

ABSTRACT OF THE DISCUSSION OF PAPERS READ AT
THE PREVIOUS MEETING

1922 REVISION OF THE INDUSTRIAL COMPENSATION
RATING SCHEDULE

S. B. PERKINS AND R. A. WHEELER

VOLUME IX, PAGE 11.

WRITTEN DISCUSSION

MR. CHARLES N. YOUNG:

The authors of the very thorough and illuminating paper which is before us for discussion have indicated the explanatory character of their work by its title. Hence, any discussion of it should be limited to the effectiveness with which they have bridged the gap between themselves, thoroughly familiar with every step of the process, and the reviewer, seeing only the final result.

In the first paragraph this statement appears: "while the present schedule has many good points, the fact remains that none of them have been based on experience." While the authors do not say that it is impracticable to base the present schedule upon experience, one unfamiliar with its inception might draw such an inference. Therefore, the statement quoted, standing alone, hardly does justice to our late colleague, to whose wisdom and initiative the 1918 Schedule is so largely due.

While it is true that the present schedule was adopted without waiting for experience which was not then available, its structure was particularly designed to remedy the very defect of the 1916 Schedule which is now charged against that of 1918. Dr. Downey and his associates had clearly in mind the necessity of establishing a flexible schedule. They were fully aware that the rating factors of that schedule were only tentative, and that, even though subsequent revisions were made in them (as was done in 1920), the physical significance of these factors should be subordinated and their values modified wherever necessary to produce results in accord with actuarial data. The fact that, on account of inertia, expense or pressure of other matters, the data necessary for such revision were not supplied, should not be charged against the present schedule. Let us not forget that Dr. Downey did the pioneer work in establishing a flexible structure susceptible to modification in the light of experience.

What has been said above is not in the least intended to detract from the credit due to Mr. Whitney for his fearless departure from previous endeavors, by actually building up the rate from the partial pure premiums corresponding to the various causes of injury. The outstanding achievement of the 1922 Revision is the reduction of the rate into its major component parts. The total absence of a given cause from a risk naturally reduces the corresponding element of the pure premium to zero. This does away with some of the inconsistencies of the present schedule, whereby the introduction of inherently hazardous equipment, if guarded, may actually result in a reduction in rate.

The table giving percentage of losses by causes for the various industries is of particular interest. It shows the degree of justification which the committee had for its liberal use of knife and saw in simplifying by the time-honored method of amputation. It might be inferred that the committee amputated every item which could not be proved responsible for a loss of at least a quarter of a million dollars, in the data under consideration. While the authors do not tell us the number of D. and P. T. D. cases, it would appear from the data that there were about 320. We see, therefore, that electricity, while it is charged with 7 deaths, is not deemed of sufficient importance to be retained. Or, perhaps it would be more fair to say that the committee was unable to assign these deaths either to high voltage or unguarded equipment, and hence thought schedule rating impracticable for this item. Additional information bearing on these suppositions would be of interest.

It would seem that 11 D. and P. T. D. cases chargeable to cranes would be sufficient to require very clear evidence that these lives could not have been saved by engineering revision, to justify the elimination of this item from the schedule. Here too, some explanation of the reasoning of the committee would be of interest. Would it not be more equitable to distribute this loss over those risks which have cranes rather than over the entire group?

In regard to the elimination of a majority of the power transmission items, the authors have explained the judgment of the committee. Their explanation is faultless—but it does not carry conviction. It requires no very extensive study of accident reports to indicate their brevity—especially in the description of

unfortunate occurrences not entirely dissociated from sub-standard conditions. It is much easier to write, "caught on shafting—dead," than to explain the presence of a murderous clutch, entirely unguarded and exposed to contact in a semi-lighted basement, or to explain why a 3-inch set screw was left 3 feet above a plank serving as a foot walk over a cement bin.

The above comments may serve to indicate a lingering suspicion that simplification may, at some points, have been secured at too great a sacrifice of economic incentive for engineering revision. It is not intended to infer that such incentive should be retained by any sacrifice of fidelity to actuarial data, where same are obtainable. But let us also remember that there are inherent factors limiting the credibility which can safely be given to the records upon which such data are based.

The above comments have a direct bearing upon a point concerning which the authors have told us nothing. The final test of the comparative merits of any two plans of schedule rating apparently has not been applied, or even seriously considered, by the committee. Neither the fact that the rate level, as a whole or with respect to individual classifications, or that the rate for a given risk is substantially unchanged, can be made the ultimate criterion. These conditions might be fulfilled by a number of systems, all of which contained similar inherent defects.

Since the schedule rate is used in determining the subject premium under the experience plan, and since the more nearly the subject premium approaches the indicated risk premium the more nearly will the final adjusted rate accord with the actual risk experience, the final test is the degree of correspondence produced between the subject premium and the indicated risk premium. This test should be made by classification within a given state and policy year, to avoid the introduction of extraneous disturbing elements. The D. and P. T. D., or other low credibility portion of the experience, should not be included in the test.

The primary purpose of schedule rating is to obtain a rate which will generally predict the risk experience more accurately than will the manual rate. While this agreement could not be confidently expected on any given risk, yet in comparing the operation of two plans of schedule rating, with respect to one or more groups of risks, it seems reasonable to ascribe a measure of superiority to that plan which is generally found to agree more

closely with the incurred experience. Such measure can best be determined by statistical analysis, by the study of the correlation between the ratio of the high credibility portion of the indicated risk premium to the subject premium as one variable, and the corresponding schedule rate, expressed as a percentage of manual, as the other. As the schedule rate affects the subject premium it will be necessary to recompute the latter in repeating the test for the schedule under consideration. The comparison of the coefficients of correlation resulting from these two tests will determine the relative equity of the two plans toward individual risks, and furnish the most satisfactory evidence of superiority. The method of rank differences is probably the most readily applicable way of securing such evidence.

The introduction of this suggestion into the discussion at this time is prompted by belief that the criticism of an important group has been directed against the proposed schedule, without apparent recognition of this phase of the problem. Unless it can be clearly shown that the elimination of minor items has actually lessened the correspondence between rate and experience, the advantages of such elimination can not be successfully denied. Such a demonstration has not yet been made, with respect to the 1922 Revision in its present form.

MR. W. W. GREENE:

In the opening paragraph of this paper the authors point out that "even if the present schedule does produce in many instances the correct rate for the individual plant, this is probably due largely to chance, for, while the present schedule has many good points, the fact remains that none of them have been based upon experience. * * * * Therefore, the problem of establishing a new and simplified schedule rating plan was undertaken with the avowed purpose of assigning to accident producing causes charges commensurate with the costs of accidents arising therefrom with due consideration to the industry involved."

The implication naturally drawn is that the new schedule is for the most part the creature of statistics rather than judgment. This is doubtless the present widespread impression regarding the 1922 schedule.

It is true that certain elements in the new schedule have a statistical basis. This holds for the pure premium relating to a

general cause of accident, such as machines or power transmission equipment. The relative hazard of various machines has been determined by a justifiable statistical method, by comparison of the present relative frequency of specified kinds of machines as revealed in current inspection reports, with the pure premiums respectively chargeable to these same types of machines. The standard ratio of machines to operators for each classification, which is involved in the rating procedure, has been determined in a similar manner.

This is perhaps as far as the statistical basis extends. In determining any charge under the new schedule a factor, reflecting the degree to which the hazard is removed by guarding, has been introduced, and in all cases this factor has been determined by engineering judgment; and, as we shall later see, a broad assumption is made as to exposure in the individual risk.

The new schedule has at least the merit of simplicity as it is confined to consideration of elevators, transmission, machine hazard; eye, foot and leg protection; safety organization, first aid, and hospital.

We are told that an analysis of the tabulation of accidents by cause gave rise to the decision that a schedule which included these things "would produce results which would substantially satisfy the function of schedule rating." The causes treated in the new schedule comprise part of five out of fifteen general subdivisions of the Cause Code of the then National Workmen's Compensation Service Bureau. It is to be regretted that more light is not thrown upon the reasons for failure to treat specifically in the schedule causes embracing 64% of the total accident cost.

Protruding set-screws, boilers, electrical equipment, hand rails and toe boards, fly wheels, and a number of our old friends of the schedule are not recognized under the new plan. The general reason for this appears to be that the total cost due to these hazards is slight. We are wondering whether this is sufficient justification for the absolute exclusion of all of these items. Should not a schedule provide means for recognizing a hazard which, although not now generally prevalent, is substantial when it exists? Is it possible that unsafe conditions regarding some of these things will become more prevalent if the schedule overlooks them entirely?

To our mind the biggest question the authors of the new schedule had to face was the determination of a measure for "exposure" to the hazards treated under the schedule.

The greater weight of the schedule is handled by reference to the number of power machines in the plant as the index of exposure. This device is justified in the following language: "A solution to this particular part of the problem presented itself provided that one assumption could be made, namely, that the classification system provided for the grouping of individual risks of sufficient homogeneity that the variation in the ratio of machines to employees in individual plants falling under one classification should not be material enough to jeopardize the validity of the rates produced by the application of the schedule itself founded upon such an assumption."

The function of the schedule is to recognize the difference in character between risks within a class. Does not the assumption of a constant ratio between machines and employees come dangerously near to begging the most fundamental question with which the schedule deals?

In public liability insurance, a flat premium is charged per elevator, per automobile, or per wagon. Every power machine or elevator might by analogy be assessed a flat premium for workmen's compensation insurance. We are not sure, but we think this procedure would be consistent with the underlying theory of Mr. Whitney's paper of some time ago, except perhaps where the number of machines exceeds the number of employees to an unusual degree.

Clearly, one manufacturer who has 100 machines and 100 employees is in different case from another who, manufacturing a similar product, has developed a process requiring only half as many machines for a like number of employees. Yet, as we read the schedule, these two employers will be charged the same pure premium for the machine hazard.

The following tabulation was kindly furnished by Messrs. Lawrence and Healy of the Compensation Rating and Inspection Bureau of New Jersey, illustrating the variability of the machine-employee ratio in two important classifications.

MACHINE SHOP, No. 3632

Employees	Machines	Ratio of Machines to Employees
18	22	1.2
14	24	1.7
105	119	1.1
37	34	.9
50	43	.9
31	36	1.2
20	55	2.8
83	65	.8
16	12	.8
12	15	1.3
10	18	1.8
10	23	2.3
14	27	1.9
12	19	1.6
6	19	3.2
<hr/> Totals 438	<hr/> 531	<hr/> 1.2

CUTLERY MANUFACTURING, No. 3122

Employees	Machines	Ratio of Machines to Employees
174	184	1.1
229	399	1.7
60	58	1.0
15	52	3.5
100	93	.9
32	35	1.1
85	90	1.1
27	109	4.0
428	307	.7
82	93	1.1
40	68	1.7
<hr/> Totals 1272	<hr/> 1488	<hr/> 1.2

These figures indicate that in the machine shop classification the range is from .8 to 3.2 machines per employee, and in cutlery manufacturing from .7 to 4.0. This confirms the impression that the inequity introduced by the assumption of a constant ratio between machines and operators is not slight.

