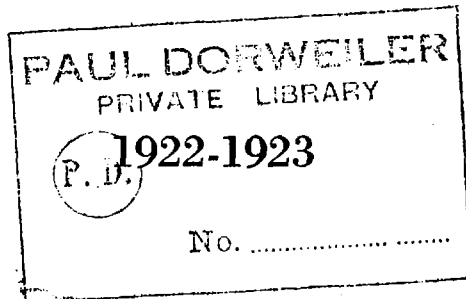


PROCEEDINGS
OF THE
Casualty Actuarial Society



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NOTICE

The Society is not responsible for statements made or opinions expressed in the articles, criticisms, and discussions published in these Proceedings.

PROCEEDINGS

NOVEMBER 17, 1922.

THE FUTURE

PRESIDENTIAL ADDRESS, A. H. MOWBRAY

"There is no cutting of the Gordian knots of life;
each must be smilingly unravelled." R. L. S.

The philosophy of life which could sustain Robert Louis Stevenson through his wanderings and sufferings and earn for him Elbert Hubbard's nickname "Robert Louis, the beloved," cannot but be helpful to a troubled world. The sentence I have quoted from his "Christmas Sermon" is an epitome of the practical aspect of that philosophy. For times like the present this precept seems particularly fit.

It would only be self deception to attempt to deny the widespread pessimism existent in the world today. The feeling of lack of leadership and question whither we are trending is found on every hand, in public addresses, in the daily press, in private conversation. To cite but one instance, Mark Sullivan, the keen observer who writes on political affairs for the *New York Evening Post*, in his Armistice Day article refers to the world as "still in reverse gear" or at best deeply mired with racing engine vainly trying to budge it ahead. Like many others he lays the trouble to the moral debacle in the Versaille treaty, the repudiation of the promises to the German people in Mr. Wilson's speeches which the allies had endorsed before the armistice.

But widespread as is this pessimism, it is not universal. In an interesting series of articles beginning in the June number, Glenn Frank, Editor of the *Century Magazine*, discusses the outlook, and, notwithstanding that pessimism, finds in the present time the prelude to a new renaissance based on new spiritual values which will be more powerful in its impulses than even the Italian Renaissance which closed the dark ages.

I shall not attempt to reproduce for you Mr. Frank's thought as I do not feel I could do him justice, but in the course of this discussion he analyzes the existing pessimism and the recent extensive literature keyed to the philosophy of despair as arising from five different types of fear impulses; first, the biological fear that the race is deteriorating of which the typical example is Lothrop Stoddard's "The Rising Tide of Color," second, the psychological fear exemplified by Martin's "The Behavior of Crowds," third, economic fear, of which Mr. Frank does not give examples in literature but of which we all could, I think, develop our own, fourth, administrative fear, as expressed by Bryce and others, that our civilization is becoming too unwieldy for us to handle, and fifth, moral fear exhibited in the criticism of present day manners, dress and morals, of the decline of church-going and of other departures from the accepted standards of the past.

Fear is, as we know, probably the most powerful of our emotional states and the most contagious. Its effect is to inhibit strongly the normal actions both of body and intellect and when it reaches the stage of despair the motive of each individual is the primal instinct of the jungle, self-preservation at any cost. The terrible effects of fear are all too well known to us in the Iroquois Theater fire and other like disasters. Should despair, promoted by these fears, seize upon the great mass of our people I would indeed join with those who feel we are entering upon a new dark ages.

But the most abjectly fearful can be calmed and even galvanized into something resembling bravery, if not true bravery itself, by the example of courageous confidence and unselfish fortitude. The tradition of the sea, "Women and children first," has many times saved the lives not alone of women and children, but also of all on board. But the strength of this tradition and other examples of heroism for overcoming fear and despair lies not in the act of heroism itself but in the unselfish motive which prompts it. The same daring for selfish ends would only enhance the fear and add to the panic.

Widespread then though the despair of panic fear may be among us now, if we have yet that potent idealism, though now latent and unstirred, there may in truth be in our present conditions the beginning of a new and even brighter era, for the blacker

the despair the more does the example shine. It seems to me there are reasons to believe that although the cloud has temporarily obscured the idealism which moved most of us during the war period, it is merely obscured and not deadened. For example, during our past two years of inaction and reaction we have individually and as a government without inquiry as to cause or responsibility freely gone in an organized effort to the rescue of the famine sufferers of Russia at the cost of millions and without hope of any reward save our own consciousness of work well done. While this is perhaps the greatest instance of national action, individual actions are found again and again. When forty-seven men were recently entombed in a mine disaster in California, rescue crews worked nights and days long after there was any reasonable ground for hope that the victims had survived and with no substantial hope of reward to themselves. Fellow workers and officials of the mine and State risked their own lives daily in the effort to save them. The press of the nation followed the efforts each day and the heart of the nation supported the effort.

But there are other ways of exhibiting inspiring idealism than through the display of physical courage, effort and voluntary suffering. The giving of special ability gratis or at far less than the market price to the service of public welfare is another evidence of earnest idealism. In the technical branches of the government service there are many such instances. There has also recently been established in New York City a new and bold experiment in the way of forward looking constructive effort for the benefit of mankind. I refer to the National Bureau of Economic Research, the purpose of which is to search out the facts of our economic life without bias or purpose of propaganda in the hope and belief that such facts may form the basis for common agreement on many of the vital problems affecting our life. The support of this institution by such diverse interests as are represented on its board is an evidence not alone of confidence and idealism but of wisdom and desire for truth.

I am not familiar with much of what is going on in Europe. Her people suffered more and are probably more war-worn and weary than we are, but I cannot bring myself to believe even such experience can have crushed out all idealism. When our own manifests itself in national action, I believe we shall find a like response abroad.

In thus expressing a belief in the soundness of the foundation for a philosophy of hope as against that of despair, I do not mean to maintain that our life and our institutions will go on in precisely the same way they have in the past. That is reaction and is contrary to the law of life which we see exemplified around us every day—what does not progress must retrograde. But it seems to me we have within ourselves the basis of regeneration that will overcome the materialistic despairing attitude of those who have come under the dominance of these fears.

For the term radical, as such, I personally have no fear if the heart of the people is sound, and I cannot feel that the so-called radicalism in the land is, as some believe, wholly bad. It seems to me that in our recent election we may be taking the first step toward that regeneration in the substitution of new and younger blood for the older and more backward-looking fearful leadership that has been ours in recent years. The severe strain on the nervous system of the resident of our modern cities has a tendency toward the establishment of hysteria that he who lives in the quiet open places does not share and these new leaders have been chosen largely by those of our citizens who dwell close to the soil.

Pasvolski in his "Economics of Communism" attributes the inability of the Communistic Party in Russia to carry through their program and its forced modification to the naturally conservative tendency of the peasant who lives upon the land. The peasant joined the revolutionary movement at the outset out of protest at the sequestration of the best lands in vast private estates. But the effort to make him a communistic farmer failed. He would have none of it, and private tillage and private trade have gone on and grown. If this is true of the Russian, it seems to me it must be much more true of the American.

When the world at large is full of pessimism and despair, fortunate, indeed, is the business that can escape its blighting influence. Most of our members are concerned in the conduct of the insurance business by private enterprise and it is no secret that today our business is undergoing the same type of stress as the business world as a whole is undergoing, perhaps an increased measure of it. If we may judge from certain items in the insurance press, there is a feeling that the insurance business, in

being held up to public scrutiny as it has been recently, is being unfairly treated in comparison with other economic activities. Perhaps there may be justification for that point of view, but, after all, the insurance business is not a creative business but one whose economic function is merely the redistribution of economic loss. As in the administration of charity which also redistributes loss, the cost of such service calls attention to itself in a way that the administrative cost of commodity production and merchandizing does not. It is natural that those who are compelled legally or by force of circumstance to use it should scrutinize its conduct most closely, comparing cost of service with value derived therefrom. In view of our gradual development from private to public ownership and operation of educational facilities, postal service, water works and other utilities, we should not be surprised at the effort for cooperative and even government conduct of the insurance business as well as many others of the public service type.

As I have said in a previous address, the strength of this movement will depend upon the sentiment of the public with respect to the sincerity of the desire of those in the business to furnish its service on the highest possible basis and at the lowest possible expense. If by their conduct the field representatives of private enterprise in insurance show a disposition to consider primarily their own interest and only secondarily that of the public they serve, and the carriers whom they represent, either through fear of each other or a corresponding self interest fail to curb this attitude, yield, and themselves become infected with it, by their example of selfishness they give stimulus to the prevailing pessimism and lack of faith. In that case, I truly believe we may look for a strong increase in the movement to eliminate private enterprise from this field, both on the part of those who may see in a state administered monopoly some means of advancing their own selfish interests whether or not the general good is served, and on the part of those who unselfishly seek the solution for the general good. For these latter will have lost faith in the private carriers and will feel that, inefficient and wasteful as much bureaucratic work generally is, it may be preferable to the product of cynical self interest in the conduct of such affairs. If, on the other hand, the business in its attitude before the public shows a real determination to make service its first incentive and reward

merely the incident thereto, shows in short that it has ideals, then it seems to me there is no ground for fear that the business will not be allowed to grow and prosper to the fullest degree that it can, and in that growth become one more force working for a better civilization than any we have yet attained. The late Josiah Royce, as the cataclysm of the war came upon us, had that sort of a conception of the possible role of insurance. Can we of this Society have any less ?

1922 REVISION OF THE INDUSTRIAL COMPENSATION RATING SCHEDULE

BY

S. B. PERKINS AND R. A. WHEELER

A schedule rating plan as an instrument of rating a risk for workmen's compensation insurance should establish the relativity of hazard between individual risks of the same manual classification to the extent that the physical condition of the risk influences its experience. How far the Industrial Compensation Rating Schedule does accomplish this purpose is a matter of conjecture. It seems fair to state, however, 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. A correct rate under the present schedule might be accomplished by the offsetting of excessive charges on some items and inadequate charges on others. The absence of experience for determining the item values of the present schedule necessitated the use of considerable judgment—sometimes excellent and other times subject to criticism. 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 first questions which naturally presented themselves for solution were as to what constituted accident producing causes. Were conditions out of which accidents could have been demonstrated to have arisen in one industry necessarily the source of a corresponding number of accidents in other industries and to what detail should a schedule attempt to measure the presence of these causes? It so happened that a number of companies, members of the now National Bureau of Casualty and Surety Underwriters, had been keeping their accident data in accordance with the Workmen's Compensation Statistical Plan which provided an individual analysis card for each accident. For the policy year 1919 there were available about 340,000 of these individual

accident reports. This mass of experience was accepted as being not only the largest volume but the most dependable experience available for the purpose of establishing a new industrial schedule.

The Workmen's Compensation Statistical Plan contains something over 500 causes of accidents. Engineering judgment concurred before any tabulation of statistics was made in two respects, namely, that the value of particular causes of accidents would vary between industries, and, secondly, that the vast majority of the number of accidents as well as the cost would be found to relate to comparatively few causes. As a preliminary step, therefore, the manual classifications were divided into 19 groups as follows:

INDUSTRIAL DIVISIONS

- | | |
|----------------------------------|---|
| 1. Stone Products | 11. Rubber and Composition Goods |
| 2. Clay Products | 12. Chemicals and Allied Products |
| 3. Glass Products | 13. Paper and Paper Products |
| 4. Ore Reduction and Smelting | 14. Printing and Publishing |
| 5. Rolling Mills and Steel Works | 15. Textiles |
| 6. Metal Products | 16. Clothing and Furnishings |
| 7. Machinery and Instruments | 17. Laundering, Cleaning and Dyeing |
| 8. Vehicles | 18. Foods, Beverages, and Tobacco |
| 9. Lumber and Wood | 19. Miscellaneous Manufactured Products |
| 10. Leather | |

Even as a preliminary measure it was not a simple matter to determine what the most important causes of accidents might be. With regard to manual classifications there were certain definite analogies between industrial hazards and the vast majority of classifications clearly belonged in one or the other of the industrial groups. Of course there were border line cases. With regard to causes of accidents, however, there were causes of all grades and importance. The two or three causes of major importance were clearly recognizable, but from there on the causes graded down so gradually that it was exceedingly difficult to place them in the order of their importance on the basis of judgment. Statistics were then relied upon to determine the answer. The first step in the actual tabulation was of course to sort out the accidents which arose out of classifications not subject to schedule rating. The costs of fatalities and permanent total disability cases were excluded in this preliminary tabulation because the occurrence

of an occasional loss of such magnitude would distort beyond justification the indications of the less important causes of injury. The death and permanent total cases were distributed over the various causes by number only in order that the frequency of their occurrence in any one cause might be checked against the indications on the cost basis of all other kinds of injury. In the actual determination of partial pure premiums which ultimately went into the schedule the total experience was used, average values being assigned to the permanent total disability cases. The result of the compilation was extremely instructive as it verified both major assumptions heretofore mentioned. A review of the compilation will verify this statement.

An analysis of the above tabulation gave rise to the first important decision with regard to the establishment of a new schedule, namely, that a schedule which included charges for machines, transmission, elevators, molten metal and eye protection and which reflected properly the presence of safety organizations and hospitals would produce results which would substantially satisfy the function of schedule rating. This decision with regard to machines, transmission and elevators would seem to require no further justification. With regard to molten metal, it is apparent that the hazard exists to a material degree, where it exists at all, and that is to be expected. In the industrial divisions five, six and seven, which constitute rolling mills, steel works, metal products, machinery and instruments, it is apparent that there will be a great deal of foundry hazard and, therefore, serious molten metal hazard, and a schedule to be satisfactorily complete for these divisions must needs include a treatment of this hazard.

