirement fund.

The obstacle in connection with the establishment of any sound industrial plan is that of pension costs especially as it relates to making adequate provision for present employees. The main problem that overshadows ordinarily all other questions is that of taking care of the accrued liability. Under any

plan of liquidating the accrued liability, the immediate outlay is so great that employers are usually inclined to cut the benefits as far as possible to keep the costs down. For this reason employers may hesitate to adopt the provision for return of contributions made on behalf of any employee when the employee leaves the service. Mr. Woodward touches very lightly on the question of providing for the accrued liability but it should receive very careful consideration. In establishing a retirement plan, calculations of the liability on account of the present members should be made with the same precision as is followed in calculating the liability to be assumed after the plan is established, otherwise this liability may be underestimated by employers and cause embarrassment later.

The accrued liability is a practical obstacle which every pension fund established in an industrial or municipal organization has to face, if the members are to be credited with service prior to the establishment of the plan. Even in the plans in which the employees are asked to contribute, the major part of the accrued liability generally has to be assumed by the employer if the system is to be of real value to the employer. Therefore, despite the fact that it may be argued that the employer must contribute on account of the employees who quit the service as well as on account of those who remain, the average employer will probably be slow to assume this extra cost, which benefits only employees, until the accrued liability has been safely taken care of on account of the employees who remain in service to draw pensions.

I have limited my discussion principally to the points of disagreement with Mr. Woodward. There are so many points in the paper with which I am in accord and so many phases of the subject in which I am interested, that had I attempted to discuss these points I fear my discussion would have been unduly lengthy.

THE DEVELOPMENT OF PUBLIC LIABILITY INSURANCE RATES FOR AUTOMOBILES—A. L. KIRKPATRICK.

VOL. VIII, PAGE 35.

WRITTEN DISCUSSION

MR. F. R. MULLANEY:

Up to the present time there has been a great deal of study and attention given to the statistical and underwriting methods used in Workmen's Compensation Insurance, but another line in the casualty field has been making rapid strides in the last few years which demands attention and that is Automobile Insurance. Mr. Kirkpatrick's article on the Development of Public Liability Insurance Rates for such form of coverage is therefore a very timely one and calls our attention to the need of devoting more time and study to the proper methods to be pursued in computing rates for such insurance. As is known to all of us who are interested in this branch of the casualty field, there is a tendency to place the control of rates for Automobile Insurance with the Insurance Departments, as is indicated in the recent action of the New York State Legislature, but the possibility or probability of rate control for this form of insurance should not be the only incentive for the members of the insurance fraternity to urge them to devise better statistical methods and underwriting practises so that adequate and equitable rates may be determined.

As has been pointed out in this article, the problems of the actuaries and statisticians have been made considerably more difficult by reason of the number of changes that have been made in the underwriting practises and bases of rates, and I believe that we will all agree with Mr. Kirkpatrick when he says "It is certain that until there is some stability in the underwriting practise no company can furnish statistical data of great value for rate making purposes. It is hoped that the time will come when a satisfactory method of underwriting may be permanently maintained without radical modifications. When that point is reached it will be possible to conduct extensive statistical studies and to make use of methods which will solve many of the present day difficulties in Automobile Rate Making." I do not believe that this point can be emphasized too much, especially so when

we find that the experience of not more than two, or at the most, three policy years can be used for rate making purposes.

We all probably realize the fact that conditions in the automobile industry have changed very rapidly and undoubtedly have necessitated changes in the handling of Automobile Insurance also. It is very interesting, therefore, to note how the experience that was available was adapted to the needs of the business by the use of certain assumptions which seem to be borne out by tests that were illustrated in the article.

The use of the projection factor method for determining the increase in cost of claims from year to year has evidently served its purpose very well for this form of insurance. It would seem that the results obtained from such a method would probably be more consistent and dependable for the calculation of automobile rates than when a similar method was used in Compensation rates where some difficulty has been experienced with the application of that method. In Compensation there are a number of factors which tend to produce inconsistent results such as changes in wages and industrial activity which condition would not affect, to such a great extent, the results when used for automobile rate computations.

In conclusion, permit me to quote from President Mowbray's address at the November meeting in which I think he sums up the entire situation: "It is for us to work out such standards and establish their soundness. And we must soon, I think, do this, not alone for Workmen's Compensation Insurance, but for all casualty lines. For when we observe the efforts (attended with some success) to make carrying of Automobile Liability Insurance compulsory, we may anticipate regulations of rates in the not distant future for this line also."