Elevators are accorded corresponding treatment. In other words, one risk with 1,000 employees, 95% of whom are on the ground floor but with one elevator serving the second floor, is charged the same elevator pure premium as another risk in the

same classification where its 1,000 employees are all above the ground floor and accordingly using elevators. Admitting the difficulties of the situation, this result does not seem satisfactory.

Quite likely for administrative reasons we must dismiss the possibility of charging a flat compensation premium per unit of machines, elevators, or transmission. Nevertheless, it seems to us that further consideration should be given to the general problem of basis of exposure. In the old schedule the number of employees was determined by the inspector, for certain purposes. The figures obtained in this way are not entirely accurate, but some way of basing the number of employees on payroll records might perhaps be worked out. In the long run, justice will probably be done if the payroll for the last year shown in the experience rating data is used.

There remains for consideration the so-called "loss cost test" of safety organization. Frankly, we see nothing in this except a duplication of experience rating, and we can see no logic in experience rating the same risk twice.

The foregoing criticisms are submitted with realization of the difficulties attendant upon the task of schedule revision. However, the Society is, we believe, interested in a more complete record of the reasons for some provisions in the schedule which has just been promulgated.

MR. RALPH H. BLANCHARD:

The new schedule which is described in the paper under discussion had its origin in a desire to produce an instrument for merit rating which would emphasize hazard measurement as contrasted with stimulus for accident prevention and which should have as a basis statistics rather than judgment. Naturally the first step was to find a proper structure for the application of statistics to the problem. The structure which has been adopted, so far as it consists of applying the partial pure premium method, seems to be admirably adapted to this purpose.

It is not quite clear to what extent the values assigned to various accident producing causes in the several classifications actually rest on definite statistical evidence. Frequent mention is made of assumptions and of reliance on judgment. It would be useful if the authors would indicate the degree to which the values in-

corporated in the tables of pure premium and of schedule rating factors can be said to rest on ascertained experience. But it seems clear that, whatever may be the present situation, we now have an excellent basis for gathering evidence and for gradually producing correct factors. Inspection reports and statistical records can be developed with this end in view.

It is explained that the weights "W" (weight unguarded) and "G" (weight removed by guarding) used in connection with the rating of points of operation represent a synthesis of engineering judgment. Since the point of operation is, in most industries, the chief accident producing cause running to a pure premium factor of 65% in some, it is especially important that calculations under this item be accurate. It seems pertinent to ask whether these weights lend themselves to correction by statistical methods and, if not, whether any other scheme of determining this portion of the rate presents possibilities of statistical control.

The treatment accorded eye, foot and leg protection is also based on engineering judgment. Will revised methods of collecting data furnish a statistical basis for this section of the schedule?

The credits allowed for safety organizations and for first aid and hospital "find their defence in the portion of accidents which are not assignable to schedule items or physical equipment of any sort." It is stated that "about 60% of the total losses fall in this group." Again, "Whereas it was recognized that the morale factor should be used to measure comparatively the condition of the individual risk against that of the average risk in the classification, it was deemed inadvisable, at the present time, to follow this procedure until more definite information was obtained as to the relative importance of the various items. They will, therefore, be entered in the proposed schedule in the same manner as heretofore,—namely, as a percentage reduction of the manual rate." Mr. Whitney pointed out in his paper read at the May, 1921, meeting of the Society that a revision of the schedule called for the co-operation of actuaries, engineers and statisticians. He also drew a distinction between schedule-ratable and non-schedule-ratable causes of accident. One suspects that a fourth group, the "practical" men, have influenced the retention of schedule rating of the non-schedule-ratable. Is it the opinion of the actuaries and statisticians that these items properly belong in the schedule? What were the reasons for retaining them? Dr.

Downey stated in a paper read before the May, 1918, meeting of the Society that the "factors affecting safety morale, as distinguished from physical safeguards, are legion and for the most part intangible," that "no definite standards can be set up which go to the root of the matter." He believed the measurement of hazard due to such causes to be the special province of experience rating. It seems to me that he was right.

It is apparent that the new schedule represents a great advance in schedule rating methods, particularly since its form is such that, with the development of knowledge, it can be made to reflect more and more accurately statistical experience; and since the items which appear to have no proper place in the schedule can be amputated without disturbing the fundamental structure.

AUTHORS' REVIEW OF DISCUSSIONS

MR. S. B. PERKINS AND MR. R. A. WHEELER:

The criticisms and suggestions contained in the remarks of Messrs. Blanchard, Greene and Young are all well taken. It was early appreciated by the committee which proposed the 1922 Schedule that only a partial step toward placing the schedule upon a sound statistical basis could be made at this time.

In reviewing the above remarks it is appropriate that we should comment upon the statistical limitations of the new schedule. In the first place no attempt was made to allow for the difference in compensation benefits between states because of the labor involved in making such a conversion for each statistical code and classification, and secondly, because the volume of statistical data at our disposal did not justify this refinement. The errors due to inadequate exposure would more than offset those introduced by the combination of statistics without conversion.

Secondly, it was also necessary to resort to a grouping of classifications not only because of the inadequate exposure but also because many of the classifications have not sufficient experience on which to base their own rate.

The process of grouping classifications had the effect of submerging some causes which were not common to all classifications within the group so that their losses, expressed as a percentage of the total, appeared negligible, but which, if expressed as a percentage of the classification experience might have been more ap-

preciable. Even this latter method would not have revealed hazardous causes which only occurred in a few individual risks. Of course, engineering judgment was called upon to supplement the above indications when it came to eliminating items of the old schedule such as Cranes and Electricity.

The losses and exposure data were not correlated in that the losses were taken from the 1919 policy issues and the physical conditions from the 1922 inspection reports. Except for the difference in time this is partially justified by reason that less exposure is required to determine an average physical condition than to determine the hazard. The percentage of hazard removed by guarding was not susceptible to statistical determination not only because there is no provision in the code but also because accident reports do not provide accurate information.

The ratio of machines to operators was assumed constant for groups of classifications and also for the individual risks within the classifications. This assumption was made because of the practical difficulty in applying the schedule where the number of employees and machines, idle and in use, had considerable effect upon the final rate.

Payrolls were also considered by the committee as a basis of exposure but it was felt that the payrolls for any previous period could not be used to represent a twelve months' condition in the future.

Undoubtedly improvements can be made both in the structure and statistical basis of the 1922 schedule. The value of claim analysis statistics was demonstrated thoroughly in the construction of this Schedule. As a result of this demonstration, and probably increasingly so with demonstrations which will undoubtedly be made in the future, more companies will appreciate the need of such information. Central organizations will be convinced of the necessity of calling for and compiling material of this kind, and it does not seem unreasonable to believe that it will be but a comparatively short time before some central organization, probably the National Council on Compensation Insurance, will be requiring all its member companies to file currently accident analyses of all closed cases. Such action cannot be taken too soon to serve the best interests of insurance.

After all, the proof of the pudding is in the eating, and it will not be long before the 1922 Schedule will demonstrate its merits

or shortcomings. It at least possesses the virtue of greater simplicity than the 1918 Schedule. It certainly must be a more economical schedule to administer and, to date, it seems as though the results were more justifiable than the results of the application of the old schedule. It is flexible. It can be modified currently without upsetting the business and it most assuredly places emphasis on the greatest industrial hazard, namely, point of operation. That in itself is an achievement.

SOME ASPECTS OF THE COMPULSORY AUTOMOBILE
INSURANCE MOVEMENT

MORRIS PIKE

VOLUME IX, PAGE 23.

WRITTEN DISCUSSION

MR. A. L. KIRKPATRICK:

The tremendous expansion of the automobile industry has brought about the condition where an automobile is within the means of the vast majority of persons. It has come to be regarded not only as a convenience but in many respects a thing of actual necessity in the conduct of business. Nearly every person has come to feel that he has to have an automobile. It is regarded as being more important to him than owning a home or any other property.

There are innumerable owners of automobiles who have no other means, and even the car which they drive is heavily mortgaged. It is just these persons, who have no assets, who are inclined to be the most reckless in their regard for the life and property of others. They have never learned the value of property ownership nor the lessons which come from careful saving. They do not know the value or the necessity for carrying any form of liability and property damage insurance and, as a matter of fact, they have no need for such insurance since they are already proof against any judgment. It is against such persons as these that the movement in favor of compulsory liability insurance for automobile owners has developed. The person of means protects himself by an insurance policy, while the person who has no property against which a judgment could be levied, affords no possible chance of recovery of damages in case of an accident. I have personal knowledge of two cases of death, due to auto-

mobile accidents, where the widows of the deceased were compelled to seek employment in order to live and maintain their families, while the owner of the automobile was able to sit back and laugh because the judgment which had been rendered by the courts could not be collected. These considerations certainly have considerable merit in connection with the compulsory automobile insurance movement.

On the other hand, there are a number of conditions which may result from such a movement and which are worthy of consideration. In the first place, the mere provision for monetary indemnity in cases of accidents does not relieve the public from its duty for the prevention of accidents. The loss which is sustained in the case of personal injuries is one which cannot be compensated by money alone. The burden is still upon the public to put forth every effort toward the eventual elimination, or at least reduction to a minimum, of these accidents.

We are all more or less familiar with the driver of an automobile who takes the attitude that, "I am insured and the insurance company will stand the damages." Such an attitude is a menace to the public safety, and yet, even the most peace-loving persons at times either carelessly or ignorantly take such an attitude. If the mere carrying of a liability insurance policy is going to furnish the automobile owner with such a sense of security from harm because of an accident for which he was responsible, then that policy is injuring public welfare.

From the standpoint of an insurance company it is doubtful if a compulsory law is of benefit to its business. Every company is confronted with the very difficult problem of selecting good risks and rejecting bad ones. So far as human intelligence is able to determine, the best of risks are now insured and the owners who are the greatest menace to public safety are not insured and could not be insured at the rates which are charged for the select class of owners. The wholesale writing of insurance on risks of all kinds by private companies would be a very hazardous undertaking at best, and it is doubtful if any company would be willing to undertake it at any rate. On the other hand, some means of providing insurance for these undesirable drivers would be necessary. It would not be possible for the private carriers to increase all of the insurance rates to such an extent that they could insure good and bad risks alike at a uniform rate. Neither could

they inject a differential rate, based upon the judgment of the individual underwriter as to the good or bad qualities of the risk in question.