With regard to eye protection, the same general argument would apply. It is unfortunate that in the Workmen's Compensation Statistical Code the great majority of accidents occurring to eyes were assigned to particular machines, the original thought probably being that all accidents arising out of the operation of a machine could be charged to it and that the proper guarding of the machine would be the remedy, whereas the wearing of goggles by the operator, entirely independent of the guarding of the machine itself, would in a great majority of cases have been the most effective preventative. As in the case of the molten metal hazard, the eye hazard, too, is primarily a local one, and

**PERCENTAGE OF TOTAL ALL OTHER AND MEDICAL LOSSES
DUE TO VARIOUS ACCIDENT CAUSES**

Schedule	Toe Boards	Handrails	Openings	Explosions	Electricity	Molten Metals	Caustic Burns	Boilers	Prime Movers	Power Transmission	Cranes			Conveyors	Machines					All Other Causes	Total All Causes	Total Losses		
											Elevators	Traveling	All Other		Total	Point of Operation	Belts & Pulleys	Machine Explosions	Flying Objects				A. O. Machine Items	Total
1. Stone Products.....	..	.1	..	..	.1	..	..	.4	1.5	1.2	.4	.1	2.2	2.3	1.0	6.7	.2	..	.3	1.5	8.7	84.4	100.0	32,388
2. Clay Products.....	..	.1	.1	..	..	..	..	..	..	3.1	.7	..	..	..	.6	12.7	.5	..	2.2	7.8	23.2	72.1	100.0	146,784
3. Glass Products.....	..	.3	.1	..	.1	..	..	.9	..	2.3	.6	..	..	..	.3	6.8	.4	..	1.4	2.0	10.6	81.2	100.0	60,344
4. Ore Reduction & Smelting..	100.0	100.0	..
5. Rolling Mills & Steel Wks...	..	.3	.3	..	.2	10.0	.3	..	.1	.6	.7	.8	1.1	1.9	.3	14.1	.5	..	2.9	2.9	20.4	64.9	100.0	14,728,119
6. Metal Products.....	..	.1	.1	..	.1	2.4	.8	..	.1	.8	.6	.5	1.1	1.6	.4	29.4	.7	.1	5.3	3.3	38.8	54.2	100.0	1,222,221
7. Machinery & Instruments.	..	.1	.1	.1	.2	3.8	.7	..	.1	.5	.7	.1	.2	.3	..	28.3	.9	.1	5.8	3.3	38.4	55.0	100.0	556,620
8. Vehicles.....	1.1	.4	.1	.2	.1	..	.6	.5	.2	.5	.7	..	22.9	.1	.1	4.3	3.9	31.3	65.0	100.0	570,874
9. Lumber and Wood.....	..	.8	..	..	..	.3	.6	.2	.7	2.6	1.2	..	.1	.1	.8	42.6	1.3	..	3.9	5.1	52.9	39.7	100.0	757,596
10. Leather.....	..	.6	.1	..	.1	..	1.0	.1	..	2.1	1.0	..	..	..	..	36.9	1.8	..	2.2	1.8	42.7	52.3	100.0	174,112
11. Rubber and Comp. Goods..	..	.2	..	.1	.4	.1	.4	.2	..	.3	.2	..	..	..	..	35.6	.8	.2	3.1	7.3	47.0	51.1	100.0	86,667
12. Chemical & Allied Products.....	..	.3	1.9	..	1.3	.2	3.6	.2	.1	.9	2.4	..	.3	.3	2.9	14.5	.4	..	1.4	3.8	20.1	65.9	100.0	271,400
13. Paper & Paper Products....	.2	.2	.1	..	.1	..	1.3	.1	..	1.0	6.4	..	.1	.1	.1	34.0	1.2	..	1.8	3.5	40.5	49.9	100.0	417,259
14. Printing & Publishing.....	..	.1	..	..	.1	.5	.2	..	..	1.8	5.5	..	..	..	..	40.9	.2	.1	3.3	9.0	50.5	41.3	100.0	244,567
15. Textiles.....	..	.4	.2	..	.3	..	.2	.1	.2	3.1	1.0	..	..	..	..	29.9	2.4	..	2.3	9.1	43.7	50.8	100.0	332,918
16. Clothing & Furnishings.....	..	.4	1.2	..	.1	..	.2	..	..	1.0	1.1	..	..	..	..	20.5	2.5	..	1.4	7.1	31.5	64.5	100.0	208,587
17. Laundering, Cleaning & Dyeing.....	6.0	.4	..	.4	.4	.5	7.1	1.9	..	..	..	..	33.6	.1	.1	.1	13.3	47.2	36.1	100.0	79,962
18. Foods, Beverages & Tobacco.....	..	.6	.2	.1	.1	.1	.4	.4	.3	1.1	2.1	.1	..	.1	1.2	19.4	.8	..	1.2	5.8	27.2	66.1	100.0	732,954
19. Miscellaneous.....	.4	.2	.1	..	.2	..	.1	.6	..	.6	1.7	.1	.6	.7	..	14.3	1.9	..	1.9	4.6	22.7	72.4	100.0	212,312
TOTAL ALL SCHEDULES	..	.3	.3	.2	.2	1.9	.6	.1	.2	1.3	1.5	.2	.4	.6	.5	26.5	.9	.1	3.2	4.7	35.4	56.9	100.0	6,835,698
PERCENTAGE OF CASES																								
D. & P. T. D.....	..	.3	.9	.3	2.2	.9	.3	.9	1.2	3.4	6.5	.6	2.8	3.4	.3	8.6	.6	..	1.2	3.4	13.6	64.2	100.0	944,242

where it exists at all it is very apt to exist to a marked degree. Safety organizations, hospitals, etc. find their defense in the portion of accidents which are not assignable to schedule items or physical equipment of any sort.

Up to this point no definite decision had been reached with regard to the actual subdivision of classifications, the tentative grouping being used only in the proof of the theory that accident causes did vary in importance between industries. At this point the whole matter of classification grouping was reviewed. The experience had originally been tabulated by individual classifications and was reviewed on the individual classification basis. In many classifications there was experience enough to determine their own relative accident cause weights. The remaining classifications had to be treated on the basis of analogy. Eventually all of the classifications were divided into 97 groups, each group purporting to be homogeneous with regard to the distribution of accident hazards.

How to measure the accident hazard of an individual risk and how to apply the data obtained in an inspection report then became the all important question. Mr. A. W. Whitney, in his paper appearing in Volume VII, Part II of the PROCEEDINGS, developed the theory which should underlie a schedule rating plan. In effect he brought out in the course of his development that the pure premium for any classification could be divided into two component parts, the one representing the anticipated cost due to non-schedule ratable causes to be called the residue, and the other representing the anticipated cost due to schedule ratable causes and that each of these component parts may be further subdivided into partial pure premiums which represent the anticipated cost due to particular causes. A partial premium relating to any particular accident cause must, therefore, represent the average cost per \$100 payroll exposed to that hazard. In rating an individual risk the point to be considered is the condition of that risk compared to the average condition of all risks exposed to the hazard under consideration. Roughly, therefore, if the index of a given hazard condition for the average risk or for the average exposure to hazard were unity and an individual risk could be shown to present a hazard 10% worse than the average, its index would be 110 and the pure premium to be charged against that individual risk for that

hazard would be 110/100 of the pure premium chargeable to the average risk. The particular problem consequently became how to determine the average condition and how to measure the departure of the individual risk from the average condition. It was necessary at this point to establish units of measure.

It is apparent that the pure premium for the machine hazard should vary directly with the ratio of total units of machine hazard present to total \$100 units of payroll exposed. If every machine presented the same hazard and every employee in a plant were constantly exposed to the hazard of one machine, there would be no need of schedule rating that particular hazard because it would be identical in every plant. In the first place all machines do not present the same hazard and, further, the hazard presented by any individual machine depends upon whether it is guarded or not. The first of these variables is subject to statistical determination. It was not sufficient to determine the amount of losses assignable to the various machines, which was readily done, but it was necessary also to determine the frequency with which the individual machines occurred and up to this time no method had presented itself of determining those very vital facts. The inspectors' reports for every plant, the experience of which had been included in the loss data, would have furnished the answer but the possibility of obtaining this correlation was absolutely out of the question. It was possible, however, to obtain from the various inspection boards and bureaus copies of current inspection reports as they were made. A call was issued for these inspection reports in July, 1921, and they were collected continuously until January 1, 1922, approximately 30,000 being obtained. If it had been necessary to determine an actual pure premium for each kind of machine, it would have been impossible to have used the loss data and the inspection reports of two differing periods or even of any but the same identical risks. However, what was desirable and necessary was a relative weight and, on the assumption that the distribution of machines had not varied materially between periods over which the loss data and the inspection reports were assembled, the results obtainable from these two masses of data, which were each large enough to avoid the stigma of selection, were deemed sufficiently indicative to be used as a schedule basis. Ratios were then developed between the actual

losses assignable to individual machines and the numbers of the machines present, and the weights based upon the relative values of these ratios were established for each kind of machine appearing with any degree of frequency in industry. All machines which did not appear with a sufficient degree of frequency to determine for themselves a weight, were thrown into a miscellaneous group.

It was thus found possible to meet the first condition, namely, that all machines do not present the same hazard. During the development of the machine weighting a refinement was injected into the procedure. The general hazard of the machine was divided into two parts—the point of operation hazard and the all other moving part hazard. It might not have been necessary to make this division except for the fact that the hazard presented by any one machine is not constant inasmuch as there are various conditions of guarding and it was recognized that the guarding at the point of operation on some types of machines reduced the hazard by a greater percentage amount than a guarding of the all other moving part. In fact, it was the hazard at the point of operation that established the difference in hazard from machine to machine and therefore it was for that part of the hazard that the weight was determined—the hazard of the all other moving part of each machine being sufficiently constant for schedule purposes.

As to the question of reduction of machine hazard by virtue of guarding, it was, of course, impossible to distribute the losses to individual machines or to groups of machines representing guarded and unguarded conditions. The judgment of various engineers, both those affiliated with the National Council on Workmen's Compensation Insurance under whose supervision the schedule was being constructed and those of the member companies who were taking an active part in its construction, was called into play. A questionnaire was submitted to each of these engineers asking their opinion as to (1) what percentage of the total hazard due to driving mechanism and dangerous moving parts of machines could be removed by guarding in accordance with the standards in the schedule; (2) whether there was any substantial difference in the above percentages as between machines of different types; (3) the percentage of total hazard due to unguarded points of operation of various individual

machines which could be removed by the installation of guards as provided in the schedule. Under this last question ninety-six individual machines were listed. As a result of the amalgamation of the various individual estimates, a series of differential values as between guarded and unguarded machines was obtained. The percentage of point of operation hazard removed by guarding was varied from 0 to 80% for the various machines, the average being about 40%, while the percentage of hazard of other moving parts removed by guarding was considered as constant at 80% for all machines. The inspection reports divulged the average condition of machines of any given type with regard to guarding both at the point of operation and all other moving parts, and these were related to the partial pure premiums which were subsequently assigned to these particular causes of accident.

With regard to the second premise, the condition that every employee in every plant be constantly exposed to the hazard of one machine is of course not realized in practice. In some plants there are fewer men than machines. It is possible, therefore, in such an instance, that every man is working on some machine all of the time, although he alternates from one kind of machine to another with no degree of regularity. It would not be unfair in such a situation to assume that every man in the plant were subject to the average machine hazard, this average machine hazard being determined by weighting each individual machine in accordance with the values heretofore determined and dividing by the number of machines. Opposed to this, however, is the condition that the plant may have more men than machines, in which case it would be obviously impossible for every man to be employed on a machine all of the time. The premium returned to the insurance carrier by the application of the partial pure premium assigned to the machine hazard would, of course, increase with the addition of the payroll for each additional employee, while the actual machine hazard might not increase at all. Obviously the payroll subject to hazard of machine operation would be determined by ratio of machine operators to total employees if such a factor could be ascertained for each individual plant. It has been suggested that this be determined by the simple expedient of asking the foreman, but it must be remembered at this point that the satisfactory application of any rating plan depends upon the inability of anyone to alter the result

of its application by the use of discretionary judgment. Criticism may possibly be offered at this point that judgment has played some part in the establishment of the schedule itself but the answer is clearly that once such judgment has been exercised the application of the schedule and this same judgment to every individual plant coming within the scope of the plan at least gives every individual operator the same kind of treatment and does not discriminate unfairly between them. 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. This assumption was accordingly made and as a result the average hazard per machine, with due regard for its type and condition of guarding, gave the index of the machine hazard for the individual plant.

A treatment somewhat similar to that accorded to the machine hazard was also necessary in the case of power transmission. In this case it was not possible to obtain the total units of power transmission because the inspection reports under the present schedule give only the unguarded transmission units. It was, therefore, necessary to assume that all accidents occurred from unguarded units. It is true, however, that accidents do happen on fully guarded power transmission but in view of the small size of the partial pure premium assignable to this cause very little error would result from making the above assumption. At this point it should be noted that the number of units to be considered under the general heading of Transmission has been cut down to three general items,—gears, belts and shafting. Also, the occurrence of an unguarded belt has been given only one half the weight assigned to each of the other two items. The omission of the other items such as fly wheel and set screws, which appeared under the Transmission section in the 1918 Schedule was made because it was found that these causes produced too few accidents, comparatively, to warrant their inclusion in the Schedule.

When it came to relating these units of hazard to the exposure, considerable difficulty was found in determining a true index of

the payroll exposure. It was not possible as in the case of the machine hazard to combine both parts of the problem, hazard and exposure by using the average hazard per power transmission unit because the total number of power transmission units was not available. It was finally decided to relate the unguarded units to the number of machines present in the risk. This cannot be justified by as cogent reasoning as in the treatment of the machine hazard, but in view of the small percentage of total losses due to transmission items it was felt that any error involved in assuming such a relation would be negligible. Therefore, to obtain the risk index for the Transmission element it is simply necessary to divide the weighted sum of the unguarded units by the total number of machines in the risk.