MR. S. B. PERKINS:

Mr. Kirkpatrick's paper on "The Development of Public Liability Insurance Rates for Automobiles" is the first that has appeared to my knowledge containing such a complete exposition of automobile rate-making methods and should prove of great interest to such of its readers as are interested in this particular subject, as well as academically to all who are interested in casualty insurance rate-making methods. Automobile rate-

making is in its infancy and it is a matter of personal satisfaction to me that the importance of the line is being recognized and that some serious attention is being given toward the establishment of rates on something which approaches a scientific basis. There are so many phases of this problem that a complete discussion of the paper would practically amount to another paper. I will, therefore, confine my remarks to two particular points.

The first of these is the matter of development of losses. In Workmen's Compensation Insurance the benefits payable, in the event of an accident, are prescribed by law, and the method and time of payment also follow the act. It is obvious, therefore, that with a constant exposure to the accident hazard, and if there be no material change in the accident rate or the severity of accidents, there would be a very definite relationship between the amount of compensation paid at the end of a given period and the total amount incurred on the same accidents. In the Automobile Insurance business, however, the relation should not be as definite, because of the fact that automobile losses are determined either by agreement between the insurance carrier and the injured or his estate or, failing to arrive at such an agreement, by judgment of the court. Either of these is subject to violent fluctuations, depending upon many conditions. The public's appreciation of the fact that the insurance carriers, not being desirous of allowing claims to go to suit, will make reasonable settlements, regardless of their liability, is one of the most effective of these conditions. The public is prone to take advantage of this situation and presents claims for which liability is known not to exist. This situation obtains until the carriers realize the extent of the moral hazard and change their policy to one which adheres more strictly to the contractual obligations.

Such a change produces two results—more claims develop into suits, legitimate ones being accompanied by judgments which many times are higher than settlements under agreements might have been but which, in the ultimate, might produce exactly the same amount of losses as under the original situation, with the exception that the money is now paid to those to whom it is due and denied those to whom it should not be paid. This is as it should be but, in bringing the claims to suit, naturally, initial payments are deferred sometimes materially, and this destroys the relationship which previously existed between

amounts paid at the end of any given period, such as twelve months, and the ultimate incurred cost. It is quite possible, also, that the courts, feeling that the public is becoming careless in operating in traffic, in attempting to curb this evil, increase their verdicts. This can easily be done because there has been no legislation stipulating what the benefits to an injured should be, as there has been in the case of Compensation. So it is that, in the development of automobile losses, these factors have to be considered in addition to those factors which enter the compensation problem, although it is equally true that some factors affecting the compensation losses, such as the change in wage scales, do not as materially affect automobile losses. Unfortunately, the factors which do not affect automobile losses are more easily measurable than the additional factors which have been considered. I do not pretend at this time to offer any remedy to the situation but merely wish to point out its existence.

The other point which I desire to comment on is the matter of proper allocation of responsibility for accidents. This is a matter which might well be incorporated in the rating problem. Certain communities establish excellent traffic rules and take many precautions to prevent accidents. Energy and money spent along these lines should receive their reward. The question is, how shall this be effected? The converse is more readily visualized. The traffic conditions in some localities may be very unsafe; at the same time, owing to the full knowledge of these conditions car owners operating continuously in these locations may suffer no more than the normal number of accidents, while the cars owned and operated from points more distant may continually find themselves in difficulties while driving through these districts. Under the present system all losses are assigned to owners and to the locations in which the cars are owned. Therefore, under the present system, the conditions which have been thus outlined would merely tend to penalize the car owners of the surrounding districts by virtue of a reaction of the subsequent rates, whereas, the real fault existed in the locations where the accidents took place. All this merely points toward the possibility of territorial charges or credits, depending upon the actual operating conditions but, as in the case of the development of losses, I am not prepared to offer a solution but I merely wish to suggest the possibility.

MR. R. H. BLANCHARD:

The general impression which I got from this excellent paper is that automobile rate making is still far from an exact science. The system described is probably more efficacious in producing an adequate premium income for insurers than in measuring the hazard involved in insuring the individual car owner. In fact it seems doubtful to me whether this hazard is even approximately measured. I am not intimately acquainted with the details of automobile rate making and I shall therefore not attempt extended discussion of the paper. However, in reading it certain questions occurred to me which I should like to have further discussed by the author in his review. They are as follows:

1. What is the exact basis of assignment of cars of various makes to the symbol groups? To what extent is this method justified by experience?