It is probable that the actual effect would be to provide ammunition for the exponents of state insurance. If a state insurance fund were established for the writing of automobile insurance, it would, of necessity, be forced to accept all risks which were tendered to it. Under such circumstances, with the private companies selecting the best risks and rejecting the poor ones, the state fund would be a gathering place for all automobile owners who could not get insurance elsewhere. It is hard to imagine the result of such an experiment in liability insurance as this. Certainly the rates charged by the state fund for such a class of risks would have to be considerably higher than the rates of the private companies. Furthermore, it would have to be subject to the same tests of solvency as are applied to the private companies.

The recent passage of the law requiring an automobile liability insurance policy from taxi cab owners in New York City led to the formation of a number of mutual companies for the purpose of carrying this insurance. Already several of these concerns have gone into the hands of receivers. Undoubtedly the general application of such a law to all automobile owners or its extension to other states would be accompanied by a similar movement to organize all kinds of cooperative institutions. The dangers of such a scramble can only be guessed at. It is certain, however, that unless the solvency and stability of these organizations is assured by proper regulation, the result will be disastrous.

MR. EDWIN W. KOPF:

Since Mr. Pike's paper was prepared, later statistics have become available on the use of the motor-car. The 1922 registration of motor vehicles increased to 12,239,000, with a production record in that year of 2,659,000 motor vehicles, an increase of 22 per cent. over the high mark of the year 1920. The wholesale value of complete truck and car output was well above \$1,789,000,000, with an additional value of \$768,000,000 for accessories and tire replacements. Some six billions of gallons of "gas" were produced. The automobile manufacturing industry now stands third in value of products among all industries in the United States.

Accompanying this phenomenal growth of the industry and the use of motor transportation for commercial and domestic use, there was an increase in deaths due to automobile accidents from 12,400 in 1921 to 14,000 in 1922. The automobile killed 38 persons per day in 1922 as compared with 34 per day in Continental United States during 1921.

Unfortunately, American public opinion has not yet caught up with the problems created by this newer element in the business and family life of the nation. Everywhere, there is more or less protest against the rising toll of life taken by the automobile. No city has as yet been able to record satisfactorily for study the automobile accidents and fatalities which occur within its borders. The Statistics Committee of the Public Safety Section, National Safety Council, has drafted a set of record forms which are recommended for use by American cities. Only when current reports are made on the location, nature and results of accidents, will it be possible to outline rational plans for traffic segregation and regulation. The members of this Society should endeavor to have these record forms introduced in their localities, preferably through the local representatives of the National Safety Council.

That the outlook is not so dark as it is painted by some commentators, is indicated by the substantial progress made in certain areas. In Connecticut during 1922, the number of deaths from automobile accidents was 206; in 1921, 235. In Massachusetts, a slight reduction was also effected from 544 deaths in 1921 to 522 in 1922. In Cleveland, Ohio the death-toll was 154 in 1921 and 147 in 1922. Some reduction was achieved in 37 other cities. These few bright spots in the 1922 record show that something *can* be done.

The Statistics Committee of the National Safety Council has under consideration this year the publication of a plan for the study of (a) traffic movement (b) traffic accident occurrence and (c) graphic solutions for some ten typical or key problems of traffic regulation in cities. It is hoped that the general circulation of this plan will enable the smaller cities so to understand their own traffic problems as to put into effect the procedures which have had a beneficial effect upon the fatality record in certain cities.

The present quandary over the automobile in respect of safety

of the person reminds one of the sanitary situation in American cities forty years ago. Then, there were alarmists who said that cities could grow no larger without seriously menacing the health of the inhabitants. There were the same sorts of pessimistic comments made on the probable state of mankind a few years hence; today, we are all afraid of sudden extinction or of permanent incapacity as a result of use either of the automobile or of the highway traversed by it. But, forty years ago, able minds rose to the occasion; the sanitary engineer, the architect and the once humble plumber came to our rescue. In the immediate future, we may hope for distinct relief of the prevailing situation through the work of the traffic engineer, the city-planner, the patrolmen,—and the tax-payer. No important forward step in the promotion of human welfare is ever taken as a result of immediate recognition of a new menace to safety. In the "good old days" we had to have typhoid fever epidemics time and time again before sanitary sewerage systems and clean, disinfected water supplies were installed. Right now we are in the "indignation" stage of our effort to adapt ourselves to the automobile. Shortly, through the genius of a few traffic students, and the persuasive effect of a rising accident death rate, we shall probably gain as complete control over automobile accidents and fatalities as we have over diseases which formerly prevailed because we huddled into cities without first having provided the facilities which guarded us from transmissible disease.

MR. ROBERT RIEGEL:

The earlier part of Mr. Pike's very excellent paper quite properly emphasized the magnitude of the deaths and injuries caused by the automobile. I believe the figures he gives to be rather an underestimate of the true situation, for two reasons. The mortalities from automobile accidents shown by the Metropolitan Life Insurance Company industrial policyholders from 1911 to 1919 are quite consistently higher than the fatalities given in Mr. Pike's table. The figure for 1921 is 119 per million population, as compared with Mr. Pike's quoted estimate of 117, and the annually increasing discrepancy between these two sets of figures leads one to the conclusion that such accidents are inadequately reported. Mr. Pike's quoted figures are based upon a broader exposure, of

course, than the Metropolitan figures. Secondly, the established rules of many vital statistics offices charge deaths by collision to the heavier vehicle. If the deaths resulting from collisions between automobiles and locomotives and trolley cars were charged to automobiles, as most of them properly should be, the death-rate from the automobile might be increased by six per cent., and the fatality rate for 1922 would then be 143 per million population. This is no criticism of the use of the figures, of course, and merely points out that they are probably not exaggerations.

The second part of this paper deals with the prevention of accidents and summarizing the suggestions they are: (1) Requiring an examination for a license and re-examinations from time to time; (2) Examining the condition of automobiles; (3) The promulgation of good traffic regulations. Considering that three hundred thousand licenses are issued in a large state, of which at least 30 thousand are for new cars, I think it is apparent that a tremendous increase in governmental expenditure and personnel would be required to periodically examine drivers. I also think that, for many obvious reasons, the examination of the condition of automobiles is a tremendous proposition to undertake. Furthermore, we do not know to what extent the condition of automobiles is a cause of automobile accidents. From personal observation alone I should think it a negligible factor. As regards traffic regulations I think we would all agree that what is wanted is enforcement and the real problem is how to obtain that enforcement. I have two suggestions to make in that connection. One is that practically all police, except traffic officers, be provided with motorcycles. I believe that the day of the policeman on foot is gone forever, because he is too greatly handicapped in comparison with the lawbreaker. Secondly, the system employed in New Jersey of punching the license cards for offences against traffic laws is a very practical method of detecting the chronic careless or reckless driver. A card with a number of punches is very definite evidence to the policeman that the person he has apprehended is a frequent offender. But, finally, our knowledge of automobile accidents is very limited at the present time. No studies of any consequence have been made of the causes of automobile accidents, and until we know something of the causes we can hardly proceed intelligently to devise a remedy. I understand that the National Association

proposes to make an investigation of this character and I think that perhaps this Society might also suggest the propriety of such a study to the proper city officials, so as to include the uninsured cases as well.

Finally, there is the very debatable question of compulsory insurance. From the standpoint of the injured person or the deceased's relatives there is no doubt that some method of guaranteeing compensation should be introduced. In this connection, however, I might say in passing that I believe some of the laws proposed to be inadequate. Take, for instance, the provision permitting personal surety in lieu of insurance. But the provision of compensation for the killed and injured carries with it serious considerations from the standpoint of the automobile owner and the public. There is, in the first place, the very grave question of whether protection would tend to make drivers reckless. Personally, I do not think so, for several reasons. (1) I believe that, crudely speaking, at the present time the careful person is the one who insures. I do not believe that handing an individual an insurance policy changes his nature. The possession of an insurance policy is a symptom, not a cause. (2) I think that the inclusion of a deductible average clause in every policy, requiring the individual to bear, say \$200 of any loss himself, and a law giving the injured party a first lien on the car, would eliminate the last vestige of such a possibility.

The most serious objection to compulsory insurance is the fact that the careful driver's insurance premium would be increased to take care of the extra hazard introduced by the careless individual who must be insured. How it is possible to avoid this, except by some merit system of rating, I do not see; and on the other hand I must confess my inability to perceive any practicable system of merit rating for automobiles. It is true that if insurance premiums were increased the interest of automobile drivers in safety would be stimulated, which might lead to some reforms; but this result I think is very problematical. If, however, the increase in rates due to the increased hazard could be offset by a reduction in the expense element of the automobile insurance business, the burden would not be felt quite so much by the automobile owner.

If matters continue as at present, without some extraordinary safety educational program on the part of the sane and conserva-

tive automobile drivers, there is only one feasible solution of the accident problem, obnoxious though it may be to automobile owners and objectionable though it appears in other ways, and that is to prohibit the manufacture of automobiles having the capacity to attain a speed greater than 25 miles an hour.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. M. PIKE:

In his interesting discussion, Professor Riegel calls attention to the difference in the number of automobile fatalities as revealed in the records of the Industrial Department of the Metropolitan Life Insurance Company and those contained in Dr. Crum's pamphlet on "Automobile Fatalities" which was quoted in the paper under review. A comparison of the figures presented in the paper with those given on page 234 of Volume VIII of the *Proceedings*, where Messrs. Dublin & Kopf review the experience of the Metropolitan, discloses that the latter has in recent years been showing results which contained from one to fourteen deaths more per million of their respective units. Thus, for 1922, the National Bureau of Casualty and Surety Underwriters, from a study along the lines pursued by Dr. Crum computed a country-wide automobile fatality rate of 129 per million of population while the records of the Metropolitan's Industrial Department indicated a rate of 135 per million of policyholders. It is, however, problematical whether the Metropolitan's figures more accurately portray the nation's death rate from automobile accidents than do the figures computed from the experience in the U. S. Registration Area. Not only is the Metropolitan's exposure the smaller of the two, but if, as is claimed, an appreciable distinction exists between insured and uninsured lives with respect to their ownership of automobiles and therefore with respect to their probability of meeting with automobile accidents, the Metropolitan's experience appears the less representative. The latter point is more fully discussed in Mr. B. D. Flynn's discussion of the Metropolitan's experience on pages 112-113 of Volume IX of the *Proceedings*.