The elevator hazard more closely parallels the treatment of machines than does power transmission, because in this instance it was assumed that the hazard of the risk could be measured by the average hazard per elevator. No weight was given to different types and sizes of elevators, although it should be noted that the revised Schedule does not apply to dumbwaiters, hand hoists and sidewalk elevators. Also, the number of units under this Section was reduced to four general items,—entrances or gates, shaftway enclosures, sides of car, and controlling mechanism. The amount of hazard removed by guarding was determined on the basis of engineering judgment as statistics were not available for this purpose, greatest weight being given to the most hazardous items. In this way, it is seen that a premium is placed upon the guarding of the most dangerous parts of the elevator, and of course this is to be desired inasmuch as it exerts an influence for the elimination of such danger points. The average elevator condition also included those risks which had no elevators for the reason that it was not possible to distinguish from the accident statistics those risks which had elevators and those risks which did not have them. The effect of this is that, as a general rule, the presence of an elevator, even though fully guarded, will produce a higher risk pure premium than the average, since a considerable proportion of risks are without elevators altogether. However, the index on the basis of average hazard per elevator is applied on the same basis as it was derived and gives, therefore, substantially correct results.

The treatment of those classifications where recognition is given to eye protectors and foot and leg protectors was to charge the full partial pure premium where there were no protectors used and to allow a reduction of 50% where eye protectors were used and 55% where foot and leg protectors were used, these percentages being determined on the basis of engineering judgment.

As has been already pointed out, the presence of such items as safety organization, inspection service, first aid, hospital, etc., in the Schedule is justified by the large percentage of losses due to accident causes which are not assignable to other schedule items. From the tabulation which has been presented, it will be seen that about 60% of the total losses fall in this group. It seems reasonable to believe that a reduction in the percentage of losses due to various miscellaneous causes,—in many instances sheer carelessness,—will produce a marked improvement in the total loss experience of the risk. The factor which should, therefore, be considered as of marked importance, is the morale factor, comprising as it does the various items which have a direct influence in cutting down losses of the miscellaneous type,—either by prevention due to safety education and inspection service, or by reduction in cost due to immediate and capable medical aid. 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.

In general it is fair to state that a great deal has been accomplished in the proposed Schedule toward building up a rating instrument on the basis of actual statistics. This is true particularly with regard to the machine hazard which fortunately, for this purpose, represents by far the greatest ratable hazard existent in industrial risks. With regard to the minor and more or less supplementary hazards, even the proposed Schedule has to depend upon a great deal of engineering judgment. This, therefore, represents the field which must be covered more thoroughly in future Schedule revisions, and, accordingly, the

necessary steps toward compiling the statistical data required should be taken with as little delay as possible. It is felt, however, that because the proposed Schedule eliminates some of the weaknesses of the Schedule in use at the present time, it is well worth the labor involved in its construction and the confusion which invariably accompanies the substitution of one rating mechanism for another.

SOME ASPECTS OF THE COMPULSORY AUTOMOBILE INSURANCE MOVEMENT

BY

MORRIS PIKE

In his address at our last meeting our President touched, in passing, on the current efforts to enact compulsory automobile liability insurance laws. The growing importance of this form of legislation has led the writer to attempt to develop the reference in the hope that those who are not in close contact with this phase of the insurance field might, however slightly, profit thereby.

It will be instructive to review first, the circumstances that have led to the demand for compulsory automobile insurance.

The use of the motor vehicle in the nation's daily life has been increasing in a remarkable way of late. Statistics compiled by the Bureau of Public Roads of the United States Department of Agriculture show the following number of registered automobiles for the years 1916-1921:

1916.....	3,512,996
1917.....	4,983,340
1918.....	6,146,617
1919.....	7,558,848
1920.....	9,211,295
1921.....	10,448,632

According to the same agency the 1921 registration consisted of

9,432,844.....	Passenger cars
965,241.....	Commercial cars
50,547.....	Taxis and busses
<hr style="width: 100%; border: 0.5px solid black; margin: 0;"/>	
10,448,632	

Based upon their usage, automobiles can be divided into two general classes—public and private. The former are employed by their owners in the transportation, for hire, of persons or property, while the latter are free from this element of considera-

tion. It is only recently that the public use of the automobile has become popular, aided greatly by the attempts to supplement existing traction lines with motor vehicle common carriers. Shipping freight by automobile has also encroached somewhat upon the domain of rail and water traffic, especially for short distances.

As our late colleague Dr. Crum has shown in his pamphlet on "Automobile Fatalities," the marked extension of the use of the automobile has been accompanied by a correspondingly increasing toll of human life. Using the data at his disposal for the registration area of the United States, Dr. Crum computed the automobile fatality rate per million of this population. Applying these ratios to the entire population, he obtained the following exhibit:

ESTIMATED NUMBER OF FATALITIES FROM AUTOMOBILE
ACCIDENTS IN THE CONTINENTAL U. S.

Year	Population	Number of Fatalities	Rate Per Million of Population
1906	85,837,372	374	4.36
1907	87,455,366	598	6.84
1908	89,073,360	749	8.41
1909	90,691,354	1127	12.43
1910	92,309,348	1681	18.21
1911	93,678,764	2040	21.78
1912	95,091,039	2769	29.12
1913	96,503,315	3796	39.34
1914	97,915,591	4194	42.83
1915	99,327,867	5864	59.04
1916	100,740,143	7305	72.51
1917	102,152,419	9052	88.61
1918	103,564,695	9517	91.89
1919	104,976,971	9827	93.61

For 1920 and 1921 others have estimated the fatalities at 11,000 and 12,500 respectively indicating rates of 104 and 117 per million of the corresponding population.

Not all cities have suffered alike from accidents caused by motor vehicles. Significant variations, attributable in the main, to peculiarities of local traffic conditions and regulations, are depicted by the statistics for the following fifteen selected cities:*

*The 1919 figures were taken from Dr. Crum's pamphlet; the 1920 and 1921 figures from a bulletin of the National Bureau of Casualty and Surety Underwriters.

	Number of Fatalities			Rate per Million of Population		
	1919	1920	1921	1919	1920	1921
	Boston.....	129	90	104	173.4	119.7	137.3
Buffalo.....	73	103	79	145.3	201.5	152.0
Chicago.....	321	450	541	120.0	164.9	194.6
Denver.....	42	38	40	165.3	147.0	152.0
Detroit.....	138	173	134	142.7	169.5	125.2
Los Angeles.....	90	158	178	159.3	267.8	291.0
Newark.....	80	74	64	194.9	177.2	150.6
New York City.....	767	763	849	137.5	134.6	147.6
Providence.....	46	35	39	194.2	146.8	162.7
St. Louis.....	97	102	112	126.2	131.3	142.5
San Francisco.....	89	92	92	177.3	179.3	176.9
Springfield, Mass.....	24	19	23	188.2	144.3	169.5
Trenton.....	16	14	29	135.4	116.2	236.2
Washington, D. C.....	64	43	55	148.1	97.1	121.1
Yonkers.....	18	11	16	181.5	108.6	154.8

Accurate nation-wide statistics of the number of non-fatal automobile accidents do not appear to have been kept. For New York City, the material compiled by the local police department indicates a ratio of approximately 25 non-fatal injuries to every fatal one. Even if only a fraction of this proportion obtains for the entire country, the attending loss looms appreciably large. And when to the total number of these personal losses is added the number of accidents involving damage to the property of others, a picture is had of the extent to which the automobile has become a source of public danger.

PREVENTATIVE MEASURES

In an effort to curb the destructive tendencies of the motor vehicle, communities have been gradually turning their attention to the regulation of conditions governing its operation. The fear, has long existed that hasty legislation would unduly decrease the efficiency of the automobile as a business or pleasure vehicle and so affect its sale. An industry which in 1921 gave employment to about two and a half million people, added over 126 million dollars to local and state treasuries for taxes and fees, and exported 104 million dollars worth of finished goods, is undoubtedly entitled to all possible encouragement instead of ill-advised restrictions. Nevertheless, it has come to be recognized that a measure of helpful legislation will in the long run promote the

use of the automobile. Not only the general public but the painstaking automobilists, too, must be protected from those careless drivers who have earned the nicknames of "road hog," "fliverboob" and (the much-to-be-dreaded) "speed maniac."

The proposals that have been advanced by safety experts who have grappled with the problem center around (a) the licensing of operators; (b) the registration of motor vehicles and (c) adequate traffic regulations.

(a) Most important, perhaps, is the question of who shall be permitted to sit at the wheel. A minimum age requirement for operators has come to be generally recognized as necessary for keeping out the immature. As adopted by the several states, however, this minimum age varies from 14 to 21 years—some have no such restriction at all—with the casual driver usually qualifying at a lower age than the professional chauffeur. A uniform requirement of 18 years for all operators is to be recommended.

The candidate for a license to operate an automobile should also undergo a rigid physical examination in order to establish the good condition of his senses that is needed for driving in our crowded sections. His moral record ought to be investigated and if found not absolutely clear, a license could well be refused him. The present situation of bootleggers, highwaymen and other criminals employing the automobile in the conduct of their depredations calls for speedy correction. A thorough test of the candidate's driving ability and of his acquaintanceship with the construction of the car can be added to the list of prerequisites.

Keeping in mind the limitations of an examination as a means of determining the probable future actions of the operator, special attention ought to be given to weeding out those who later prove themselves undesirable. Thus, it is entirely logical to require at periodic intervals renewal physical and moral examinations as well as driving exhibitions in order to derive the complete and timely benefits of such supervision.

Repeated careless or illegal operations of the car should be made to result in the suspension or even complete revocation of the license. On this phase of the question favorable attention is merited by section 290-a of the New York State Motor Vehicle Law, which permits a suspension or revocation of the license for the following chief causes: 1. "For a third or subsequent violation of the

speed provisions of this article, or ordinance or regulation made by competent local authority, within one year;" 2. "Because of some physical or mental disability of the holder, or the disability of the holder by reason of intoxication or the use of drugs;" 3. "Because of the conviction of the holder at any time for a felony;" 4. "For habitual or persistent violation of any of the provisions of this article, or of the general highway traffic law, or of any lawful ordinance, rule or regulation made by local authorities in relation to traffic;" 5. "For gross negligence in the operation of a motor vehicle or operating a motor vehicle in a manner showing a reckless disregard for life or property of others;" 6. "Knowingly permitting or suffering any motor vehicle under the direction or control of the holder to be used in aid or furtherance of the commission of any crime;" 7. "For preventing lawful identification of any motor vehicle under the holder's direction or control, or evading lawful arrest or prosecution while operating such motor vehicle;" 8. "For wilfully evading lawful prosecution in another state or jurisdiction for an offense committed therein against the motor vehicle or traffic laws thereof."

An idea of the extent to which law-breaking motorists have been engaging the attention of the police is presented by the following record of arrests and convictions in New York City:

Offenses	Arrests					Convictions*				
	1917	1918	1919	1920	1921	1917	1918	1919	1920	1921
Violation of traffic regulations.....	18,453	14,997	30,018	40,662	43,152	17,859	14,349	27,890	39,944	42,254
Speeding automobile.....	9,875	9,927	17,693	24,596	25,650	9,659	9,645	17,538	24,243	25,594
No lights.....	4,396	3,475	7,846	13,259	12,519	4,359	3,429	7,862	13,395	12,153
Operating without license.....	1,526	1,892	906	4,786	6,243	1,285	1,697	720	4,447	5,215
Motor vehicle law violation.....	1,192	2,249	5,091	7,912	4,638	1,102	2,118	4,789	7,241	4,433
Smoking automobile.....	1,357	1,264	2,726	3,373	2,544	1,330	1,280	2,543	3,391	2,476
Passing close to a stopped car.....	1,239	947	1,654	2,173	1,834	1,186	907	1,462	2,140	1,707
Reckless driving.....	1,139	1,093	1,120	1,424	1,439	760	712	787	964	966
Unnecessary noise.....	359	88	130	406	586	313	65	88	399	564
Operating vehicle while intoxicated..	175	152	173	334	276	93	88	75	153	156
Dazzling lights.....	311	101	216	425	236	303	101	186	447	210
Speeding around corner.....	54	59	73	462	225	46	54	62	435	220
Running away after accident.....	219	194	236	309	179	43	26	27	50	55
	40,295	36,438	67,882	100,121	99,521	38,338	34,471	64,029	97,249	96,003

*Convictions, include dispositions of arrests made in previous years.

Indeed, so great had the congestion become in the New York City traffic courts that the local authorities recently adopted the plan of allowing drivers of motor and horse-drawn vehicles five infractions of minor ordinances before summoning them into court. Offenses like driving on the wrong side of the street, parking too near a fire-hydrant, lack of lights, misusing a one way street, etc., are now being cared for by the warning card system, except where there has been involved, besides, substantial injury to person or property or the same has been narrowly averted, in which case a summons may be issued or an arrest made.