2. Is there any relationship between losses and the type of car within a given symbol group? We find, for example, within each group, cars of relatively cheap construction; cars which depend for their sales on a sporty appearance and other cars which are built primarily to be sold as conservative and reliable instruments of transportation. Does the public liability hazard correspond to any degree to the types of buyers to whom cars of these various classes appeal?

3. To what extent do the characteristics of the individual owner deserve consideration? For example, are the extent to which he uses his car, his skill as a driver, care used in maintenance and driving given consideration? Is the past record of the driver worthy of attention as an indication of relative hazard? What are the practical limitations on the measurement of individual hazard?

4. In the construction of rates for 1921 certain assumptions were made concerning the development of premiums and losses under policies issued in 1920. These policies have now all been terminated. To what extent has experience to date justified these assumptions?

I have submitted these questions with the idea of indicating the features of automobile rate making which appear to one somewhat detached from the practical conduct of the business to require critical analysis. It seems to me that a full discussion of them would be of considerable value to the Society.

AUTHOR'S REVIEW OF DISCUSSIONS.

MR. A. L. KIRKPATRICK:

While this paper was primarily an exposition of the methods used in making automobile rates, some questions have been raised which involve further explanation and an opinion as to the accuracy and value of those methods.

When private passenger cars were rated upon the basis of a list price, it was a simple matter to determine the group in which each kind of car fell, merely by the price of that car. This involved the use of a rule of thumb. But in eliminating the inequities produced by this method no definite rule can be said to have applied. In general, the object to be attained by the assignment of cars to symbol groups rather than list price groups was the elimination of the inequities produced by cars of similar type and hazard which happened to have a different list price, and consequently took a different rate. In making the assignment to symbol groups, each type and make of car had to be considered separately and the assignment to a symbol group determined in each case, in the most equitable manner possible. This can be readily understood by referring to the manual and studying the symbols of almost any make of car. It will be noted that although different models may have list prices which fall in different groups, yet the same symbol has been applied to all models of similar construction and which involve the same Public Liability hazard.

Experience has shown that there is a certain definite relationship between the list price of the car and the losses which that type of car produces. It is a pretty difficult thing to explain to the layman and the purchaser of insurance why a Packard car is any more dangerous to drive than a Dort. There have been various explanations given for this relationship, but the discussion of these causes is not within the scope of this paper.

In developing the 1920 policy year experience to determine the ultimate cost of that business, a certain amount of judgment was exercised in determining the development factors. Later experience is not yet available to show how close the actual cost came to that arrived at by the methods described. It is reasonably certain, however, that the results will not be wide of the

mark as respects the business as a whole. But where only a limited volume of experience was available in certain territories the method could not be strictly adhered to.

Mr. Blanchard has raised a question as to the extent to which consideration should be given to the characteristics of individual owners. The matter of measuring the hazard in the case of each driver is one which has puzzled automobile underwriters for a considerable period. Many suggestions have been made as to methods of securing information which will distinguish a risk involving a careless driver from one involving a careful driver. There is no doubt but what the personnel hazard is by far the greatest hazard to be considered in automobile underwriting, but so far there has been no satisfactory solution presented for getting the information which will enable the underwriter to determine which drivers are good risks and which are bad. Some companies have adopted the policy of an inspection report which covers the owner of the car himself. The chief difficulty involved is to get this inspection at a reasonable cost. The remedy which has been generally adopted by companies is to review very carefully the experience of each owner and when that experience appears to indicate a bad moral hazard, the policy is cancelled. This method appears to be the most generally used, although it is admittedly not entirely satisfactory and does not permit of a careful selection of risks in advance.

Distribution of Surplus by Casualty Companies Writing Participating Insurance—William Leslie.

VOL. VIII, PAGE 54.

WRITTEN DISCUSSION.

MR. H. R. BASSFORD:*

Mr. Leslie's paper "Distribution of Surplus by Casualty Companies" should be of particular interest to those Life Companies who do a Group Insurance business. Our Company has paid dividends on the "Individual Risk Experience Method" for the last two years and this method has apparently been satisfactory to most employers. The exact formula used is a slight

*For James D. Craig.

modification of formula number 25 in Professor Whitney's paper on "Theory of Experience Rating." Instead of applying the formula to loss ratio, as Mr. Leslie does, it is applied to the surplus. This application of the formula produces results somewhat similar to Mr. Leslie's formula shown on page 70 of his paper. So modified, it is as follows:

$$\text{Dividend} = a\,[P' + Z\,(P - P')\,]$$

P': At the end of each calendar year, the divisible surplus is determined as a percentage of the premium on all policies in one line, say, all Group Life Policies. This percentage applied to the premiums earned on the particular group under consideration, represents the class experience, in the formula, P'.