On the subject of accident prevention Professor Riegel apparently questions the necessity and practicability of thoroughly examining and periodically re-examining applicants for driving

licenses and their vehicles, fearing the increased expenses entailed by such investigations. In this connection the local Police Department records for 1922 contain the following information as to the causes of death or injury from vehicular accidents on New York City highways:

Cause	Number Killed or Injured
Defect in pavement.....	170 persons
Defect in vehicle.....	385 "
Fault of driver.....	3,138 "
Fault of person hurt.....	2,781 "
Stealing ride.....	578 "
Crossing street not at crossing.....	6,168 "
Other causes.....	1,726 "
Unknown.....	14,115 "
	<hr/> 29,061 "

Thus, of the 14,946 people the cause of whose death or injury could be determined, 41% were hurt because of "jay-walking," 21% because of careless driving and 3% because of defects in the vehicles.

So far as the wisdom of examining candidates for licenses is concerned it should also be recalled that the question of moral hazard appears to be the stumbling block of automobile underwriting. Insurance companies are now able to keep informed on a candidate's claim record. Some have even undertaken to inspect both the prospective policyholder and his vehicle. It remains for the public authorities, however, to pass upon the trustworthiness of the candidate for the driver's license regardless of whether or not he will ever apply for insurance.

With regard to the inspection of vehicles, reference should be made to the labors of the recently organized Bureau of Public Safety of the New York City Police Department. Members of this bureau have been delegated to make running tests of the automobiles used in the city with the result that defective brakes and steering wheels are being detected and ordered corrected at the rate of about two hundred a month.

In the field of traffic regulation, the local authorities have sought to reduce accidents by stressing the necessity of exercising care on the streets and highways. For 1923, Public Safety Day happened to coincide with the date of the Society's meeting (May 25). Those who were present at the time probably recall the deafening din that was caused by the blowing of sirens.

automobile horns, factory and steamship whistles when the clock showed 2.59 P. M. Statistics available to the local authorities have indicated that the hour of dismissal from school holds the greatest danger to children who in 1922 accounted for four hundred and seventy-seven of the nine hundred and sixty-four lives that were lost in vehicular accidents in New York City. Similar demonstrations greeted the arrival of 2.59 P. M. for the ensuing month. Thus besides its annual "Safety Week" New York City has recognized the necessity of a "Safety Day," a "Safety Hour" and a number of "Safety Minutes." And, if the truth be told, it is not enough that attention be given intermittently to thoughts of safety only at specified intervals. What is needed is the training that will instill habits of thinking and acting safely every second of the live-long day.

On the legislative side, the states of Michigan, Ohio and Rhode Island should now be added to the ten states that were listed in the paper under discussion as having enacted compulsory automobile insurance laws.

The discussions of Messrs. Kopf & Kirkpatrick cast additional light on the causes of the compulsory automobile insurance movement and on some of its attendant features.

The note of optimism struck by Mr. Kopf in citing the decrease in the number of deaths by automobiles noted during 1922 in Connecticut, Massachusetts and thirty-eight cities, is also reflected in the experience in New York City during the first half of 1923. Statistics issued by the Bureau of Public Safety of the local Police Department, reveal four hundred and fifty-four deaths by automobiles in New York City during the first six months of 1923 against four hundred and fifty-eight deaths for the same period in 1922 in spite of the increase in the number of automobiles used in the city from about 270,000 to 315,000. It is apparent though, that there still is room for considerable improvement in this direction.

THE ALLOCATION OF ADMINISTRATION EXPENSES BY LINES FOR
CASUALTY INSURANCE COMPANIES

ROBERT S. HULL

VOLUME IX, PAGE 38.

WRITTEN DISCUSSION

MR. H. O. VAN TUYL:

Mr. Hull's paper on the allocation of expenses by lines of insurance is timely. With the increasing interest in rating matters and the demand on the part of the public that rates be made on a scientific basis it becomes increasingly necessary to determine accurately the expense element for each line of insurance as well as the element of losses. Heretofore, in making rates the percentages of the premium estimated to be needed for expenses have been determined on the basis of very inadequate data.

The need of a proper division by lines of the expense of securing business is likewise very evident since the observance by the companies of the new rules covering acquisition and field supervision cost recently adopted by the stock casualty companies can be determined only from a proper analysis of such expenses. Where these expenses consist of commissions, the allocation is automatic but as to those other expenses reported on the disbursements page of the convention blank as "salaries, traveling and all other expenses of branch office employees and agents not paid by commission" a split must be made. An allocation of such expenses to lines in proportion to premiums written or collected is unsatisfactory. A closer analysis based on the time actually spent in solicitation and supervision in the various lines is required to produce really dependable returns.

One reason why companies generally have not heretofore analyzed their expenses by lines has been that state departments have not required such an analysis. However, it is expected that in the near future there will be required on the part of one or more state insurance departments, an analysis by lines of total production expenses. Such analysis will also probably be required for administrative expenses as well. By combining the returns of all companies it should be possible to arrive at more dependable data than has heretofore been available covering the cost of each element of expense.

A scientific method of expense analysis by lines is one that represents applied common sense. The most important element in administrative expense is represented by the remuneration of employees. Generally speaking, all other expenses such as rent and miscellaneous office expenses can be divided on the same basis as is applicable to salaries. The establishment of proper pro-rates for salaries is, therefore, the main problem and a variety of units are suggested by Mr. Hull as a basis for determining this split.

The principles outlined and the various methods suggested are believed to be not only sound but capable of practical application. It should be remembered, however, that a search for an absolutely accurate split of expenses might lead one to an unreasonable degree of refinement. Here the element of common sense must come into play and aid in finding the happy medium between makeshift and crude methods on the one hand and over refinement on the other. One danger to be pointed out is that a system of pro-rates once established must not be allowed to continue in use after conditions which existed when the pro-rates were established have changed. An annual revision at least should be made. It is advisable that the responsibility for the cost analysis be centralized and that care be exercised in making sure that changes made in the system are in harmony with the underlying principles of it.

The suggestion that the expenditure for furniture and fixtures be pro-rated among the various lines of business without regard to what department is actually to use the new equipment, is believed to be entirely feasible. This leads one, however, to the further thought that the purchase of new equipment when a new casualty company is organized throws upon that one year, an excessive share of that expense. Of course, the only alternative would be some method whereby the depreciation only in equipment should be charged against each year's transactions. This difficulty is of particular consequence, however, only at the beginning of a company's operations or when its business is expanding very rapidly.

The application of cost accounting principles in the analysis of casualty company expenses is a development greatly to be desired. Each company that makes such careful analysis of its expenditures has the satisfaction of knowing just what its costs are in each line. General agreement upon basic principles and the application of sound methods will go far toward producing results of uniform accuracy and value.

MR. JOSEPH FROGGATT:

When I was asked by Mr. Michelbacher to discuss the paper on "The Allocation of Administrative Expense by Lines for Casualty Insurance Companies," which was presented at the last meeting of the Society by Mr. Robert S. Hull, I accepted the invitation because of the fact that this matter has been one discussed innumerable times with Company Officials, Accountants and Statisticians, and from these discussions I have come to the conclusion that the opinions with reference to the proper method of making this distribution are as numerous and varied as the expenses under discussion.

The paper written by Mr. Hull suggests a general outline for the solution of this problem, which should receive our very careful and thoughtful consideration. We may not agree with him in every particular but he gives us an outline for discussion and a foundation on which it would be possible to build a system which would provide for the proper distribution of these expenses by lines of business.

I note that Mr. Hull's paper is confined to casualty companies. Consideration would have to be given in devising a system of this character to the fact that perhaps a majority of casualty companies also write fidelity and surety bonds, but the system which will apply in its general principles to the casualty business will also apply to the Fidelity and Surety Departments, as all of the departments have to be taken up as separate units.

As I have heretofore stated this matter has been under discussion for years by a great many companies and I believe some of them have given up the hope of arriving at an accurate allocation by lines and after attempting the matter for a few years have almost despaired of arriving at a proper solution of this vexing problem.

The general introduction by Mr. Hull refers to the use of cost systems in connection with manufacturing lines of business and it is true that while there are some manufacturers who know very little about their costs and, in fact, may know less than is known by some insurance companies, yet there has been a great improvement by the introduction of cost systems in manufacturing concerns, and there is to be found in almost all manufacturing companies doing an important business a fairly well devised cost system. I agree with Mr. Hull that it is just as necessary to

know costs in insurance business as in manufacturing lines of business.

Generally speaking I agree with Mr. Hull as to the general principles involved and the general outline as presented by him with, of course, the understanding in all of this that the matter would have to be discussed by a representative body of accountants and statisticians of the companies in order that the general plan could be clarified and a uniform method determined upon.

There is one feature which does not appear to have received attention and which would have a material effect upon this distribution. I refer to the fact that a considerable volume of business is written by general agencies and branch offices, in which cases practically all of the policies are written at the general agencies and branch offices, the Home Office having saved the expense of inspections, typing of policies, and, in some cases, the expense of underwriting. There is also a curtailment of the detail of accounting because of the system of handling business by some companies through its branch offices and general agencies. In some instances salaries are paid, while in other arrangements the entire cost may be treated as part of the acquisition cost. This would be a matter which would have to be taken into consideration in this allocation of expenses by lines and is one of the most perplexing features of the entire matter.

The question of the distribution of executives' salaries is one which cannot be treated under any particular and specific rule as, in some instances, the President of a company may be almost entirely a "claim" man while in other companies his services may be devoted almost entirely to investments, while in others entirely to underwriting of some particular line. The general principle, however, is not affected by this, but in each company these peculiar situations would, of necessity, have to be given very careful consideration.

I think the question of dealing with the distribution of these expenses in any instance with relation to volume of business is likely to lead to trouble. I believe the safer and more equitable way would be to treat the distribution according to the number of items handled. It doesn't take any longer to handle a premium of \$5,000.00 than it does to handle a premium of \$25.00, except that in one case you might have reinsurance in connection with it while in the other you would not have this additional work.

Nevertheless, through practically all of the other departments the \$5,000.00 premium would be handled with about the same amount of labor as the \$25.00 premium so that a distribution by premiums to my mind would be misleading. I am glad to note that Mr. Hull refers to this in the paragraph relating to the Premium Accounting Division and to the Statistical Division.