In Massachusetts, a state commission that was appointed in 1921 to investigate "the expediency and necessity of requiring the owners of motor vehicles to carry liability insurance" had before it this impressive data:

Year	Autos Registered	Motor-cycles Registered	Number of Persons Killed	Number of Persons Injured	Licenses Suspended	Licenses Revoked	Drivers' Rights Suspended
1908	18,066	1,922	13	486	51	44	
1909	23,971	2,394	54	989	132	68	
1910	31,360	3,358	77	963	198	90	
1911	38,907	3,658	110	1,248	254	95	
1912	50,132	5,034	142	1,962	325	190	
1913	62,660	7,127	188	2,923	365	198	
1914	77,246	8,161	229	4,010	521	231	34
1915	102,633	9,520	294	6,197	615	303	181
1916	136,809	10,713	315	9,131	641	514	232
1917	174,274	11,065	438	7,282	794	717	300
1918	193,497	12,862	499	8,598	957	811	398
1919	247,183	13,698	582	16,287	1,013	856	264
1920	304,631	15,143	481	21,182	1,270	1,172	346
1921	360,732	12,058	536	11,487	1,940	1,119	629

The killed and injured were further classified as follows:

Killed	1914	1915	1916	1917	1918	1919	1920	1921
Pedestrians.....	150	188	219	260	304	379	316	335
Occupants of autos...	56	84	68	128	136	160	114	157
Motorcycle riders.....	18	15	15	33	28	25	28	28
Bicycle riders.....	3	3	7	11	19	17	12	14
Occupants of carriages	2	4	5	5	4	1	1	..
Street car passengers..	..	..	1	1	8	..	10	2
Injured								
Pedestrians.....	2303	3110	4710	4001	3871	5719	7731	6524
Occupants of autos...	879	1521	2363	1831	3560	8712	11055	3744
Motorcycle riders....	337	636	895	682	504	677	870	424
Bicycle riders.....	256	497	613	524	428	622	868	594
Occupants of carriages	217	421	521	223	192	541	344	173
Street car passengers..	18	12	29	21	43	10	218	28

(The remarkable decrease in the number of non-fatal injuries for 1921 is probably due to better police protection and increased vigilance on the part of the authorities with respect to the suspension and revocation of licenses and rights.)

(b) After passing upon the fitness of the driver, attention must next be directed to the condition of his automobile. The vehicle should be officially inspected and tested for mechanical defects before being registered, even at the risk of duplicating the precautions that are usually taken in the factory and repair shop. The use of bumpers, signal lights, non-glaring headlights, mirrors for revealing the roadway behind the car, and chains for reducing skidding can justly be insisted upon. At registration, notation can be made of the vehicle's secret descriptive numbers and a bill of sale or other evidence of a clear title required in order to curb the numerous thefts that have also accompanied the increasing popularity of the motor car.

(c) Finally, communities can assist the safety movement by establishing uniform and specific traffic regulations, the proper enforcement of which will probably entail a substantial increase in the number of their traffic policemen. Special attention should be paid to the opening of one-way streets and to the grading of speed limits according to particular zones within the city.

Recent accident prevention campaigns have stressed the fact that eternal vigilance is the price of safety. This idea must be kept alive, the public—pedestrian, passenger and driver alike—being periodically reminded of the needs for exercising great care

and faithfully observing the local traffic rules. The success of recent intensive safety-first movements in Chicago, Detroit, Rochester and St. Louis is pointed to as indicative of the improvement that is possible in this direction.

THE GROWTH OF COMPULSORY AUTOMOBILE INSURANCE

The reality of the automobile menace has been keenly felt by those seeking to collect damages. After the injured party had finally succeeded in establishing in court the negligent operation of the machine, there still remained the task of collecting the judgment that had been awarded him. Where the defendant was a person of visible means, this enforcement was not a difficult matter. But where, as in numerous cases, the owner was judgment-proof and without liability insurance justice was denied its course. One of the relics of our war-time prosperity is the class of people who persist in maintaining automobiles the surrender of which would figuratively as well as literally, put them on their feet again.

An obvious source of recovery would appear to be the automobile itself. But those who have had to turn to the vehicle as their last resort know only too well how little money it yields. On the average, a motor car's depreciation is complete in three years. Its depreciated value is often still further reduced in the forced sale that ensues for the discharge of the lien. Nor is it usually the high priced machine that is attached for default in the payment of the judgment. Its owner is quite often financially able or, at least, carries sufficient liability insurance. So that the majority of these liens can be expected to be levied against the poorer grades of cars with their diminished values.

The judgment-creditor will also learn that a goodly number of the automobiles sported by apparently wealthy people are already heavily mortgaged. It is quite a common practice for a motor car to be acquired by a small cash payment, the balance to be paid for in due time. Or, short in funds yet loathe to part with his car the owner may have hypothecated it for a temporary loan. Finally, there is the cunning owner, who fearing just such an attachment has recorded against his vehicle a fictitious chattel mortgage of which he already holds a signed release. Thus, the

relief offered to the injured and bereaved by the imposition of a lien against the automobile appears to be rather limited, even where the statutes give preference to attachments of this sort.

On the general question of indemnifying injured persons, the Massachusetts commission that studied the problem in 1921 stated: "The carrying of liability insurance is, of course, a common practice but many cars are operated without this form of protection, and in such cases the injured person is relegated to his rights against the person actually causing the injury. If this person is of sufficient financial responsibility the injured person can, of course, recover, but persons of financial responsibility are exactly the ones who are likely to be covered by liability insurance. It unfortunately appears to be a fact that a not inconsiderable proportion of automobile operators are without sufficient financial responsibility to meet a judgment even of moderate size, and that frequently they own only a small equity in the machine they are operating, the title remaining in a person or corporation which has advanced money for the purchase of the car. That under these circumstances many injured persons are entirely without legal redress is to be expected, and a number of instances have been brought to our attention where that redress has in fact proven entirely inadequate."

Even where an insurance policy was in force at the time of the accident, collection of the judgment was not always possible. Until recently, the majority of these contracts provided for the indemnification of the assured for the claim payments that he was legally required to make. Thus, if the assured were bankrupt and so could not be made to pay the award against him, the carrier likewise became freed from its obligation. It has been alleged, too, that unscrupulous adjustors have gone so far as to buy back their insurance policies after the occurrence of an accident, and so left judgment-proof debtors unable to make restitution for the harm they had done.

Besides these practices, certain clauses of the standard policies, incorporated in perfectly good faith as a necessary safeguard of the carrier's interests were also proving a means of denying the injured party the compensation that he could not otherwise obtain from the defendant. For instance, under the terms of the contract, the insurer was usually rendered free from liability if the accident occurred while the automobile was being operated:

(1) in a speed contest; (2) by a person under the minimum age established for local drivers; (3) by an unlicensed operator in states where such license is required; (4) by an intoxicated person; (5) in a manner which violated the declaration warranties—employing a private livery car as a taxicab, for example. The provisions governing the giving of claim notice and the limit on the carrier's maximum liability for injuries to all persons involved in any one accident also conspired in the same direction. Public-spirited defendants have been known to borrow money to meet judgments procured against them, becoming thereby in turn entitled to indemnification by the carrier. It was not to be expected that they would go quite as far where, because of the policy exclusions, the insurer was not liable for the judgment.

A situation was thus being created where the numerous automobile accidents were in many cases leaving the injured and the bereaved without the restitution to which the courts had deemed them justly entitled.

The legislative authorities were then called upon to right the wrong by providing a means of enforcing court awards. Commencing in 1916 in New Jersey, the compulsory automobile liability insurance movement has already spread to Arizona, Connecticut, Illinois, Nevada, New Hampshire, New York, Oregon, Washington and Wisconsin. In several states only the more thickly populated centers are covered by these acts as for instance in Illinois, where the state law covers Chicago solely and in New York where only New York City, Buffalo and Rochester are included. Besides these territories, numerous cities have, like Cleveland, Gloucester, Los Angeles, Minneapolis, St. Paul, and Youngstown established similar ordinances of their own accord.

The majority of these acts embrace the operation of all public passenger automobiles. The possibilities of these cars injuring passengers as well as pedestrians, their great exposure to accidents and the fact that, as a class, their owners are below the moral and financial standards of other automobile owners probably led to their being singled out for special treatment. In some states the law's scope is further restricted to jitneys and taxicabs or even to the former exclusively, as in New Hampshire. In Washington, the act extends to the sphere of commercial trucking.

SPECIAL FEATURES OF THE COMPULSORY INSURANCE ACTS

Seeking to make certain the payment of the average awards procured against the owners of the vehicles coming within their purview, these compulsory insurance laws have introduced novel departures from the established underwriting practices. They no longer regard the automobile insurance policy as a contract of mere indemnity but require a direct settlement upon the issuance of the judgment, irrespective of the financial or legal status of the assured. Acts of omission or commission on the part of the assured—failure to give notice, violation of his warranties, etc.—are likewise not permitted to relieve the carrier of its liability. While, by requiring an official notice of cancellation five or more days before the same can become effective, the authorities are able to keep a car covered before and after an accident.

The above features are aptly illustrated by the New York act that was adopted in 1922. The statute took the form of an amendment to the state highway law and its enforcement was placed under the jurisdiction of the State Tax Commission. Its insurance clauses provide that: "Every person, firm, association or corporation engaged in the business of carrying or transporting passengers for hire in any motor vehicle, except street cars and motor vehicles operated under a franchise by a corporation subject to the provisions of the public service commission law over, upon or along any public street in a city of the first class shall deposit and file with the state tax commission for each motor vehicle intended to be so operated, either a personal bond with at least two sureties approved by the state tax commission, a corporate surety bond or a policy of insurance in a solvent and responsible company authorized to do business in the state, approved by the state tax commission, in the sum of two thousand five hundred dollars, conditioned for the payment of any judgment recovered against such person, firm, association or corporation for death or for injury to persons or property caused in the operation or the defective construction of such motor vehicle. Such bond or policy of insurance shall contain a provision for a continuing liability thereunder notwithstanding any recovery thereon." "Either a personal or corporate surety upon a bond filed pursuant to this section or an insurance

company whose policy has been so filed, may file a notice in the office of the state tax commission that upon the expiration of twenty days from such filing such surety will cease to be liable upon such bond, or in the case of such insurance company, that upon the expiration of such time such policy will be cancelled."

The New York statute thus clearly creates the unconditioned obligation to pay any judgment up to \$2,500 that may be obtained against the insured. The latter, however, retains the right to set up as a defense his own lack of negligence or the contributory negligence of the injured party.

The provision in the New York act for accepting either a surety bond or a liability insurance policy is also representative of these compulsory insurance laws. It might be well to re-state at this point the fundamental distinction between the two forms of protection. Under the bond, the surety (the obligor)—whether an individual or a corporation—undertakes to answer for the failure of the insured (the principal) to meet the judgments, to the extent of \$2,500 each, that may be obtained by one or more successful plaintiffs (the obligees). The principal is first called upon to meet the awards, failing which, whatever collateral he may have deposited with the surety is then applied toward satisfying the claims, the balance if any, being finally met by the surety. A liability insurance company, on the other hand, undertakes to investigate accidents, to defend the assured against the attending suits and, if unsuccessful, to pay the judgment with no previous recourse to the insured. Because of the usually larger amount of its net obligation, the liability insurance company assumes the greater risk.

INSURANCE LIMITS

Some localities have prescribed insurance limits other than the standard amounts hitherto offered by the liability insurance carriers. Thus, New York and Wisconsin have set up \$2,500, instead of the usual \$5,000, as the policy limit of the insurer's liability to any one person, Wisconsin also fixing \$5,000 as the upper limit in place of the customary \$10,000.

Such modifications as have been made in the property damage limits have all been upward of the existing \$1,000 maximum for

an accident, several states, as Illinois, New York and Wisconsin, fixing the same amounts for both property damage and public liability.

Attempts have already been made by the state legislatures of Illinois and New York to dispense with the upper limit of the carrier's liability. The Illinois officials finally accepted, instead, "10-10" limits for accidents to either persons or property,—the lower limit having been placed at \$10,000 for Illinois. New York, however, has followed the wording of its statute and has insisted upon the policy or bond providing for a continuing liability of \$2,500 for every judgment regardless of the total cost. This class of automobile liability insurance has therefore taken its place along with employers' liability and workmen's compensation insurance as an exception to those sections of the New York Insurance Law which limit the net amount of an individual risk on the carrier's books to 10% of its capital and surplus, if a stock company, or to 10% of its net and contingent assets, if a mutual company.

CONCLUSION

What the future of the compulsory automobile liability insurance movement will be remains to be seen. From present indications it apparently bids fair to follow in the footsteps of workmen's compensation insurance. Attempts have already been made in several states to extend the scope of these acts to all types of cars, to establish state funds for writing the line and even to replace them by automobile compensation acts, similar to the existing workmen's compensation codes. Unsuccessful though they have all been thus far, the spirit that prompted their suggestion is worthy of note as perhaps indicating the trend of the times.

If this resemblance to the workmen's compensation line be sustained, our members' experience in the latter field should enable them to supply helpful advice and guidance that will spare the automobile line unnecessary friction and lost motion.

Probably our most important activities will center around the making of correct automobile rates for the required local coverage. Referring to our contact with the workmen's compensation line, we recall that the pooling of statistics by all types of carriers has

made possible a wide and varied exposure which enjoys the confidence of the field. From the material thus collected gross rates have been constructed by non-partisan organizations employing approved statistical methods. It may be that a similar pooling of the latest experience with automobiles, especially public automobiles, will in time be adopted. With this as a base there can be developed currently correct rates which by the very close fit of their component items will tend to discourage the promiscuous undercutting that it is alleged has at times been practiced in the automobile line.

Our attention will also have to be given to the peculiarities of the various compulsory insurance acts in order that the local premium may be correctly related to the coverage provided in the different states or even smaller political divisions. Perhaps too, a sort of schedule rating of individual localities will be introduced for evaluating the particular attention being paid to the reduction of automobile accidents.

With the extension of compulsory automobile insurance there may come an increased state participation in the settlement of automobile claims and the control and administration of the rates. At the present time little state control is being exercised over the size of the automobile premium or the competitive conditions surrounding its use. Arkansas, Maryland, North Carolina, Oregon, Vermont and Washington require the rates to be merely filed with them to enable the authorities to pass upon charges alleging discrimination. New York and Wisconsin, however, exercise supervision over the reasonableness of the automobile rates employed in their territories, the former also passing upon the adequacy of these charges.

These are only a few of the ways in which the members of our Society may be called upon to co-operate with the public, the carriers and the state authorities in rendering the services that may be expected of us as a result of the compulsory automobile liability insurance movement.