P: The individual risk surplus P is determined for each Group on its renewal date. The Group is credited with the premiums earned up to the renewal date and charged with expenses (graded on large groups) and with claims incurred. The net balance represents the individual risk surplus, P.

Z: Professor Whitney, in his above mentioned paper, suggested that the credibility factor Z is a matter of individual judgment. We wished to make it as simple as possible and to have it depend on the size of the group only, being any independent value for any one group. In the above formula, the factor represents the probability that the actual experience will come within a reasonable percentage of the expected experience. In Group Life Insurance, the probability of the contingencies insured against is rather simple, inasmuch as the face of the policy is paid in case of death or total and permanent disability. The Z factor, therefore, is practically a factor of the number of years of life exposed.

a: As pointed out in Mr. Leslie's paper, there will be a number of cases where a formula of this type will produce negative dividends. As it is impossible, practically, to "collect this dividend," the total of the dividend quoted will probably exceed the amount of surplus to be distributed and accordingly, the factor "a" which is a fraction, has been inserted to reduce the dividend and so provide for negative dividends as well as for a contingency reserve.

The class experience used with such a formula should be strictly homogeneous and should therefore include the experience

of one industry only. Usually, however, the experience of any one industry is not of sufficient size to produce the true average experience. It is therefore more practicable to use the entire experience in one line of insurance, if the law does not forbid it. Little injustice will result, provided the original premium charged is in proportion to the risk insured. If experience proves that any one industry has been charged an incorrect premium, it is possible to correct this in the calculation of the dividend, by assuming that the particular group was charged the correct premium and determining the dividend on this basis. The dividend can then be corrected by the difference between the premium charged and the correct premium.

Under Group Life Insurance, the most reasonable time for paying the dividend seems to be at the annual renewal date. At this time, the employer decides whether he wishes to renew or not, and it seems, therefore, the proper time for making the financial adjustment to which he is entitled. It is for this reason that the individual risk experience is carried to the renewal date of the policy. Again, if the general experience has changed since the end of the calendar year when the class experience factor was determined, the change will be reflected in the calculation of the individual dividend.

One of the objections which Mr. Leslie has cited for this type of formula is that "It is not in consonance with the idea of a fixed dividend policy which has the effect of enabling an employer to forecast with considerable certainty his final insurance costs." In order to prevent the net cost from fluctuating widely, for any one employer, from year to year, the credibility factor should be made rather small. It runs as low as five per cent. on small groups in the above formula.

In the application of the formula, a total dividend is calculated for the full exposure of the Group and then the dividend is determined for the particular year in question by subtracting previous dividends paid. Of course, in determining the surplus for all years of experience, the Group is not charged with the dividends already apportioned. As the experience is accumulated on any Group, the credibility factor increases and the general tendency is to have dividends increasing with duration. Employers who are familiar with the Life Insurance business

naturally expect increasing dividends and such a method, therefore, gives general satisfaction.

In the practical application of a formula of this type, the following points must be considered:

1. Wide fluctuations in individual dividends should be avoided. This can be done best by limiting the value of the credibility factor.

2. The avoidance of an over-payment caused by negative dividends. This can be accomplished by fixing maximum and minimum dividends or by limiting all dividends. Usually, the investment income is negligible on any one group as the insurance is issued on the One Year Term Plan and no reserves accumulate and can be used for this purpose.

3. Where the loss ratio runs high, it is necessary to be particularly careful in the underwriting of large risks. One or two poor risks of considerable size may require all surplus and vitiate any dividend formula.

We agree with Mr. Leslie in that under the test of actual use, the formula has proved satisfactory to most employers. It is equitable and does not discriminate unfairly between risks.

CLASSIFICATION OF RISKS AS THE BASIS OF INSURANCE RATE MAKING, WITH SPECIAL REFERENCE TO WORKMEN'S COMPENSATION—A. H. MOWBRAY

VOL. VIII, PAGE 77.