There is quite a good deal in favor of the system suggested as to the distribution of the general charges remaining after all charges which it is possible to dispose of have been treated in the system provided for the direct allocation, and I am rather inclined to believe with Mr. Hull that the best method of doing this is to treat the unassigned charge as a percentage overhead to the directly assigned charges; that is, to distribute them in the same ratio as the total of the assigned items. Any distribution by volume of business, I believe, would work a hardship on some Departments, but, of course, this is a matter for very detailed discussion, and the solution can only be arrived at, in my opinion, after considering the whole question from all angles at meetings of the Company accountants and statisticians as previously referred to.

Reference is made to inspections, traveling expenses and salaries of field men. I believe most companies have an account form whereby all of the time and also the expenses are shown in separate columns and allocated to the particular line of business handled by the field man. This seems to me to be a very practical way of solving these particular items of expense.

If any consideration is given to the distribution of administrative expenses on a basis of premium writings, thought should be given with regard to automobile liability, property damage and collision, as a division of these automobile coverages would seem to be necessary and advisable, although, of course, we all recognize that the property damage and collision features are always covered by endorsements attached to the liability policies.

I was glad to note the reference made by Mr. Hull to the Furniture and Fixture item, and the suggestion of carrying this item as an Asset and charging off the amount through Depreciation Account and distributing this expense by Departments is, in my opinion, a proper method. The fact that Insurance Departments do not allow this item as an asset need have no bearing on the methods employed by the companies in arriving at their results

by lines. The Annual Statements to Insurance Departments can be made in the usual way but the statistics of the company can be treated in accordance with the method as outlined by Mr. Hull and which would certainly work out far more satisfactorily than any method which provides for the charging of such purchases immediately to Expense Account.

The paper written by Mr. Hull has outlined in a very logical manner this entire subject and I believe a discussion of it to be of material benefit and would enable us to arrive at some concrete results. It would, of necessity, have to be done through meetings called for this special purpose and be handled by a Committee which shall make this subject a special study and eventually report to this Society the general plan evolved as a result of such meetings.

MR. CHARLES E. WOODMAN:

The installation of cost systems has been delayed in many instances by unfortunate experiences with or reports of systems which were too involved and elaborate to operate economically or even accurately, without constant supervision by the installers. There is no question but what any business should know the cost of what it sells. The only point debatable is how shall the cost be ascertained.

I feel it is quite necessary to call to your attention Mr. Hull's statement that "It is not intended in this article to lay out plans for a cost system, but rather to offer some suggestion on expense allocation which may be applied in such detail as may be advisable to accounting systems now in use."

The accounting systems in most insurance companies have been very largely influenced by the items of income, disbursements, assets and liabilities required in the Convention Form of Annual Statements. It being necessary to file your statements on these forms, the accounts have been maintained so that a Trial Balance gave as many of the items called for as possible or at any rate practical. In this Convention Form there are 66 sources of income, 130 classes of disbursements and 109 kinds of assets and liabilities. It would seem to be very difficult to so formulate your records as to further separate these expenses by lines of business, and I do not believe Mr. Hull so intended. The maintaining of a cost system would, therefore, seem to necessitate a

separate set of records. These might perhaps be subsidiary, the charge against each department being entered in these records and the total of the item being posted in the general books. This would operate very satisfactorily provided we follow true formulas for the distribution.

Mr. Hull has chosen as the general heads under which insurance expenses fall the following:

1. Acquisition
 - (a) Commissions
 - (b) Other Acquisition
2. Administration
 - (a) Underwriting and Recording
 - (b) Statistical and General Accounting
 - (c) General Administration
 - (d) Investments
3. Service
 - (a) Inspections
 - (b) Loss Expense
4. Taxes

While the matter of acquisition expenses is receiving a good deal of attention, perhaps we will not derive much aid therefrom, for our cost account. Commissions and brokerage are easily ascertained and in fact are reported by lines of business.

What are we to do with expenses of special agents and branch offices? Are we to distribute a special agent's salary and expenses over all lines equally, only on lines which he is developing or on the business produced? How are we to distribute branch office expenses other than claim, audit and inspection? You have almost as difficult a problem in each branch office as you have at the head office and probably no two are alike.

As to the division of the office force into groups, it is probable that the departments have been organized and work assigned on the principle of economy and a cost accounting system will not disturb such arrangements, but will attempt to secure its data without handicapping the work. Each company will have its system and therefore it is unnecessary to discuss any plan but devote our attention to the units of measurements which I will treat in the order presented by Mr. Hull.

Mail Registration and Correspondence Files costs are to be distributed to lines by rates of number of items, for each line to

total all lines. Of course all expenses of these departments are to be considered and we have not so far discussed apportioning some general expenses to departments.

Mr. Hull's suggestions for cost charges for experience work seems correct as to principle but probably too involved to be practical.

The balance of page 42 I am unable to understand. Reference is made to employees, floor space, furniture, stationery, etc., chargeable to the department as a whole. I had assumed that all charges against these departments were included prior to the prorating against the different lines of insurance. Again Mr. Hull mentions a subdivision of a rent charge according to the percentage of the division of clerical salaries in each department. As a basis for the distribution of a rent charge, I know of no substitute for useable floor space.

The proposal to establish weights in the Compensation and Liability Underwriting Departments which will represent the relative time required to handle the average proposal for each class of business by means of tests, I do not believe would operate as satisfactorily as dividing the total cost of the department for any period selected on the ratio of number of risks written in each line to the total number written. If it is contended that the work entailed in underwriting some line is much greater than others, the additional cost will be thus developed.

The proposal to distribute the Automobile Underwriting Department expenses between Liability, Property Damage and Collision on a ratio determined from volume of premium seems in error. The cost is the same irrespective of amount of premium except for the additional ink used for the larger premium. The proper apportionment is based on the number of coverages.

Mr. Hull suggests the division of the expenses of the Premium Accounting and Statistical Department on number of paid premiums. It would generally be much easier to determine the number of premium charges by lines and this would probably be satisfactory for the distribution of the expenses of the Premium Accounting Division.

As to the distribution of the Statistical Department expenses great care should be taken to eliminate from a general distribution any clerks or expenses which while under the supervision of the Statistician or quartered in his department are engaged in work

not applying to all departments. Such costs should be treated separately, and the general or expenses applying to all lines distributed on ratio developed from number of items, this to include written, cancelled, reinsurance but excluding losses, etc. It will be necessary to separate the expenses in connection with losses from the expenses in connection with premiums as the expenses in connection with losses should be treated separately.

In all companies there are the internal service departments and a proper distribution of the cost of these departments can not be outlined except very generally. Mr. Hull's method appears proper.

As to the general charges which would be items such as executives' salaries and their secretaries, rental and other charges, I would choose an equal distribution amongst lines rather than a division based on volume of premium income but perhaps a fairer method than either of these would be on the basis of number of risks written by each department to total risks written. The General Accounting Department expenses could also be distributed on this basis, and the audit department amongst lines subject to audit.

Investment expenses I believe had better be applied against investment income and no attempt made to distribute to departments. The investments will represent more funds than the total reserves and all investments usually produce income and are chargeable with expenses. It would be only logical to credit each line with its proportion of the investment income and this could be done by applying the average rate of income on investments to the mean reserve.

A proper distribution between the various lines of the expenses of the Payroll Audit Department is a difficult matter. I agree with Mr. Hull that any apportionment based on volume of premium is incorrect. I do not know as we would be far afield in distributing on number of audits made. While there is little additional expense in a concurrent audit, can we say which line was the primary and which the secondary. Under the plan both lines secure a reduced expense. There is, of course, a greater expense on an audit taking a day than one taking half a day, but unless there is nothing but the Auditor's salary involved the difference is slight. Many things enter into the cost of an audit and we would have to get an exact cost on each audit to arrive at a true figure for each line.

The method of apportioning inspection costs is especially favorable due to the forms of reports submitted by inspectors.

The suggestion of applying time test to establish weights for some of the units of work would probably be found to produce misleading results unless a sufficient period were taken and every feature of the cost considered. I would prefer to determine the cost by taking the number of applications or risks recorded during a month and dividing this number into the total cost chargeable against this line of business. This would develop the underwriting cost. As to the cost of handling losses generally referred to as unallocated loss expense, this can be included with the loss ratio as it is necessary to maintain a claim department even though the loss payments are negligible. This unallocated loss expense is a distinct subject from underwriting expenses and should be measured against the allocated loss and loss expense payments. The subject will require as careful treatment as the underwriting expenses.

On the items of expense for traveling, furniture and fixtures, stationery and supplies, we will have many problems. Traveling will have to be analyzed to determine the purpose of the trip and whether it is chargeable to a department or comes under the general overhead expenses. Furniture and fixtures while not considered by Insurance Departments as an asset should if possible be distributed over a period. Stationery and supplies in most instances can be charged either to a department or if for general use such as correspondence to overhead.

As a general resume of the subject, I would offer the following suggestions for the distribution of costs.

The rent charges plus charges for porters and artificial light can be distributed by lines at a charge per square foot for space used, by determining the cost per square foot of useable floor space (eliminate hall space, wash rooms and perhaps executive rooms) and dividing remainder into total rental, light bills and porter charges. It may be that some less aggressive superintendent has not secured as good natural light for his department as others and in such event, we can consider the abnormal artificial light charge as an offset to claim for sub-normal rental charges.

Salaries can be distributed by departments, in most instances, the balance being charged to overhead for later distribution;

all expenses of departments serving all lines will be distributed on number of items for each line to total, or if serving only some lines by ratio of items in each line to total of all lines served.

Agents' licenses, auditors', directors' or trustee's fees, legal expenses, Insurance Department expenses and general traveling might reasonably be distributed equally by lines.

Express, telephone, telegraph, postage (excluding any of these expenses in connection with losses) can be distributed by number of risks written during period on each line.

Stationery and supplies by lines using the stationery or supplies where known and for the balance distributed on ratio based on number of risks written.

State taxes on premiums on amount of premiums written.

Furniture and Fixtures by charging $1/8$ or $1/10$ of inventory of each department or line and in instances where department serves all lines prorating the annual charge on same basis as other items.

There are other items but the comments on those mentioned are sufficient to indicate the many features which would require careful analysis and treatment.

It would seem that it would be less expensive to determine the costs by a periodical investigation than by maintaining a cost system. Many of the ratios and principles used in the first apportioning of cost could be used at subsequent periods.

Finally I believe that one of the greatest benefits to be derived from such a tabulation or determination of costs would be the cost per risk of the different lines underwritten.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. ROBERT S. HULL:

The discussions submitted touch very interestingly on a number of the points made in the original paper. These comments fall generally into three classes: points which are discussed and amplified without any essential disagreement, including some things that seem not to have been made clear in the paper; points on which there is apparent disagreement probably due to differences in office organization or accounting methods; and points on which there is disagreement in principle. The first class need be touched, if at all, only briefly; the second cannot be developed in much detail within the limits of this discussion but must wait the attention of such a gathering of Accountants and Statisticians as Mr.