THE ALLOCATION OF ADMINISTRATIVE EXPENSE
BY LINES FOR CASUALTY INSURANCE COMPANIES

BY

R. S. HULL

It is an astonishing fact in the light of present day knowledge, that the industrial development of this and other countries should have progressed so long, without producing until comparatively recently a science of cost accounting. Today an adequate cost system is a commonplace necessity for any progressive manufacturing concern. It exercises certain very important functions. First, it indicates and calls attention to fluctuations in cost from period to period in individual departments as well as in the product as a whole. It thus supplies a fair measurement, making due allowance for external conditions, of the efficiency and economy of the administration. Second, it furnishes a reliable means of allocating cost between different classes of products and so makes it possible to fix prices correctly on each. Third, it indicates when prices are fixed by competition or other outside influences, which line may be pushed to the greatest advantage, and which line must be handled more economically in order to show a profit. In other words, such a system points the way to wise economy in the weaker lines, and may prevent injurious retrenchment in the lines on which the company's prosperity depends.

One of the more recent developments of costing practice is the agreement by certain trade associations on a standard method of cost accounting. This is to be followed so far as possible by all members of the association with the object of eliminating unintelligent competition. Without such uniformity it sometimes happens that one large dealer, through ignorance of his true costs, will establish a price at which neither he nor his competitors can show a profit.

It is hardly necessary before this group to draw the obvious analogy between the costing requirements outlined above, and those of casualty insurance. The same needs exist for efficiency and economy to which correct expense allocation is the surest guide. Mounting costs, producing expense ratios excessive as

compared with premium income and loss ratios, have made the whole problem acute. The time has come when costs must be correctly allocated, as a preliminary to the study of necessary economy, as well as to form the basis of executive and selling policies, which shall continue to insure solvency and produce profits under adverse conditions.

In spite of the advance made in the past few years in the science of costs in manufacturing and mercantile lines, so far as I know, the entire literature of casualty insurance costing consists of the paper by Mr. Claude E. Scattergood on "Cost Accounting in Casualty Insurance," presented before this society in 1916, some pertinent remarks in Mr. William Leslie's recent paper on "Distribution of Surplus by Casualty Companies Writing Participating Insurance," and a brief memorandum presented by the writer of this paper for the Current Notes section of the last number of the PROCEEDINGS of this Society, of which the present paper is an elaboration. 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.

Insurance expenses naturally fall under certain general heads as—

- (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

The assignment of expenses to these divisions presents no particular problem.

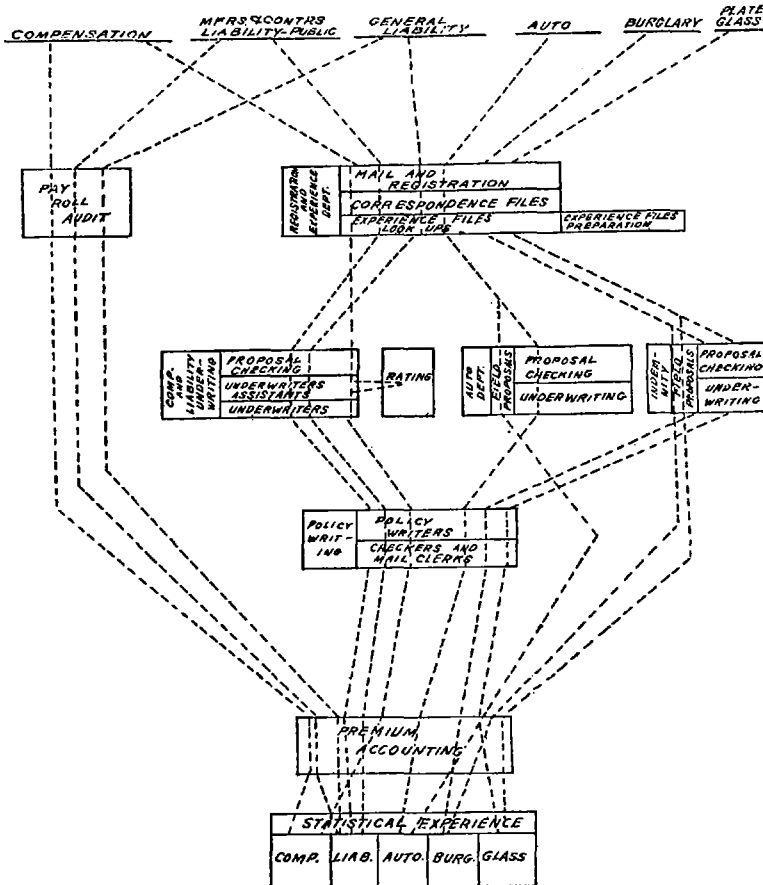
The question of acquisition expense is receiving so much attention at present that a discussion of it in this paper is unnecessary.

In allocating the home office administrative expense, the same principles can be followed which have been pretty firmly

established in cost accounting in manufacturing and commercial lines. The work to be done will fall roughly under the following divisions: first, the division of the office into groups, homogeneous as to the kind of work done; second, the ascertaining of a common unit of measurement to be applied to the different lines of business handled in each group; third, the finding of the cost of operating each group over the period under consideration (this may include salaries, charge for floor space, stationery and supplies, a share of the departmental supervision and charges for service from other departments); fourth, the finding of the cost per unit of work in each group, including both direct and indirect charges; fifth, the assembling of the charges in all groups to each line of insurance, and the addition of the general overhead charges for the company as a whole.

Taking up first the division of the office force into groups, a beginning will have been made by the division of the home office force into departments or administrative units. The next step will be the sub-division into groups of each department which handles more than one line of insurance. In the department which handles the underwriting and recording work, a convenient method of establishing the group divisions is to take a typical proposal of each kind handled and to follow it through its course of the office, noting each separate process involved in the work. Such a routing and sub-division of departments can perhaps best be illustrated by a diagram, showing the routing of different lines of insurance through a series of departments. This chart does not represent an actual company and does not pretend to be complete as it is illustrative only. It represents a company doing Automobile, Compensation, General Liability, Burglary and Plate Glass business.

It is assumed that all the proposals pass through the groups under the titles "Mail and Registration," "Correspondence Files" and "Experience Files." From the latter Division Compensation, Manufacturers' and Contractors' Liability and General Liability proposals pass through the Compensation and Liability Underwriting Department, where they go in turn to the Proposal Checking group, the Underwriter's Assistants and the Underwriter, a part of the Compensation business going through the Rating Division. From the Underwriting Division the proposals pass to the Policy



Writing Division, through the Premium Accounting to the Statistical. The business of the Automobile Department is divided into two main sections. The "Field Proposals" section handles business written in the Field and the "Home Office Proposals" section handles the business referred to the Home Office. Business passing through the Field Proposals section goes directly to the Accounting and Statistical Department. Business passing through the Home Office Proposals section goes to the Policy Writing department and then to the Accounting and Statistical. The Burglary and Plate Glass business passes through the Indemnity Underwriting, Burglary and Glass, divided between

Field Proposals and Home Office Proposals and from there follows the same route as the Automobile business. The Policy Writing Department handles all Policies written at the Home Office. The premium accounting for all lines is handled through a single division. The Statistical Experience work is divided into sections handling the different kinds of work. The Payroll Audit Department handles Compensation, Manufacturers' and Contractors' Public Liability and a little Automobile business which routes from there to the Accounting and Statistical Division.

Having established the working groups for the departments outlined above the second step is the establishment of units of measurements in each group. In the Mail and Registration and Correspondence Files groups, the cost will be divided between lines of insurance, in ratio to the number of each kind of proposal handled. In the experience file, it is necessary to consider the preparation of the experience, which would be affected by the number of claims in each line. It might be possible to divide this group between experience preparation and experience look-ups. The former would be proportional to the number of claims handled and the latter to the number of proposals. This completes in brief the outline of the work of the first department and gives a sub-division for each group, but there will be also a department head, miscellaneous clerks and runners to be accounted for, as well as floor space, furniture, stationery, etc., chargeable to the department as a whole. These must be distributed as an overhead on the direct charges, that is, in the same ratio as the total charges for each branch of insurance from all the groups together. It is immaterial so far as the principle of the matter is concerned, whether all these charges for expenses applicable to the particular departments are charged to the department and split in total; or whether each expense account, as for instance rent, is first split against the various departments and then sub-divided according to the percentage of the division of clerical salaries in each. In the latter case the aggregate of departmental charges may be reduced to a mean percentage applicable to the total rent charge. A little higher degree of accuracy will be produced in the case of rent and stationery charges if the number of clerks chargeable to each line of insurance is used instead of the salaries paid.

The Compensation and Liability Underwriting Division handles Workmen's Compensation, Manufacturers' and Contractors' Liability and General Liability.

In the proposal checking group it will be a simple matter by the means of time tests to establish weights representing the relative time required to handle the average proposal for each class of business.

These weights must be applied to the number of proposals in each line to give the basis for the division. The time of the underwriter's assistants and of the underwriters can hardly be measured so that a judgment division of their time between lines is about the only method possible. Where Public Liability is written concurrently with Compensation or Employers' Liability, the additional work entailed in the Underwriting Division is exceedingly small. It would seem that some charge should be made to the Public Liability group and that it should not all be allowed to ride entirely on the Compensation or Employers' Liability. On the other hand it cannot stand one-half the expense incurred. The most reasonable way of handling this would seem to be to give the Employers' Liability a weight as compared with Compensation in the same rate as the average rate of premium for the two lines. This method of weighting will be discussed more fully under the head of Payroll Audit.

In the Automobile Department the only problem is the division of expense between Liability, Property Damage and Collision. Since a single policy covers one, two or three of the lines, with practically no additional work involved after the first, there seems to be no better way than to divide the Underwriting and Policy Writing cost among the lines in ratio to the total premium for the year.

The Indemnity Burglary and Glass Underwriting Department is divided in the same way as the Automobile Department, but handles two separate lines. A test could be made in each group to establish weights for the two kinds of insurance handled, and the cost could be divided on the basis of the weighted number of each kind of proposal.

The Policy Writing Division should be distributed between lines of insurance according to the number of policies written at the Home Office, subject to such weighting as may be found necessary. Special treatment may be required for the clerks

or typists handling endorsements, to give due weight to the large number handled in some lines, as Automobile. In coming to the Premium Accounting Division and to the Statistical Division, we have to consider not only the policies written, but the items originating in the Payroll Audit Division, as well as cancellations, partial premium payments and the like. For these divisions, then, the best unit of measurement will be the number of paid premium items. The Statistical Division will handle also Loss Experience, which brings in an additional element. This work is so generally done on Hollerith or Powers cards that the number of cards punched for each year for both premiums and losses will usually be available and will furnish a very fair basis of measurement.

Enough has been said to outline the general method employed. In almost every department there will be clerks or groups of clerks which present some problems which will have to be settled by the application of common sense as it is impossible to lay down enough rules to cover every case.

The Audit and General Accounting Departments may fairly be classed as a general charge, but an analysis of these departments may suggest methods by which at least some of the clerks may be definitely allocated according to the duties performed. For example, an Audit clerk whose duties were confined to auditing the work of the Investment Department would be charged in the same way as the salaries of that department. Clerks auditing claim payments only could be allocated accordingly. After all direct charges have been made, the method of distributing the remaining overhead will necessarily be somewhat arbitrary. It is, therefore, highly advisable to make every effort to make the overhead group as small as possible. No salary should be allowed to go to it until due consideration has been given with the possibility of treating it as direct charges.

There is the group of departments which might be described as internal service departments, whose work is chargeable to other departments rather than direct to any line of insurance. This group may include Stenographic, Tabulating, Telephone Operators, Purchasing and Supply Departments, Office Supervision and Welfare. The Stenographic Department will usually keep records which will show the departments served so that the work may be charged to these departments and be

distributed in the same ratio as their respective departmental salaries. In the Tabulating Department the work may be divided to lines on the basis of the card forms handled or may be charged to the divisions served. This department lends itself very readily to the use of the machine hour rate so generally used in manufacturing costs. The machine rental, cost of floor space and power, and the salary of the machine tender can be reduced to an hourly rate to be charged for the use of the machine. It is probably as well to take the total cost of operating the sorting machines and divide it according to the actual hours of operation for the different divisions, and to do the same with the tabulators. The remaining clerks may be divided as an overhead on the machine time, or may be charged directly if the character of the work lends itself to such treatment. The Telephone Operators should be charged against other departments according to the number of telephone extensions used. The salaries and expenses of the Purchasing and Supply Departments should be treated as an overhead charge on the supplies issued. Office Supervision and Welfare Work should be charged to Departments according to the number of clerks in each.

After all the charges which can be disposed of by direct allocation have been assigned, there will remain a considerable total of general charges still to be disposed of. The writer believes that the best method of doing this is to treat the general charge as a percentage overhead on the directly assigned charges, that is, to distribute them in the same ratio as the total of the assigned items. There might be arguments in favor of distributing the salaries of the general executives between lines in ratio of the premium volume, but the argument would hardly hold for such classes of overhead charges as General Accounting or Audit Department.

Investment expenses, if it is thought necessary to divide them among lines of insurance, should be apportioned according to the reserves which make up investable funds of each department.