WRITTEN DISCUSSION

MR. R. A. WHEELER:

Although the classification of risks as a basis of insurance rate making is fundamental to the making of insurance rates, the evolution of this phase of rate making as affecting Workmen's Compensation insurance has been slow and without the guidance of recognized principles or consistent theories. This may be due, not to the absence of principles or theories, but to the conflict of different principles and theories. Mr. Mowbray states that rates should provide an equitable distribution of

insurance cost by being closely adjusted to the inherent hazard of individual risks. This would appear to be self-evident were it not for the fact that there are those who believe that it is not especially important that every commodity should bear a specific cost or that every consumer should pay his exact quota. From an insurance carrier's point of view, however, it would be unsafe to accept other than the above fundamental principle. How far we can go towards making rates that are closely adjusted to the inherent hazard of individual risks is another matter. We are then confronted with the problem of determining the inherent hazard of an individual risk, the solution of which presents many practical difficulties.

Mr. Mowbray has offered the following fundamentals as a basis for a solution:

1. Bringing together into classifications, risks which have inherent in their operation the same causes, the variation in strength of which may be further subdivided by schedule and experience rating plans.

2. The resulting classification system and its extension through schedule and experience rating should be harmonious.

3. Such a classification system must be consistent with the practical conduct of the business.

In applying these principles to Workmen's Compensation Insurance, the theory produces a process manual, although as he states, in addition to process, recognition must also be given to other factors, such as general level of wages, character of workmen and extent of indemnity.

Finally a program is presented for the study and review of the present manual in the light of the foregoing theory. This calls for an examination of individual risks as to exposure to accidents and the occurrence and cost of accidents as to causes, and I would add, an examination into the bases of payroll accounting.

Whatever theory underlies a system of classification, care should be taken to see that it is susceptible to statistical analysis and control.

While I am in entire accord with Mr. Mowbray's theory and principles, I am constrained to point out some of the practical

difficulties in applying them at the present stage of statistical development.

1. Our statistics have been accumulated under a classification system comprising nearly 1000 classifications of which scarcely 20% have sufficient nationwide exposure to indicate either accident frequency or loss cost per unit of payroll. That such a situation might arise was predicted by Mr. Magoun, in the February, 1915, *Proceedings*, when he said: "It goes without saying that such a refinement in classifications is impossible for statistical purposes in general."

2. Statistics as to cause of accident have been so finely divided for each of these 1000 classifications that they are, to a large extent, vitiated by lack of exposure. This of course can be partly remedied by the grouping of classifications and causes.

3. Statistics as to physical conditions causing accidents have not been kept currently to go hand in hand with the loss costs attributed to physical conditions making difficult desired correllation. Although this has not been done in the past some data is available on current conditions.

4. The lack of state regulation of rates and the enforcement of manual rules, has brought about improper assignments of payroll and losses to the existing classifications. For instance, the payroll on high rated classifications has been assigned to low rated classifications until the vicious cycle has finally produced in New York State a rate of $28.99 for "Iron and Steel Erection."

Progress is now being made by the committees of the National Council along the lines indicated in this paper, although it is not certain what principles will emerge as underlying a revision of the classification or the accompanying schedule and experience rating plans.

MR. W. W. GREENE:

The erection of a satisfactory system of classification is no slight task in any form of insurance. In workmen's compensation insurance it is perhaps the biggest and most fundamental of our difficulties. Mr. Mowbray's paper is admirable as an expression of the philosophy which should govern our approach to this problem.

His discussion of abstract principles leads him to certain criteria which are so worthy of emphasis that I take the liberty of reiterating them, in essence.

(1) The classification should embrace risks which display the same causes of loss.

(2) Within the classification, the variation from risk to risk in the strength of each such cause should not be greater than can be handled by the (schedule and/or experience) rating plan.

(3) The classification should not cover important hazards which are not common to all its risks. (The foregoing, I believe, expresses what Mr. Mowbray had in mind).

(4) The classification system and the supplementary rating plan should be in harmony.

(5) "The basis throughout should be the outward, recognizable indicia of the presence and potency of the several inherent causes of loss including extent as well as occurrence of loss." This last, though well put, seems to be quite definitely implied by (1), (2) and (3).

The value of a clear statement of the essentials of classification building is very substantial, though probably all along the makers of classifications have been carrying these standards in the back of their heads. The author of this paper has performed a very necessary and helpful analysis of the physchology of manual making.

Mr. Mowbray goes on to outline a program for the study and review of the manual.