Froggatt suggests; but the third will occupy most of the space now at the writer's disposal.

Mr. Froggatt speaks of the complications introduced by the practice of writing some classes of policies and performing certain other essentially administrative work at branch offices or general agencies. One of the essentials of the proposed system is that the division of the expenses of each department shall be according to the volume of work actually handled in that department, i. e., the cost of home office policy writing would be divided in proportion to the policies written at the home office. As Mr. Froggatt suggests, the allocation of such expenses when handled in branch offices is a most perplexing feature of expense allocation, but the original discussion was confined to Home Office expenses, partly because the branch office system is not in very general use and partly because the same general principles outlined for the home office can be applied to branch offices. Owing to the difficulties of analyzing each branch office in detail, it will probably be best to select a few typical branches for intensive study and to derive from these a system of weights which can be applied either to the number of policies issued or to the premium volume by lines of insurance for each of the Company's branches, and to divide the expenses of each branch on the basis of these weighted figures. While the resulting figures might be subject to criticism as to particular branch offices, the total results should not be far wrong.

Mr. Woodman also raises the question of branch office expenses and throws in the question of special agents (or field assistants as we must now call them). There are several interesting possibilities, but the writer has to own that he has no definite solution to offer. If the function of the field assistant is primarily to organize the territory to produce business in all lines, a division based on premium volume would seem a fair one, or possibly a division based on new premiums. If he is chiefly engaged in developing and supporting the lines which the average agent finds it difficult to write, his expenses should logically be charged to these lines. The records for the branch office or territorial division may show the amount of premiums in each line which have been written with the aid of field assistants and this would seem to be a reasonable basis for dividing their salaries. Possibly 50% of the field assistants' salaries could be divided on total premiums written and 50% on business written by them.

Of course, as Mr. Woodman says, the primary division of the rent charge, including light, janitor service and other space charges must be based on floor space. The further divisions suggested by the writer would apply only within a department or work group handling more than one line of insurance when the floor space used was common to the several lines handled.

Mr. Woodman proposes a division of underwriting cost based on the actual number of policies written in each line, instead of attempting to weight the different classes of business to allow for the differences between lines in the time and attention required for underwriting the average policy. In spite of the difficulties involved in determining an approximately correct weighting for the various lines, it would seem that even a rough approximation would be better than no weighting at all. There are some minor liability forms carrying low premiums which will pass through the underwriter's hands very rapidly, which would show a prohibitively high expense if saddled with the cost of underwriting the average policy of all forms. A study of this matter may point to the necessity for handling some low premium forms in a much simpler and less expensive way than has been the custom.

Mr. Woodman's suggestion that Automobile underwriting expense should be divided on the basis of number of coverages presents a decided practical disadvantage in the disproportionate burden of expense, considered as a percentage of the premium, thrown against Property Damage. Moreover, this method seems to the writer no better in theory than a division on a premium basis; wherein the automobile business differs from most other forms. As Mr. Froggatt points out, the Automobile Liability is the basic coverage which must be written before Property Damage or Collision can be added. When these are added they are covered by the same policy at practically no additional expense in the underwriting or issuing of the policy. The additional coverage increases the volume of premium but not the cost of issue. If, to a \$40.00 auto liability premium, a \$15.00 property damage premium is added under the same policy, it seems reasonable that the expense charge against the \$15.00 premium for issuing the policy should be 27% rather than 50% of the total. When it comes to the premium accounting and statistical departments on the other hand, the cost of handling the property damage premium will be the same as for the liability and should be charged accordingly.

OBSERVATION OF THE TREND OF WAGES AND EMPLOYMENT
BY PAYROLL AUDIT DATA

W. J. CONSTABLE

VOLUME IX, PAGE 51.

WRITTEN DISCUSSION

MR. CHARLES G. SMITH:

Mr. Constable's paper deals with a subject which has so far only been touched upon incidentally, if at all, in the Proceedings. He describes the methods developed by the National Council in its endeavor to substitute facts for appearances with reference to wage levels and their trend.

My first impression from Mr. Constable's paper is an additional emphasis on the unfortunate circumstance that in workmen's compensation insurance and certain other less important lines, we seem to be eternally bound to a standard of measurement which is in itself a variable, and subject to many conflicting influences.

Not only does our measuring device vary continually in time, but at any given instant, having eliminated the time element, the device is still a variable; e. g., it varies by industry, sex, age, occupation, locality, labor conditions, wage schemes, etc., to mention a few factors at random. So that in any event we must recognize that our standard of measurement is not only variable, but that it is not even a single variable—it is rather a distribution or bundle of variables, whose make-up depends on many factors which are often unknown, often incapable of accurate measurement, and often of uncertain effect and weight with relation to the wage distribution itself.

One is almost forced to inquire whether we are forever committed to this unsatisfactory measuring device.

The same question may be framed differently. How long will the public continue to expect us to express the resultant of so many independent variables by means of a one-dimension constant—i. e., the manual rate? Is this not such an expectation of the impossible as would stagger Einstein himself?

The plan adopted by the National Council deserves a great deal of credit, as an endeavor to compile a body of information which will in some degree reduce the arbitrary assumptions

which have to be made. But it seems to me that the possibilities of this plan are limited. The payroll auditor, before filling out the blank, has discarded all information except the number of employees and the total weekly wages, allocated to classifications. So that when the information is assembled, we have nothing but the *trend* of *average* wages by classifications.

The distribution has already been lost. Of course a distribution based on information from other sources can be estimated, but I believe that a wage distribution derived from cases where awards have been made will in a given plant of any size, or in an industry, show a consistent discrepancy when compared with an actual distribution as derived from the payroll records. In other words, the employees suffering injuries and obtaining awards will probably not represent a random sample of the wage distribution, because accident rates will not be constant among all employees regardless of distribution by wage levels.

It has not been stated what proportion of the business in any state or region is represented by the returns; in any event, they seem to be extremely meagre. Perhaps an investigation of the reasons for failure to report would throw light on the credibility of the returns and also upon the probability of obtaining useful information in the future under this plan.

It seems to me that the plan is inherently defective in that the returns are so subdivided—by months of expiration and classifications—that the necessary combinations are not homogeneous as to time, which circumstance may tend to obscure the results. The expirations of each month are a different group and we never get a cross-section of the business as a whole at a particular date. Consequently, in order to relate the results to any given date, arbitrary assumptions have to be made which lay the conclusions open to question.

It occurs to me that it might be worth while to try the experiment of having the payroll under each policy reported for four separate weeks—the first and last weeks, as now, and also the first and middle weeks of the calendar year (or some other suitable fixed dates, six months apart). In this way, every policy reported would make its contribution to the cross-section, thus building up a much more reliable fund of information bearing on this point. I doubt whether the labor involved would be seriously increased.

I believe the presentation of the results could be somewhat improved by adding a total line to combine the figures for all months. For example, a notice dated April 13, 1923, gives number of employees, weekly payroll and average earnings for each month (except December) in 1921 and 1922, but no totals for the eleven months.

I am somewhat skeptical as to the value of the returns as a measure the amount of employment or unemployment—partly for the reasons given above, and partly because of the automatic exclusion from the returns of all information where either the initial or the final week is not reported. Consequently, all plants which began work or which discontinued during the period will be disregarded.

The treatment of seasonal industries does not seem to have been worked out satisfactorily as yet, to judge from the instructions. It would be interesting to learn whether any important information has been developed in this field, and whether the prescribed method is regarded as satisfactory.

I do not know how many dozens of agencies are collecting wage statistics for various purposes. The National Council is only one such agency. Possibly a systematic exchange of information and methods among such bodies would throw light on the fundamental problem.

A research job along the following lines suggests itself. Some such agency could select a fairly homogeneous industry, completely and efficiently organized, and co-operate in a joint laboratory investigation into wage rates and trends, so planned as to be of value for insurance and other purposes, and to serve as a model or starting point for similar work in other industries. I believe the results of such an investigation would more than repay the cost; besides, there is a possibility of throwing some light on the question of an ultimate substitute for payrolls as a basis for workmen's compensation rates.

In conclusion, I believe the plan cannot yet be said to have produced practical results commensurate with the cost of obtaining the information.

The paper is marred by two errors in spelling of a character which is peculiarly unfortunate in a scientific publication.

The above discussion was written prior to the announcement that the wage statistics plan had been abandoned.

MR. L. W. HATCH:

In view of the announcement yesterday (May 24) that the National Council on Compensation Insurance had discontinued, on recommendation of a special conference on the subject, the statistical plan which Mr. Constable's paper sets forth, it seems a bit superfluous to proceed with further discussion of that plan. However, since what I had in mind to say relates to an aspect of the matter which is not referred to in the announcement of reasons for discontinuing the plan, and which it may perhaps be worth while to record for consideration in case a new plan for the same purpose should be projected, I will briefly set it forth even though it be in the nature of a post mortem criticism of an already defunct institution.

In the Council's General Notice No. 352 the reasons cited for discontinuing the plan related to obstacles to its practical application, namely, lack of sufficient accuracy, abnormal expense, and business acquisition complications. But even if such obstacles had not stood in the way, the plan would have been open to a more fundamental criticism of failing to produce, in one very important respect, the kind of information needed.

It would seem to be fairly obvious that one of the most valuable things for all practical purposes, and especially so for the fundamental matter of rate making, to be secured from any such data is light on the trend of employment and wages by which to forecast future conditions.

Did the plan afford such information? It seems to me not. This failure is demonstrable even for the form of comparison which the plan affords, namely, a year to year comparison for each month. A test on this point may be made by comparing results as to employment conditions for 1922 for New York State as shown by the plan in the figures published in *Bulletin* No. 10 issued by the Council last March with those shown by the labor market figures published monthly by the New York State Department of Labor. The following table presents the figures for such a comparison.