In the Payroll Audit Department a unit of division is readily at hand in the number of audits made for each line of insurance, but this figure will require considerable adjusting before it can be applied to produce accurate results. In the first place, it is necessary to take account of the concurrent audits. The additional cost of a Public Liability Audit for example made

concurrently with a Compensation or Employers' Liability audit will be negligible, but will probably be carried on the records of the Payroll Audit Division as one audit. It will be necessary then to determine the number of concurrent audits and to deduct this from the total number made over a given period. The net figure remaining, divided into the total cost of the Payroll Audit Division, will give an average cost per audit which will serve as a basis for subsequent computations. Take for example, the charge to be made to Public Liability on account of an audit. Assume that it has been found that approximately 90% of such audits are made concurrently with Compensation audits. Then 10% of the Public Liability audits must be charged for at the full average cost. The cost of the remaining 90% must be allocated between Compensation and Liability. It is hardly fair to charge Liability with merely the difference between the cost of a Compensation audit alone and of the two audits together, as this difference is negligible. If the cost were being divided for each individual audit, a division in proportion to premium would seem to be a fair one. However, in dealing with the whole group together some other method must be found. A division based on average premiums would be incorrect because premiums on Compensation Policies carrying Public Liability will on the average be higher than the average for all Compensation Policies taken together. The answer seems to be to make the apportionment on the basis of relative average rates.

Assuming that the average rate for Public Liability is \$.20 and the average for Compensation is \$1.20, then of the combined premium one-seventh belongs to Liability and six-sevenths to Compensation. This would seem to be a fair basis for dividing the cost of the audit. Therefore, the charge for Public Liability audits will be the number of such audits made, times 10%, plus 90% of the total number divided by seven, giving the chargeable number of audits, which will be multiplied by the average cost per audit to give the total charge.

Among the Liability audits will be found Team and Automobile risks, which cannot reasonably be charged at a figure representing the average cost of all audits, including Compensation. Since Compensation furnishes the greatest number of audits this raises a question as to the relation between the cost of the average Compensation audit and the cost of the minimum audit,

under which the two above groups might be expected to fall. The cost of an audit will be largely affected by the number of classifications involved. An estimate given by a Payroll Auditor of the average number of classifications per audit will almost invariably be too large, as the large audits which may require several days to make and which may cover sheet after sheet of classifications, while they make a strong impression upon the auditor, are very much the exception. A test of over one thousand audits indicated that the average audit carries not over three classifications, and that the simplest kind of an audit on which it is hardly necessary to do more than go through the motions, will cost, during its passage through the Field and the Home Office, approximately one-half as much as the average audit. It will, therefore, not be far wrong to take the number of minor Liability forms and charge for them at one-half the average cost, taking account also of the fact that Teams, and some of the other forms as well, will frequently be made concurrently with regular Compensation Audits.

The division of inspection costs has had considerable study in connection with the Boiler Statistical Plan. The companies which have adopted that plan will probably be able to furnish a fair segregation of their inspection costs by line. But for all companies it is necessary to have some method of arriving at these costs as they will differ widely between the different lines of insurance. Inspections lend themselves readily to costing on the basis of the Inspectors' daily report, to which the overhead items may be added on the basis of the time actually spent in Field inspections. Probably the simplest and most workable plan is to take the total number of inspections made and the total number of inspection hours spent at each kind of insurance, including the time necessary to make reports, and to divide the company's total inspection costs for the period under consideration by the total number of inspection hours. This will give a cost per hour, including direct and indirect costs. This figure multiplied by the total number of inspection hours for each kind of business will give the total charge for the period to each line.

Reference has been made to time tests as a means of establishing weights for some of the units of work. The method of making such time tests is to take a number of proposals, or whatever unit is under consideration, representing each kind of insurance

handled by the group. These should be followed through the processes which it is desired to study, and a record kept of the exact time necessary to pass them through the routine work. Under some conditions it may be advisable to make detailed tests with a stop watch of the different parts of the process. Care must be taken that the conditions of the tests are as nearly identical as possible for the different kinds of insurance, and that the groups of proposals, or policies handled, are large enough to reproduce substantially, the average sized risk. It may be necessary to make tests on several different days, and to average the results. It may be advisable also in some groups to study the number and character of irregular cases which require special treatment. Unless tests are quite extensive it is obvious that the time required for handling the work under test conditions will not be that which will be reproduced in the ordinary day's work. Therefore, the results will represent relative time between different lines rather than a rate of production which can be expected over considerable periods. In addition to its value in the cost allocation, it is possible that a very important by-product of such study will be the introduction of greater efficiency into the methods of handling the office work.

Of the expense items, the largest will probably be travelling expense, rent, furniture and fixtures, stationery and supplies. Wherever possible expenses should be charged directly by lines. Otherwise they should be charged to the department served, or if necessary, to general overhead. Traveling expense accounts will naturally be distributed in the same ratio as the salary of the individual or the aggregate salaries of the department to which they pertain. Rent or floor space, as noted above, can be assigned to departments and split according to the salaries or the number of clerks in each. Stationery and supplies can usually be charged directly by lines, or to departments. If no record is kept of the issue of small office supplies by departments, they can be charged on a formula based on the total number of clerks chargeable to each line, or a very similar result will be reached if the aggregate salaries are used in place of number of clerks.

The furniture and fixture account raises an interesting point as it represents an asset having a life running over a number of years, but since the Insurance Departments will not accept it as an admitted asset, it is usually charged off in the year in which

the expenditure is incurred. Having once charged off the cost of a given lot of equipment, probably against the department for which it was originally ordered, the Accounting Department has no further interest in the matter and the equipment may then be moved in or out of storage or sent to another department without any further charges being made. The result is, that a new department, organized perhaps in a time of expanding business and high-priced equipment, might be charged in the first year of its existence, with a lot of expensive furniture and mathematical machines which would represent the greater part of its equipment needs for a good many years to come. On the other hand a department which was organized during a period of slack business might be furnished entirely out of storage or by drawing on other departments and secure its entire equipment at a negligible cost so far as the books of the company were concerned. The proper method for charging a department for equipment is to spread the charge over the life of the equipment in use in the department. This method is effective where furniture and fixtures are carried as an asset and depreciation is charged off each year according to the equipment in use in each department. It is possible, however, to produce substantially the same effect by treating the expenditure for this account in each year as if it represented merely the cost of maintaining the existing equipment, and charge it as if it were a depreciation charge,—that is, in proportion to the value of the equipment in use in each department at the beginning of the year.

When ratios have been established for charging the salaries and expense for all departments on the basis of a years' work, the same ratios may be used for the following year subject to adjustments at the year end, if there has been a decided shift in the relative volume of business between lines, or if economies have been introduced which effect some lines more than others. A thorough resurvey should be made at least once a year and the ratios either checked or corrected for use in the following year.

It is hoped that enough has been said to bring out some valuable discussion on this subject of expense allocation. The subject is a large one and should have the benefit of many view points. The problems presented will vary greatly in different companies but it should be possible to solve all or most of them on some common ground, that will produce reasonably correct

results that shall be consistent as between companies. It is time that the insurance companies gave this matter of expenses careful study and established at least a few basic principles of correct cost allocation so that expense ratios produced by different companies may have the same significance and so that each class of insurance may carry its own burdens.

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

BY

W. J. CONSTABLE

In March, 1922, a plan for collecting accurate wage and employment statistics was put into operation by the National Council on Workmen's Compensation Insurance. Data have been accumulating since that time and the first bulletin giving comparative figures for the State of New York has recently been issued. It is the purpose of this paper to bring before the members of the Casualty Actuarial Society the methods and results of this plan.

THE IMPORTANCE OF WAGE LEVELS IN WORKMEN'S COMPEN- SATION RATEMAKING

The experience upon which workmen's compensation rates have been based at each revision has always been obtained from Schedule "Z". Due to the present methods of accounting, two years must elapse before Schedule "Z" for any particular policy year is available. The experience, for example, for policy year 1920 is just now becoming available in 1922. It is obvious that between the time represented by the experience and the time when it becomes available, changes in wage levels may have taken place. These changes in wage levels tend to vitiate the experience unless they can be measured. The payrolls indicated by the experience may be materially changed because of a change in wage level and likewise the losses, which are based upon a percentage of the injured employee's wages, may also be changed. In view of this lag in securing experience statistics for workmen's compensation ratemaking, authoritative data showing the recent trend in wages and in employment and industrial conditions generally are of great importance in ratemaking and are vitally necessary for the use of committees when rates are under consideration.

INFORMATION AVAILABLE BEFORE THE 1920 REVISION AND AT
THE TIME OF THE 1920 REVISION

Prior to the 1920 revision very little wage data were available. The problem of bringing experience to the level represented by current conditions had to be met therefore, wholly by the use of judgment. Factors were inserted in the rates which were supposed to measure the changes that had taken place in wage levels and industrial conditions. It was generally understood that the use of this type of factor in the 1920 revision would be avoided. At the same time it was admitted that from the years represented by the experience (1916-1917 policy years) to the year to which the rates would be applicable (1920) a great many changes had taken place which would have to be measured. These changes were measured in the 1920 revision by the use of so-called "projection factors" (See Actuarial Problems of the 1920 Revision of Workmen's Compensation Insurance Rates—A. H. Mowbray—Proceedings Vol. VI page 250).

WAGE DATA NEEDED FOR COMPENSATION RATEMAKING

The calculation of "projection factors" necessitated the use of some judgment, although they were more firmly based on experience than were the factors used in earlier revisions. Even at the time of the 1920 revision no authentic wage data which would show the current level of wages were available.

The problem of determining a suitable method for keeping track of the trend of experience so that the rates might be more promptly adjusted to meet changing conditions was referred early in the 1920 revision to the Actuarial Committee of the National Council. After extended consideration, the Actuarial Committee reported that, in its judgment, no more satisfactory way of solving this problem could be had than that afforded by the annual application of the "projection factor" test. Subsequently, the matter was informally discussed among the members of the Actuarial Committee and an outline of a plan for securing accurate wage statistics, at a minimum expense and trouble, which would be very nearly up to date, was submitted to the Committee.

WAGE DATA WHICH THE NEW SYSTEM IS DESIGNED TO SECURE

The new system is designed to secure data directly from actual compensation insurance business giving definitely and in classified form, the recent trend of wages. This will furnish a suitable basis for determining the probable future trend of wages. The system is designed to secure wage and employment data by classifications at intervals of one year. It is expected that a study of the data combined by months will give for each state practically a running average of weekly wages by industries. By a comparison of the number of employees during the first week of the policy period with the number during the last week, when a large group of policies of the same expiration date are studied, it will be possible to show the extent of employment and unemployment at a given time as compared with the same period in the preceding year.

METHODS AND DIFFICULTIES OF THE NEW SYSTEM

The system provides for the printing of blanks by the National Council (see Appendix A) which are supplied to the carriers without cost. These blanks are padded in blocks of 100 blanks (50 pairs) together with a carbon sheet for use with each pad. These pads are distributed by the carriers to their payroll auditors who are required to prepare and transmit to the home office in duplicate a report, as called for in the blank, for each policy audited. The original of the two copies returned by the auditor to the home office is kept by the carrier and the duplicate forwarded to the office of the National Council, which undertakes the compilation and analysis of these data.

It will be noted upon reference to the blank that the data furnished are for two separate weeks which in most cases are one year apart. The following instructions for filling out the blank will explain the method of securing the statistics and the use of the blank. These instructions are printed on the cover of each pad distributed so as to be available to the payroll auditor at any time.

"The blank shall in each case, for purposes of identification, show the name of the carrier and policy number, the state in

which the operations of the risk are carried on and the date of the audit. On the upper half of the blank shall be shown by classification the number of employees and weekly payroll for the first week of the policy year for which the audit is made, and on the lower half of the blank the corresponding figures for the last week of the policy year or audit period. The figures are to be taken from the original payroll records of the assured, classified in the same way in which the total audit figures are classified.

"The weekly payroll reported shall be the total weekly payroll for each classification as shown by the payroll books plus the proper proportion of the monthly or semimonthly remuneration paid foremen, superintendents and other workers who may be paid by check. The number of employees shall be determined by adding together the number of employees shown for each day upon which work was done and dividing by the number of such days, for this purpose counting partial days as full days (since the number of employees would be entered for partial days as for full days). Ordinarily this divisor would be 6 but will vary in the case of seven day industries and for weeks in which one or more holidays occur. To the total number as so determined shall be added the number of superintendents, foremen, etc. paid by check whose names do not appear on the regular payroll.

"On the line provided for recording the working hours for each week shall be entered the number of normal working hours for the interval into which the particular week falls. This, in general, will be the hours worked in that week, but where a holiday occurred within such week they will ignore the effect of the holiday closing.

"It being the purpose of the investigation to get the comparative trend of wages and employment, note shall be made in the space provided at the bottom of the blank when the payroll for either week was reduced by reason of a holiday intervening or was reduced or increased by reason of reduced hours or overtime work. Such comments are necessary for interpreting the returns received. In any case where the insured's books are so kept that this information cannot be obtained, the blanks shall be returned to the home office together with memorandum of explanation why the information cannot be obtained."

The National Council, upon receipt of this sheet carefully audits the data in order to see that they are consistent for the two periods. The proper coding is entered on the card which is then sent to the punch room where the data are punched on a Hollerith card. The card used in this tabulation is reproduced in Appendix B.

Only the month and year of the final period are punched on

this card. Since comparison of degrees of employment is to be made at periods one year apart, only one date is necessary, the date of the initial period being one year prior to the date punched on the card.

Of course, many reports are received on which the data cover periods at intervals of less than one year due to interim audits or cancellations. For these reports, one card is punched for each period with the proper date and also with a coding in the "Special Items" column. By means of this coding these cards can be eliminated before a comparison of employment is made. It is obvious that, when a comparison of degrees of employment is to be made, it is essential that the date used cover the same risks for each period. If the tabulation is to give data as to average wages at any specific time, the "special item" cards can be included in the tabulation.