In outlining the work of manual revision he refers to the study of descriptions of individual risks in the particular classifications under consideration, to reviewing "complete accident records for these risks covering a considerable period of time and including an analysis by cause and cost," to what we understand to be a weighting of the potential causes of accident in each risk on the basis of the actual experience, to comparison of the several risks within the classification to determine if any "include as important elements of their hazard causes which are not common to all," and to review the present grouping of classifications in the light of the information developed by the foregoing steps.

In the writer's opinion Mr. Mowbray's program falls below the promise of the earlier part of the paper.

It seems to us that what the classification system particularly needs is more of the panoramic view taking in all industry, and less of the view which is restricted to a particular industry. The most serious difficulties of our present set of classifications are due more to failure to look at the manual as one problem, than to anything else. This failure has not been the fault of the individuals who have done the work, but rather of the general plan (if it may be called a plan) of manual revision, which has precluded consideration of more than one particular group of classifications at a time.

There is no doubt that the complete descriptions of individual risks referred to by Mr. Mowbray are necessary to the panoramic view. We would point out that for practical purposes these descriptions are now available in connection with manufacturing risks. We refer to the inspection reports now on file in the offices of the rating bureaus of the principal industrial States.

As a means of "breaking into" the problem, these reports should be sorted into groups which are, in a general way, homogeneous from the standpoint of material, process and product. Preponderance will have to be given in most cases to one of these three aspects of the risk, and the procedure which is suggested in one industry is certainly not the one which can be profitably followed with respect to all. The natural "lines of cleavage" between well-defined subdivisions of an industry can be recognized by any one with common sense and with the necessary detailed information at hand.

Assuming that the sorting of inspection reports will furnish a first approximation to a set of classifications for a given industry, this hypothetical set of classifications can be tested by an intensive field investigation. The revisions in classification plan indicated by the field investigation can be made.

When tentative classification plans have been worked out for all industries, they should be examined from a general point of view and made to be as consistent as possible. The tentative classification scheme as a whole should, of course, be compared with the existing set of classifications, and then it should be submitted for criticism to groups of employers, and for final review to a selected group of underwriters.

Until the system is in practically complete form, subject, of course, to revision, the work, to secure adequate results, should be under the immediate direction of a single mind. Committees can criticize, they can seldom create.

The classification problem is quite as much a business problem as it is one of insurance theory. The business cannot satisfactorily proceed unless the dividing lines between classifications are satisfactory to the great majority of employers.

We believe that highly satisfactory results can be obtained in the manner we have indicated, without resort to as rigid an application of theory as possibly Mr. Mowbray has in mind when he referred to the analysis of individual risk experience. Such experience, in the detail mentioned by Mr. Mowbray, would be difficult to secure, and we fear that a great deal of it would not be indicative because of lack of necessary breadth of exposure.

AUTHOR'S REVIEW OF DISCUSSIONS.

MR. A. H. MOWBRAY:

It is very gratifying to find my critics do not differ with the theory of classification I endeavored to formulate. It is with the practical application that difficulty is found. This is to be expected and it may well be that the program I have outlined for working out the theory will require radical revision. Agreement on the underlying theory of classification must, if it becomes general, tend to clear away some points of disagreement and difficulty.

The difficulties Mr. Wheeler points out are real and important and will certainly slow up progress. Yet, as I noted in outlining the theory, we cannot hope to get a perfect scheme of classification which will precisely analyze the entire industry of the country in narrowly defined classifications. After all, can we not make some progress even with the faulty material we have and get a better start for the next step?

Mr. Greene suggests a different approach to the practical problem on the basis of what he calls a panoramic view in place of study of individual risks. In other words, as I understand him, he would proceed by analysis rather than synthesis. Since risks are the things to be classified it seems to me self-evident

that a proper system of classification cannot be worked out without a study of risks, their likenesses and differences. It may well be, however, that the problem can be attacked from both points carrying the analysis through the major divisions of industry which will give groups of classifications, and then building up individual classifications within these groups by study and association of risks.

It may also be possible to shortcut this work somewhat through the use of independent expert advisers on different lines of industry. I have recently found that a brief interview with a well-known consulting engineer in oil production furnished the basis for an apparently satisfactory solution of the classification problem in this field. This was so, however, because of his intimate knowledge of conditions in large numbers of individual enterprises of the type we must classify, the equivalent of the study I have suggested. However, we have to deal with many lines in which such independent experts cannot be found, and here we will have to find our own means for developing and a scheme of classifications consistent with the general theory.