COMPARISON OF CHANGES FROM 1921 TO 1922 SHOWN BY COUNCIL AND
STATE REPORTS

Months	Changes in Number of Employees in Per Cent.	
	Council returns	State reports
January.....	1.2 +	0.7 -
February.....	3.2 +	0.6 +
March.....	6.0 -	0.8 +
April.....	1.7 +	1.5 +
May.....	6.0 -	4.5 +
June.....	3.1 +	8.1 +
July.....	9.0 +	10.3 +
August.....	7.9 +	13.0 +
September.....	4.0 +	11.0 +
October.....	6.6 +	11.9 +
November.....	6.4 +	14.5 +
December.....	3.0 +	16.2 +
Year.....	2.7 +	*7.5 +

*Average

Any allowance necessary to be made for the fact that the State figures represent manufacturing only, with larger firms chiefly represented, while in the Council figures other industries also, with firms of all sizes, are included would not sufficiently modify results as to eliminate the contrast shown by this comparison. The evidence from the two sources agrees only on the point of indicating that there was greater improvement over the previous year in the last six months of 1922 than in the first six. But even on this point the State figures show a clearer and greater change than do those of the Council. In the present connection, however, what it is desired to emphasize is the contrast which appears as to the course of things in the last half of the year. The Council figures would indicate that the gain over the previous year was at a diminishing rate after July, but the State figures show just the opposite, namely, a gain in a steadily increasing degree. A still further difference in results appears for the year as a whole, the State figures recording nearly three times as great an improvement as the Council returns show.

But the chief shortcoming of the Council figures as a means of

forecasting conditions ahead was the fact that they afforded practically no comparison of the movement from month to month in the same year, and it is precisely such information which is necessary in order to discover in what direction, and how fast conditions are changing. The Council figures were not constructed for any such direct comparison and any suggestion of trend which might be drawn from the month by month comparison with the year before was neither clear nor dependable. How far short of what is desirable the Council figures were as a result of this lack, may be seen by noting how small an indication its figures, given above, afford of the general fact that straight through the year 1922 there was a continuous gain in employment from month to month. This gain as registered by the labor market figures for manufacturing published monthly by the New York State Department of Labor was from one to three per cent. in every month except March and July and amounted to no less than 18 per cent. from January to December. Here is direct and positive evidence of what the movement was through 1922 and whither it was tending at the end of the year, while the Council figures afforded little or no evidence of this sort.

The moral of all this is that if, or when, the Council again undertakes collection and compilation of such statistics it should endeavor to secure data on a comparable basis from month to month for the current year rather than from year to year for each month. Data of the former kind would afford all the light that the latter can plus much that is most important of all which the latter kind of figures fall short of.

Just what figures could or should be sought for this purpose among those naturally available from compensation insurance experience, I do not undertake here to suggest. But bearing on this question I am moved to register a query. Why is it not the logical and economical thing for the Council, when again considering this matter, to inquire first of all whether there is not already available in Federal and State government reports and bulletins, as good or better statistics for all practical purposes, when properly analyzed or put in proper form, as it would ever be possible to secure from the usually available data connected with compensation insurance experience? I am inclined to think it would be found on examination that much more fruitful data are already available than may have been realized.

MR. R. S. HULL:

Mr. Constable's paper is of interest both to those immediately concerned with rate making and to those on whom falls the responsibility for furnishing the statistical material. It is chiefly from the latter angle that the following comments are directed.

Mr. Constable speaks of the need for reliable and up-to-date information as to wages and employment conditions for Workmen's Compensation ratemaking. This is needed as a modifier for the Schedule "Z" experience which must on the average be about two years old before it is available for this purpose.

The wage data system is designed to secure the recent trend of wages and employment in classified form as a basis for determining the probable future trend of wages.

Mr. Constable outlines the methods and difficulties of the new system. The methods seem to be carefully worked out and should produce the desired results provided the full co-operation of the companies can be secured through their payroll auditors. But here the difficulties begin. Most of the statistics now furnished by the companies come through trained statistical departments and more remotely from the claim divisions which have been trained to furnish a certain amount of information for purely statistical purposes beyond that required for the settlement of claims. The most important part of the work under the new system falls upon the payroll auditors, to most of whom it is an unwelcome extra job to be disposed of as lightly as possible. To keep these records coming in proper form and quantity requires a good deal of follow up work from the home offices of the companies and must entail considerable expense. Therefore, the company executives, who are already inclined to be jealous of the sums expended on statistical work, must be thoroughly sold as to the value of the results to be obtained in relation to the outlay required. The actual cost to the companies of the gathering of the data is difficult to determine. If an auditor reports only on cases where the data can be secured with a minimum of effort, the cost will be very slight but if he is held to furnishing reports on all but very exceptional cases, as he must be if the work is to be of value, the cost may be quite an item. In the rush seasons when it is impossible to make audits fast enough the slowing down of the work also will be a considerable factor. One company has a case on record where a conscientious auditor spent 15 hours in securing

the wage data out of 30 hours spent on the entire audit. This is doubtless an exceptional case but such things have their weight with the executives in charge. It is the writer's impression, subject to correction by someone in actual touch with the work at the Council, that thus far the co-operation secured from most of the companies has been quite perfunctory and if the system is to continue successfully it must be resold to the companies. There can be no doubt from the actuaries' viewpoint of the prime value of anything which will conduce to more accurate ratemaking, but it may be interesting to consider briefly the alternative sources of information, in case full co-operation in the system under discussion cannot be secured from the companies.

First there are the weekly wages punched on the loss cards filed under the Council Statistical Plan. If the cards are filed currently this data will be fairly up-to-date and should give an indication of wage trends since the filing of the latest Schedule "Z." These cards have the advantage of permitting a wage distribution by size groups which has its value in studying maximum and minimum limits under compensation laws, but have the disadvantage of being limited in number and frequently inaccurate when the amount of wage falls outside the maximum or minimum limits for the state in which the accident occurred.

As a test of the possibilities of this source of information a block of 32,000 loss cards for New York State were taken representing losses from January, 1921, to December, 1922, on 1921 and 1922 policy years. A tabulation was made showing for each month the number of accidents and the total of the weekly wages reported, producing an average weekly wage for each month and for each of the two years. These averages were plotted on Chart I in a continuous curve showing the fluctuations over twenty-four months. A similar curve was plotted from the Council Bulletin No. 10—Statistics of Wages and Employment Conditions and from the Industrial Bulletin of the New York Industrial Commission.

The Industrial Commission's curve showed a very consistent drop from January, 1921, to February, 1922, and a similar rise from April, 1922, to December, 1922. The Travelers' curve follows a similar trend broken by apparently abnormal months indicating that a broader spread of experience would bring it into fair correlation with the industrial commission's curve though on a lower

average level. The Commission's curve showed a decrease of 2.6% from the 1921 average to that of 1922, while the Travelers' curve showed an increase of 1.9%. This discrepancy seems to be due to the few abnormal months mentioned above rather than to a difference in the general trend. It would be interesting to see a curve representing the experience of all companies as shown by their loss cards.

The National Council's curve shows very clearly the insufficiency of the data in the early and late months of the year. This will be overcome in a measure when the system has been in operation for a longer time, but even in the middle months this curve is more irregular than either of the others, but with an apparent tendency to follow the irregularities of the Travelers' curve. A comparison of the yearly averages shows a decrease of .5% from 1921 to 1922. It is evident that the Council's data is not yet sufficient to furnish a continuous curve of wage changes from month to month.

It is interesting to note that 32,000 loss cards seemingly give a more nearly sufficient volume of data than 150,000 employees reported through payroll audits. This is due undoubtedly to the greater spread of these loss cases among employers and industries.

A second set of curves was made on Chart I showing for the three groups of data the ratio in per cent. of 1922 to 1921 wage rates by months. Here again the trend of all three curves is similar. The New York Industrial Commission's curve shows a steady gradual increase except for December which shows a falling off. The Travelers' curve moves on a higher level throughout except for the months of October and November which fall below the Commission's curve. The months of February, July, August and September show a considerably higher figure than New York and the net result, as shown above, is a net increase for the year instead of a decrease, although the trend is in the same direction.

The Council's curve shows that their data is much better adapted to this type of comparison than to the other and with the exception of three months, for two of which the data was insufficient, the curve follows the trend of the New York Commission's curve very well but indicating throughout smaller deviations both above and below 100%. The general trends of both of these sets of curves are brought out still more clearly on Chart II on which the same information is charted by the use of four months mov-

ing averages. The writer's conclusion is that unless the Council's system of gathering wage data through payroll audits is to be carried out much more fully than is now being done, the wage data from the loss cards is preferable.

The second source of information is in outside publications having to do with labor and unemployment conditions. The state labor department reports of New York, Massachusetts, Wisconsin and Illinois give much valuable information in tabular form as to wages and unemployment in those populous states. The Monthly Labor Review of the U. S. Department of Labor gives comparative tables showing wage and employment conditions for selected industries; also at monthly and yearly intervals records of wage adjustments by industries, and occasionally wage and employment data for particular industries by states. Publications of state labor commissions bearing on wages and unemployment are reviewed and frequently quoted at length. The United States Department of Commerce in its weekly Commerce Report and its monthly supplement on "Trend of Business Movements" gives much valuable information on labor and unemployment conditions and the volume of immigration and emigration. It would seem that a review and assembling of these tables from month to month would furnish a valuable body of data for the compensation ratemaking boards.

A third source of information is in a study of general business conditions and trends, in a word, of the business cycle, and of the relative position within the cycle of the years for which Schedule "Z" experience is available and the years in which the new rates are to be operative. Experience has shown that changing wage and employment conditions not only affect compensation costs by changing the size of the weekly compensation payments, but that the rapidity and direction of such changes have a great influence on accident frequency and average length of disability. Granting the limitations of prophesy based on the future course of the business cycle there are certain distinct advantages in this broad view of business trends. Present fluctuations in business are so rapid that rates made today on data of yesterday may be out of date tomorrow when the rates become effective. And since rates once made are likely to continue in effect for some years, they should be based on a probable average of conditions over those years with a recognition of the fact that they may be more

than adequate in one year and inadequate the next and that the results of each year should be considered in relation to the probable trend for the period. One advantage of a study of the business cycle in this connection is that wage changes generally lag behind other fluctuations which should therefore furnish a fair index of at least the immediate course of wage trends. There is even a certain normal order on very broad lines in which wages and unemployment in different industrial groups respond to changes in general business conditions.

The recent publication on Business Cycles and Unemployment, an Investigation under the Auspices of the National Bureau for Economic Research, contains a great deal of valuable information in this line. Chapter VI is entitled "Changes in Employment in the Principal Industrial Fields from January 1, 1920, to March 15, 1922," by Mr. Willford I. King. This chapter includes tables covering broad groups of industries showing the estimated quarterly fluctuations in Hours Actually Worked, in Number of Employees and in Wages and contains much interesting discussion of the effect of boom and depression on wage and employment conditions.

Chapter IV on "What the Present Statistics of Employment Show," by Mr. William A. Berridge, gives a very interesting study of the relation of employment and wage rates to the business cycle, indicating the very close correspondence in point of time between fluctuations in employment and in the usual indices of business activity.