One of the first difficulties which arose was to determine how the reports should be made out in the case of a seasonal industry where the policy anniversary fell in the off season. If the payroll reports came in for the busy period only, the data might be misleading and imply that the industry was working under maximum pressure throughout the year unless it were known to be a seasonal industry. It was decided, that it would give a better indication if the same rules were followed in this industry as in other industries and that unless the plant was actually closed down at the time of the audit, the first and last weeks of the audit period should be reported. Assuming that the policy expiration dates are uniformly distributed through the year, this will give indications both of wage trend and of employment conditions throughout the year and at various times during the year which is the purpose of the plan. In cases, however, where the plants are actually shut down at the time of the audit, it was decided that data for a week during the busy season should be reported. Of course, these data could be used to produce average wage indications only, for the corresponding week of the preceding year would be missing unless the home office was able to furnish it from previous records.

Another difficulty arose relative to the reporting of the data where an assured furnished board and lodging. It was decided that the cost of board and lodging should be included in the report.

Still another difficulty was encountered in the case of an assured who maintained no payroll records. The carriers were advised that oral statements should be reported if the auditor was convinced from other evidence of their correctness. It was felt that the size of the risk which kept no payroll records would be very small and the inclusion or exclusion of these reports would have very little effect.

It was expected that when the data were compiled in the office of the National Council there would be sufficient basis for a study of industrial groups if not of individual classifications. When the first tabulation was made, however, it was found that, even by industrial schedules, the data were not sufficiently extensive to form a basis for conclusions. The entire data for each state were then tabulated and these figures analyzed.

RESULTS

The first tabulation for the State of New York is reproduced in Appendix C.* Even this combination of all the experience for the State of New York which was filed at the time the tabulation was made was not extensive enough to go very far in drawing specific conclusions. It showed, however, that average employment conditions in the establishments from which these figures were derived were approximately the same in 1922 as in 1921; that average earnings were about 5 per cent. less in 1922 but that during the first half of 1922 the trend of wages was slightly upward. For comparison with these figures the National Council had the data which are gathered and published by the New York State Department of Labor. Both sets of data showed the same trend as to employment and wage levels, although the National Council average wage figures were higher throughout. This was probably due to the difference in the way the two sets of data were gathered. The National Council data give the rate of earning for a full time worker since the rule provides for reporting the average number of workers for each week reported. The rate of wages is calculated by the New York Department of

*Subsequent to the presentation of this paper, a second tabulation was made and the tabulations for New York, New Jersey and Massachusetts are presented.

Labor by dividing the total earnings by the maximum number working on any day during the week,—that is, the total number of names on the payroll. This method of reporting would tend to decrease slightly the rate of wages. Nevertheless, comparison showed that the National Council data were sound and, on the whole, in line with the Labor Department's data.

Tabulations were made for each state but for no other state were the data sufficiently extensive to issue any bulletin to the carriers. A second tabulation is now being made and it is hoped that this will produce sufficient volume to enable the National Council to issue figures for a number of states.

In addition to this use of the data for comparative studies to be bulletined to the members of the National Council, it has been found to be of value in other respects. For example, a recent amendment to the Georgia Workmen's Compensation Law increased the maximum limit of compensation from \$12 to \$15 per week and decreased the minimum limit from \$6 to \$4 per week. A calculation of the effect of this amendment as made by the National Council showed that the cost of compensation under the law was increased about 4%. Due to the age of the compensation law in Georgia, (effective March 1, 1921) no distribution of wages for the state was available and it was necessary for the National Council, in calculating the effect of the amendment, to use a distribution of wages obtained from the states of Tennessee, Maryland, Virginia, Louisiana and Kentucky, which were thought to have a level of wages closely resembling Georgia. The proposed increase was protested by certain interests in Georgia on the ground that, because of the very low wages prevailing in that state, the increase in the maximum limit would be more than offset by the decrease in the minimum limit. A tabulation of the National Council wage data, while not extensive, showed that the average wages for Georgia were abnormally low. Of course, no wage distribution could be obtained from these data but the average wage seemed to bear out the contention of the Georgia interests protesting against the increase.

These data were brought into use in another way in the State of Texas where in September, 1922, certain amendments were proposed to the compensation law, the effect of which it was necessary to determine. The latest Texas wage distribution in

the office of the National Council was for the last half of the calendar year 1919. A tabulation of the wage data for Texas showed the average wage during the first half of calendar year 1922 to be about \$26. The average wage at the time of the 1919 wage distribution was approximately \$23. From these two sets of data it appeared that the Texas wage level was about ten per cent. higher in 1922 than during the last half of 1919. Assuming that the ten per cent. average increase was distributed uniformly on all wages it was possible to bring the 1919 wage distribution to the present level. This change in the distribution produced a limit factor differing from that calculated by using the 1919 wage distribution and therefore made more accurate the calculation of the probable effect of the proposed amendment.

FUTURE USE FOR NEW WAGE DATA

At the present time the plan has been in effect only a little over six months and the data so far are limited but, even in their limited extent, have been found very useful. It is realized that before any definite conclusions can be drawn from the data a wide exposure must be obtained and that a considerable period of time must elapse before the exposure will be available. However, the data already are broad enough to indicate a trend which will be helpful in determining the proper level for any new rates.

It is also felt that these data, giving both the trend of wages and an index of general business conditions through comparative indications of employment and unemployment, will be useful for underwriting and other uses in home offices. If the data are broad enough to be tabulated by groups of industries, they will indicate which industries are taking on new employees, and thereby possibly increasing the hazard by bringing in less well-trained workers, as well as where workers are being laid off. Through the explanatory comments which are to be studied and reported by the National Council, it should also become evident where plants are working full time or where only part time.

These data should be useful to the payroll audit departments of the various carriers. A comparison of figures compiled by the carrier's home office from its own experience with the figures of all carriers as compiled and sent out by the National Council

would be valuable to the audit departments in checking up the results of their audits and to the financial department in forecasting the general trend of premium income to the extent that it is effected by changes in business conditions.

As outlined in the opening paragraph, the purpose of this paper is to present the methods and results of this new plan. It is hoped that the discussion of this paper at a future meeting will bring from the members of the Society helpful criticism of the methods used in compiling these statistics. It is believed that the data have justified the work necessary and have proved of such value that the plan should be continued. While the results of the plan have not been as valuable as expected, each tabulation produces a larger volume of experience from which increasingly dependable conclusions may be drawn.

WAGE STATISTICS DATA

(Name of Company)

Copy for Home Office.

Policy No. _____ Date of Audit _____

Week ending _____
(First week of policy period)

State	Classification Number	No. Employees		Payroll		

Working Hours per Week _____

Week ending _____
(Last week of policy period)

State	Classification Number	No. Employees		Payroll		

Working Hours per Week _____

Notes and Comments _____

NATIONAL COUNCIL ON WORKMEN'S COMPENSATION INS.

Carrier	Policy Number	State	Class	Sched.	Group	Exp. Year	INITIAL PERIOD			FINAL PERIOD			Special Items	Counter
							Number Employees	Weekly Payroll	Hrs. Per Week	Number Employees	Weekly Payroll	Hrs. Per Week		
0 0	0 0 0	0 0	0 0 0	0 0	0 0 0	0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0	0
1 1	1 1 1	1 1	1 1 1	1 1	1 1 1	1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1 1	1 1	1
2 2	2 2 2	2 2	2 2 2	2 2	2 2 2	2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2	2
3 3	3 3 3	3 3	3 3 3	3 3	3 3 3	3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	3 3	3
4 4	4 4 4	4 4	4 4 4	4 4	4 4 4	4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4	4
5 5	5 5 5	5 5	5 5 5	5 5	5 5 5	5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5 5	5 5	5
6 6	6 6 6	6 6	6 6 6	6 6	6 6 6	6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6 6	6 6	6
7 7	7 7 7	7 7	7 7 7	7 7	7 7 7	7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7 7	7 7	7
8 8	8 8 8	8 8	8 8 8	8 8	8 8 8	8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8 8	8 8	8
9 9	9 9 9	9 9	9 9 9	9 9	9 9 9	9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9 9	9 9	9
1 2	3 4 5	6 7 8	9 10	11 12 13 14	15 16 17 18 19	20 21 22 23 24 25	26 27 28 29 30	31 32 33 34 35 36	37 38 39 40	41 42 43 44 45				

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APPENDIX B

NEW JERSEY

ALL SCHEDULES

APPENDIX C

Date of Tabulation	1921			1922			1921			1922		
	JANUARY			JANUARY			FEBRUARY			FEBRUARY		
	First Period			Final Period			First Period			Final Period		
	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage
*	131	4,085	31.18	104	3,453	33.20	166	4,564	27.49	158	4,429	28.03
**	67	1,388	20.72	55	1,258	22.87	42	1,159	27.60	43	1,168	27.16
Total	198	5,473	27.64	159	4,711	29.63	208	5,723	27.51	201	5,597	27.85
	1921			1922			1921			1922		
	MARCH			MARCH			APRIL			APRIL		
*	737	18,615	25.25	780	18,419	23.61	2,061	56,310	27.32	2,165	54,264	25.06
**	545	14,686	26.95	571	13,050	22.85	1,326	31,932	24.08	1,254	29,295	23.36
Total	1,282	33,301	25.98	1,351	31,469	23.29	3,387	88,242	26.05	3,419	83,559	24.44
	1921			1922			1921			1922		
	MAY			MAY			JUNE			JUNE		
*	1,720	41,598	24.18	2,044	52,468	25.66	316	7,962	25.19	331	8,219	24.83
**	3,151	79,854	25.34	2,987	75,015	25.11	1,971	54,856	27.83	2,076	57,099	28.97
Total	4,871	121,452	24.93	5,031	127,483	25.34	2,287	62,818	27.47	2,407	65,318	27.14
	1921			1922			1921			1922		
	JULY			JULY			AUGUST			AUGUST		
*	65	1,231	18.93	32	780	24.37						
**	1,872	44,934	24.00	1,906	46,988	24.65	499	13,929	27.91	633	15,853	25.04
Total	1,937	46,165	23.83	1,938	47,768	24.65	499	13,929	27.91	633	15,853	25.04

*Date of Tabulation August 17, 1922.

**Date of Tabulation October 16, 1922.

MASSACHUSETTS

ALL SCHEDULES

APPENDIX C

Date of Tabulation	1921 JANUARY						1922						1921 FEBRUARY						1922					
	First Period			Final Period			First Period			Final Period			First Period			Final Period			First Period			Final Period		
	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage
*	57	1,001	17.56	133	3,136	23.57	210	5,864	27.92	230	5,862	25.48	210	5,864	27.92	230	5,862	25.48	230	5,862	25.48	230	5,862	25.48
**	7	146	20.86	13	295	22.69	48	1,311	27.31	27	580	21.48	48	1,311	27.31	27	580	21.48	48	1,311	27.31	27	580	21.48
Total	64	1,147	17.92	146	3,431	23.50	258	7,175	27.81	257	6,442	25.07	258	7,175	27.81	257	6,442	25.07	257	6,442	25.07	257	6,442	25.07
1921 MARCH																								
*	1,910	48,029	25.14	1,865	48,430	25.96	8,660	206,549	23.85	9,095	215,227	23.66	8,660	206,549	23.85	9,095	215,227	23.66	8,660	206,549	23.85	9,095	215,227	23.66
**	222	5,295	23.85	246	5,586	22.71	5,004	104,826	20.95	5,268	100,378	19.05	5,004	104,826	20.95	5,268	100,378	19.05	5,004	104,826	20.95	5,268	100,378	19.05
Total	2,132	53,324	25.01	2,111	54,016	25.59	13,664	311,375	22.68	14,363	315,605	21.97	13,664	311,375	22.68	14,363	315,605	21.97	13,664	311,375	22.68	14,363	315,605	21.97
1921 APRIL																								
1921 MAY																								
*	6,398	156,163	24.40	6,320	153,659	24.31	2,145	53,782	25.07	2,311	55,187	23.88	2,145	53,782	25.07	2,311	55,187	23.88	2,145	53,782	25.07	2,311	55,187	23.88
**	4,033	93,336	23.14	3,887	93,272	24.00	4,479	102,816	22.96	4,425	101,660	22.97	4,479	102,816	22.96	4,425	101,660	22.97	4,479	102,816	22.96	4,425	101,660	22.97
Total	10,431	249,499	23.92	10,207	246,931	24.19	6,624	156,598	23.64	6,736	156,847	23.28	6,624	156,598	23.64	6,736	156,847	23.28	6,624	156,598	23.64	6,736	156,847	23.28
1921 JUNE																								
1921 JULY																								
*	1	13	13.00	6	128	21.33	933	20,767	22.26	1,002	22,503	22.46	933	20,767	22.26	1,002	22,503	22.46	933	20,767	22.26	1,002	22,503	22.46
**	4,174	104,171	24.96	4,446	109,563	24.64	933	20,767	22.26	1,002	22,503	22.46	4,174	104,171	24.96	4,446	109,563	24.64	4,174	104,171	24.96	4,446	109,563	24.64
Total	4,175	104,184	24.95	4,452	109,691	24.64	933	20,767	22.26	1,002	22,503	22.46	933	20,767	22.26	1,002	22,503	22.46	933	20,767	22.26	1,002	22,503	22.46
1921 AUGUST																								

*Date of Tabulation August 17, 1922.