Doubtless all these things are considered by the Actuarial Committee of the Council. But would not a systematic assembling by the Council of such data as they appear go far toward furnishing a substitute for the present system of gathering wage statistics from payroll audit data and at a much less expense to the companies?

The above comments are not intended as a wholesale condemnation of the wage data system now in use by the Council but are rather in the nature of a few suggestions of alternative sources of information in case the present system should appear to the companies co-operating through the Council to be too expensive to be practical.

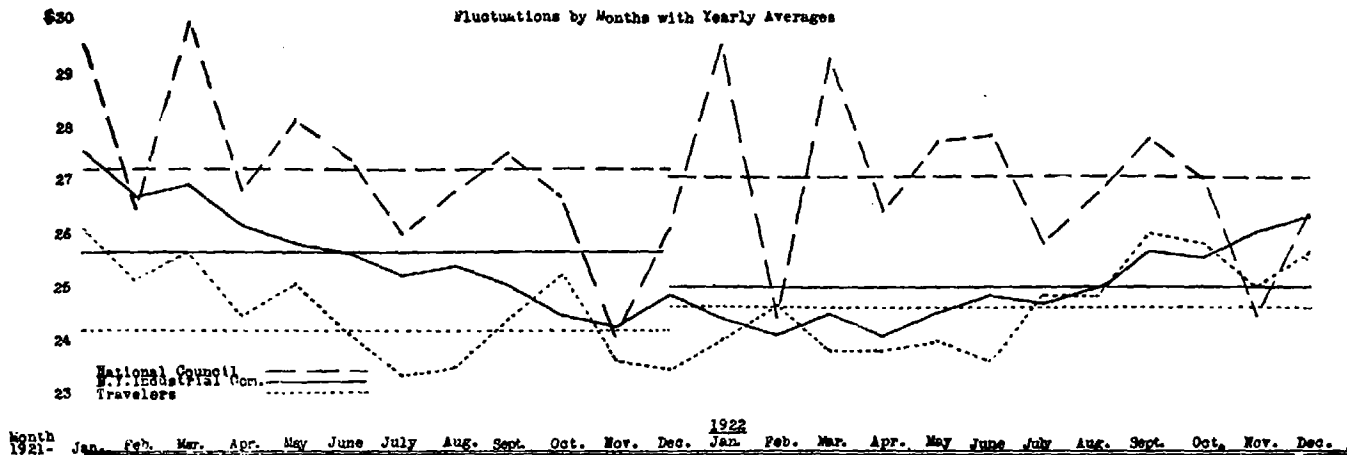
CHART I

COMPARISON OF WAGE STATISTICS—NATIONAL COUNCIL, NEW YORK INDUSTRIAL COMMISSION
AND TRAVELERS LOSS CARDS. NEW YORK STATE—YEARS 1921 and 1922

Weekly Wage
Rate

334

DISCUSSION



RATIO PER CENT. 1922 to 1921 WAGE RATES BY MONTHS

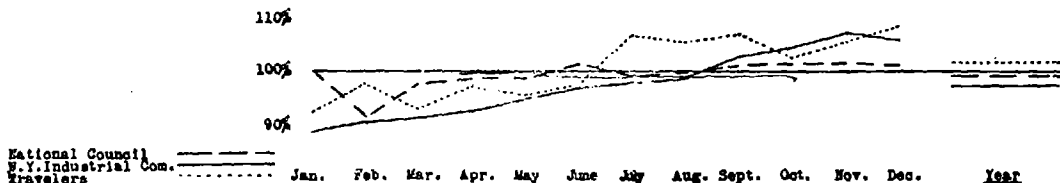
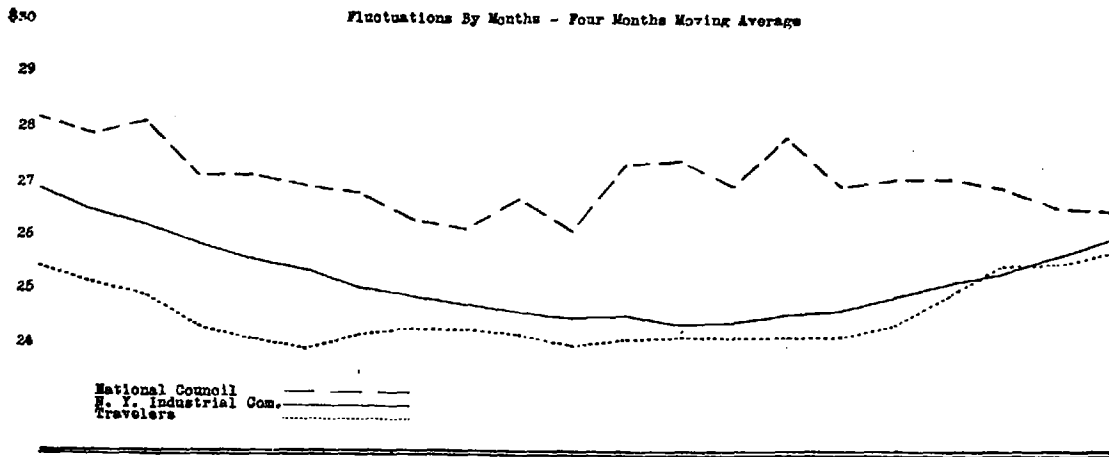
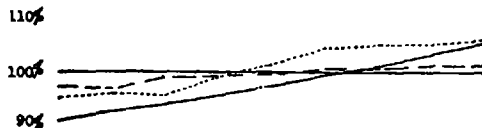


CHART II
 COMPARISON OF WAGE STATISTICS—NATIONAL COUNCIL, NEW YORK INDUSTRIAL
 COMMISSION AND TRAVELERS LOSS CARDS
 NEW YORK STATE—YEARS 1921 and 1922



RATIO PER CENT. 1922 to 1921 WAGE RATES BY MONTHS
 FOUR MONTHS MOVING AVERAGE



PERMANENT TOTAL DISABILITY FROM ACCIDENTAL CAUSES

W. N. WILSON

VOLUME IX, PAGE 65.

WRITTEN DISCUSSION

MR. JOSEPH H. WOODWARD:

In view of the usual practice of valuing annuities upon lives totally and permanently disabled by accident upon the same mortality table as is used for active lives, the subject of Mr. Wilson's paper is of more than theoretical importance. Although we have good reason to believe that the mortality upon disabled lives gradually approaches the mortality among the general population as the time elapsed since the accident increases, there is nevertheless little doubt that the use of an active life table for valuation purposes and in connection with ratemaking procedure is unnecessarily conservative. While Mr. Wilson has much to say about the mortality among lives disabled by accident as compared with the mortality among lives disabled by disease, it might have been more instructive if greater emphasis had been placed upon a comparison with the mortality among active lives, particularly after the lapse of a period of several years following the accident.

The table on page 73 clearly shows that up to and including the fourth year the mortality among lives disabled by accident is much lower than the mortality among lives disabled by disease. It is for the durations of over four years, however, that it is most important to know what mortality to expect and for these durations very little can be learned from Mr. Wilson's statistics, inasmuch as the total exposure for durations of over four years is only 93.30 and the total number of deaths at these durations is only five.

Mr. Wilson has excluded from his experience 17 cases of loss of both hands and 13 cases of loss of both feet on the ground that these were permanent partial cases that had been compensated as permanent total. Bearing in mind the provisions of many workmen's compensation laws that, in the absence of conclusive proof to the contrary, multiple dismemberments of these types shall be held to constitute permanent total disability, it seems doubtful whether the method followed in the paper is beyond criticism.

Mr. Wilson does not state what practice was followed where there was a total disability for a short period followed by death and where the award of compensation was for temporary total disability. It would appear that such cases should technically be considered as permanent total disability inasmuch as the man was uninterruptedly disabled between the date of accident and date of death.

The table showing the mortality curve for the first year of disability (page 77) is interesting, as it graphically illustrates the fact, obvious on the basis of general considerations, that for extremely short durations the mortality rate must be extremely high. Theoretically, except for persons who are instantly killed, there is always a period of permanent total disability which precedes death.

From the table on page 81 we see that out of totally disabled lives surviving one year after the accident, nearly one-third are suffering from dismemberments, the other important causes of disability being back or spine injury, hip injury, and fractured skull. If we could compare this with a similar table showing the nature of disability among lives disabled by disease and who had survived for a period of one year, it would be evident that a much lighter mortality is to be expected among the accidentally disabled lives.

What we really need is a greater volume of data at the longer durations, and it is to be hoped that others will follow Mr. Wilson's example and submit their statistics for publication in the *Proceedings*.

AUTHOR'S REVIEW OF DISCUSSION

MR. W. N. WILSON:

As Mr. Woodward furnished me with a copy of his discussion prior to the publishing of this volume, I would like to take this means of explaining one or two of the questions raised by him.

On page 82 I have mentioned that a review of all of the claims disclosed the fact that 17 had been granted permanent total awards under the claim of loss of both hands, and 13 under loss of both feet. It is unfortunate that I did not explain more fully just what the nature of the awards was. In compensation insurance, benefits for dismemberment cases are awarded according

to a specific schedule contained in the compensation laws of most states. It sometimes happens, however, that a case which is distinctly permanent partial, such as loss of one foot with no other impairment, is granted a permanent total award by a court and benefits for loss of both feet must be paid to the injured. Another and possibly more frequent example is found in the award of permanent total benefits for loss of both members to a person who has two members only partially impaired. Such disabilities are of course not really permanent total disabilities in the sense that the term is usually interpreted, and it is such cases which I have excluded from the exposure. There was actually no case where the injured lost the use of all or even the greater part of two members which was not included as a permanent total.

Mr. Woodward deplors the fact that the statistics accompanying the paper did not include data on more than 93.30 years of exposure for durations of over four years, and that the total number of deaths at these durations is only five. It might be further pointed out in this connection that the exposure on workmen's compensation of permanent total cases of over four years duration must necessarily be quite small as compensation insurance is a comparatively new thing.

In answer to the question as to what practice was followed where there was a total disability for a short period followed by death and where the award of compensation was for temporary total disability, I would like to say that for the years included in the investigation every death occurring more than one day after the injury was investigated, and all but a few were included in the distribution, these few being cases where a review of the claim files left practically no doubt that the death had occurred from some cause not in any way connected with the accident. I think now that it might possibly have been better to have included even these deaths because, as Mr. Woodward states, the injured were uninterruptedly disabled between the date of accident and date of death. However, there were at most only five or six of these cases. My reason for excluding them at the time of the investigation was simply that I was endeavoring to obtain the exposure upon lives suffering from disabilities which were of a permanent and total nature.