**Date of Tabulation October 16, 1922.

TREND OF WAGES AND EMPLOYMENT

NEW YORK

ALL SCHEDULES

Date of Tabulation	1921 JANUARY 1922						1921 FEBRUARY 1922					
	First Period			Final Period			First Period			Final Period		
	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage
*	2,622	78,732	29.87	2,657	79,906	30.07	1,387	36,601	26.39	1,412	33,635	23.82
**	236	6,191	26.23	243	6,075	25.00	285	7,691	26.99	338	7,955	23.54
Total	2,858	84,923	29.57	2,900	85,981	29.65	1,672	44,292	26.49	1,750	41,590	23.77
Date of Tabulation	1921 MARCH 1922						1921 APRIL 1922					
	First Period			Final Period			First Period			Final Period		
	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage
*	3,016	89,307	29.61	2,820	79,357	28.14	10,505	284,443	27.08	10,736	283,450	26.49
**	1,172	35,295	30.12	1,086	33,620	30.96	4,715	121,822	25.84	4,867	125,151	25.71
Total	4,188	124,602	29.75	3,906	112,977	28.92	15,220	406,265	26.69	15,603	408,601	26.19
Date of Tabulation	1921 MAY 1922						1921 JUNE 1922					
	First Period			Final Period			First Period			Final Period		
	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage
*	8,672	250,665	28.91	8,576	239,010	27.87	1,852	56,891	30.72	1,879	55,425	29.50
**	9,881	274,956	27.83	8,594	231,855	26.98	13,463	360,166	26.75	14,170	383,652	27.07
Total	18,553	525,621	28.33	17,170	470,865	27.42	15,315	417,057	27.23	16,049	439,077	27.36
Date of Tabulation	1921 JULY 1922						1921 AUGUST 1922					
	First Period			Final Period			First Period			Final Period		
	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage	No. Emp.	Payroll	Aver. Wage
*	87	3,271	37.60	87	3,135	36.03						
**	12,379	325,305	26.28	13,168	342,242	25.99	1,922	49,937	25.98	2,144	55,289	25.79
Total	12,466	328,576	26.36	13,255	345,377	26.06	1,922	49,937	25.98	2,144	55,289	25.79

*Date of Tabulation August 17, 1922.

**Date of Tabulation October 16, 1922.

PERMANENT TOTAL DISABILITY FROM
ACCIDENTAL CAUSES

BY

W. N. WILSON

A disabled life table, to be proper and suitable as a basis of evaluating permanent disability claims arising out of accidental causes, should be constructed out of data similar in nature and accumulated under conditions closely paralleling those which gave rise to the disabilities it purports to measure. It is unfortunate that, so far as the writer has been able to ascertain, no American permanent total disability table based entirely upon lives disabled by accidents has been produced. It was because of a realization of this growing need that the experience herewith presented was compiled; and it is being submitted to this Society with the hope that it may stimulate sufficient interest in the subject to prompt others with similar experience available to prepare it, so that ultimately a dependable basis may be afforded for an American experience table based solely upon lives disabled by accidents.

The data consists mainly of mortality rates for the first five years after inception of disability as experienced upon workmen's compensation permanent total disability cases of the Travelers Insurance Company; a distribution of these same cases by nature of disability; and, for comparative purposes, a similar distribution of disease permanent totals as experienced on Travelers life contracts.

REVIEW OF EXISTING LITERATURE

By far the best papers so far published upon the subject of permanent total disability will be found in the Transactions of the Actuarial Society of America.* Many of the members present are thoroughly familiar with these papers, but some who have been following other fields of actuarial work might appreciate a brief

*A great deal of literature on this subject has also been published in other countries, but as Mr. Dawson in his discussion of Mr. Little's paper states, "The most valuable literature is in the T. A. S. A." Other sources, however, are: "The Swiss Experience," published by Haer Schaertling; "The German Government's Table on Death Rates Among Workingmen," Mr. Louis Weber; "Bulletin of the French Institute of Actuaries"; and the French table "1904-Tariff."

review of what has heretofore been published pertaining to the subject of this paper. In giving such a review the opportunity will also be taken to emphasize any references which have been made in the past to the accident phase of the subject. At first thought it is surprising how few these have been, but it does not seem so remarkable when it is remembered that disability coverage as offered in connection with life insurance involves no factor which would tend to cause a predominance of either sickness or accident claims.

Excellent articles on permanent total disability have been written by Messrs. Jackson, Meade, Pipe, Bohlman, Little and Hunter, and with several of these are presented large volumes of American fraternal experience. (T. A. S. A.) The discussions, likewise published in the Transactions, will also be found valuable and interesting. It should be mentioned, however, that each of these articles is largely devoted to the development of formulae for calculating disability premiums and the treatment involves primarily the rate at which lives become disabled, whereas this paper deals with a further stage, the course of life after the commencement of disability.

One of the most valuable contributions is that of Mr. Arthur Hunter, which appeared in volume twelve. Using as the basis of his article the experience of three American fraternal, Mr. Hunter has given a very clear mathematical treatment of premium calculations for disability benefits on life contracts, including a few remarks as to the value, from a life insurance standpoint, of tables prepared from fraternal records. He would anticipate a considerable difference in the experience, due partly to the possible inaccuracy of the statistics and partly to the difference in exposure produced by medical selection in life insurance.*

Mr. Hunter is among the few writers who have included a treatment of disabled lives during the period of disability. He has given mortality rates by ages for each of the first ten years as well as aggregate rates covering in all 3,027 disabled lives. An interesting statement is also included to the effect that the death rate upon disabled lives may, with the gradual increase in the period of

*The difference here referred to would show up in the rate at which healthy lives become disabled. There is a further difference to be expected in the experience of fraternal and insurance companies, and that is to be found in the mortality rate after disability, the difference being due to the varying degrees of disability considered as permanent and total.

disability, be expected to approach that of the general population as a limit, as one may expect that the lives remaining after a few years will be composed largely of the blind, victims of double amputations, and other invalids whose disabilities will not be serious obstacles to longevity.

Mr. Little is another writer who, in addition to a discussion of disability premiums, has devoted a portion of his article to the mortality of disabled lives. (Vol. XIV, T. A. S. A.) He even goes a step further than some by intimating that the lives disabled by disease will probably die off more quickly than those disabled by accident, the point being raised in connection with the possibility of selection against a life insurance company where an option is granted of choosing paid up insurance or an annuity. That particular problem, however, has since then become less important as the provisions of the disability clauses in life insurance have changed. Nevertheless, the mention by Mr. Little and the consequent discussion of the point by Mr. Jackson show that even back in 1913 the American actuaries were thinking seriously of the possible difference in mortality on accident and disease victims.

Mr. Meade, in T. A. S. A., Volume XII, presents another very interesting article on permanent total disability. He does not distinguish between accident and disease victims. He does, however, strongly emphasize the point that the possibility of an invalid surviving a number of years is increased up to a certain point with the lapse of time after the beginning of disability.

This last point is very important and will bear considerable thought. One often hears a remark to the effect that some certain injured person, having been totally disabled for a number of years, probably cannot have much longer to live. In the case of a man disabled only a year the remark might be that in all probability he will not die for several years. This type of reasoning is based too much on the thought that disabled lives may be expected to live on the average a certain number of years. The whole subject takes on a different aspect when we consider Mr. Meade's quotation of Mr. Louis Weber—a French authority—"that whether the invalidity result from disease or accident, it is always a sign of the weakening of the organism, and that morbid state, present or past, constitutes a second factor, at least as important as age, which influences the degree of vitality. Invalidity is, therefore, at each instant, subject to two causes of death—weakness due to increas-

ing age and weakness due to infirmity." Further on Mr. Weber continues—"an invalid of forty who was stricken with incapacity for work twenty years before is unquestionably much more robust than another invalid of the same age who has been the victim of an accident at the age of thirty-nine, for the very fact of having survived twenty years after a shock so violent as to cause permanent disability is certainly a guarantee of future survival which is not afforded to the recent invalid."

If Mr. Weber's thoughts are accepted as reasonable, the obvious practical conclusion is that the reserves for pensions to totally disabled lives should increase for some time after the beginning of disability even though payments have been made meanwhile.

The experience presented by Mr. Meade is also taken from American fraternal and covers 5,144 disabled lives, of whom 2,361 had died at the end of the period of observation. Mr. Meade, like Mr. Hunter, gives the mortality rates by age and year of disability.

Mr. Craig in his discussion of Mr. Hunter's paper brings out another point which deserves attention in studying mortality rates on disabled lives. Admitting that the mortality rates do decrease for a time at least after inception of disability, then it must be conceded that there is bound to be a difference in the aggregate mortality rates produced by any two different sets of experience, depending upon the distribution of the exposure as between fresh lives and those disabled for some time. In considering this point it is interesting to note that the German government statistics show the mortality rate at age 35 to be .22 for the third year after disability; .14 for the fifth year, and .11 at seven years after the commencement of disability.

It is further contended by some writers that an ultimate table on disabled lives would show a mortality closely approximating that of the general population. There is room for difference of opinion on this point, however, as the past morbid state referred to by Mr. Weber must always have some influence on vitality. If it were possible to determine the exact relation of the two laws involved, an ultimate table might be developed, but this is a refinement hardly to be hoped for. The obstacles encountered in producing even an aggregate table have led many of the life actuaries to the conclusion that the only practical basis of valuing annuities to invalids is by means of a select table, and when a select table is available, based upon sufficient and reliable exposure,

it will undoubtedly replace any existing tables used for valuation purposes.

Mr. Flynn, in his discussion of Mr. Meade's paper, also speaks of the decreasing mortality rate just mentioned, pointing out that "the use of an aggregate annuity table on disabled lives will give results which will be seriously underestimating the liability in valuing annuities on lives disabled a few years."

In discussing the possible difference in the experience on disease as against accident cases, Mr. Flynn again states that, "a table prepared from general permanent total disability statistics may not be adequate when applied to cases of permanent total disability as encountered in workmen's compensation insurance," presumably because the latter are primarily due to accident. To support his contention he compares the annuity values of Mr. Meade, based upon disease and accident cases combined, with the annuity values used in France in valuing claims under employers' liability experience, which latter table he believed to have been based upon lives disabled by accident only. His comparison follows:

Age	Meade	English Employers' Liability	French Employers' Liability (1904—Tariff)
25	15.803	16.235	20.758
35	13.935	14.403	18.715
45	11.236	12.372	15.932
55	9.089	10.004	12.637
65	7.473	7.250	9.079

A still more remarkable comparison is that of the annuity values as of date of inception of disability.

Age	Meade	French (1904—Tariff)
20	6.3891	16.9403
30	7.9994	15.9610
40	7.3793	13.8719
50	6.7371	11.1670
60	6.3193	8.3216
70	6.0358	5.4558

If the differences noted in the above figures can be attributed to the type of disability, accident or disease, as Mr. Flynn suggests, then there can be little doubt but that the distinction is an important one.

Following the presentation of this comparison, Mr. Dawson, in an oral discussion, stated that in Norway "an analysis of available experience has led the actuaries to adopt the practice of assuming accident permanent total annuities the same as those for the general population." This practice is no doubt an extreme one, especially if applied when the period of disability has been less than two years. It does, however, show very clearly how far in this direction Norwegian actuarial opinion has crystalized.

OPPORTUNE YEAR FOR CONSIDERATION OF SUBJECT

This is an exceptionally opportune year for a consideration of this subject, as the growth of the non-cancellable form of accident and health contract has interested many persons in life pension contracts who have not hitherto dealt extensively with them. Mr. Cammack has offered a reserve table for annuities on this line, and his table is being generally accepted. There is the possibility, however, that its use on non-cancellable claims may lead to the practice of applying it to "regular accident" claims. Consequently, it is necessary to bear in mind that, whereas the table is applicable to a line such as non-cancellable accident and health insurance, where claims may be expected to occur from disease and from accident in natural proportion, it is not advanced as a proper reserve table for claims arising solely from accidents, as is the case in "regular accident" insurance.

VALUE OF WORKMEN'S COMPENSATION DISABILITY EXPERIENCE

By far the largest volume of experience in this country on accident permanent total cases is that of the companies issuing workmen's compensation insurance, but this is not truly representative of all accident total disability as only "at occupation" accidents are included. This objection is not serious, however, as it is the resulting disability and not the cause of accident which influences the mortality rate and the only possibility of a different mortality rate on "at occupation" and "foreign to occupation" disability cases is the possibility that the two "distributions by nature of disability" differ. One thing is certain, that a table based on this experience would be the best possible for valuing

workmen's compensation permanent total pensions. It may further be contended that an error is involved in using workmen's compensation experience unless that of all companies covering all States and all industries can be obtained, as the resulting values will be unduly influenced by the experience of particular sections and particular industries. However, it is too much to hope that all experience can be obtained and it is, therefore, advisable to study the data that is available. If several of the larger companies would compile their experiences, these, when combined, even though not the entire experience of the country, should furnish valuable indications, if not a dependable basis for mortality rates.

It should be mentioned here that although various State insurance departments have required the reporting of all permanent total experience, and one at least has published the mortality experience on a part of the cases reported, it is not safe to use these data in the preparation of a mortality table, as a number of inaccuracies enter into these figures which it is impossible for the departments to correct. An example of such is found in the inclusion of permanent partial cases which have been granted permanent total awards.* The companies could easily exclude such cases by an examination of their claim files.

One bad feature of the workmen's compensation experience is that the claims have not developed beyond a few years, and consequently the mortality rates can be studied for only a short period. For the same reason, the total number of deaths experienced so far would necessarily be small, whatever the volume of experience obtained. It is not essential, however, especially considering the preparation of a select table, that the number of deaths be large, if the exposure for the first five years is sufficient. All that is necessary is a comparison of rates for the first few years with those of existing tables. The data furnished herewith shows very few deaths, but the indications of even this small volume should not

*The late Dr. Downey has published certain data compiled from the experience reported to the Pennsylvania Insurance Department. The objections to accepting the mortality rates shown by that experience are: The possible inclusion of permanent partial cases; the undue influence of particular industries when only one State's experience is included; and the possible inaccuracies in age due to the fact that no pensions are provided in that State and consequently the age is not deemed so important in reporting. In considering the nature of disability distribution, it can be readily believed that this feature is not followed up as closely by the department as would be possible from an examination of company claim files.

be ignored if we consider the exposure, remembering at the same time that Mr. Meade's entire experience covered only a little over 5,000 lives and Mr. Hunter's considerably less than that. Again, probably neither experience included as many accident permanent totals as does the experience here given.

PREPARATION OF DATA HEREWITH PRESENTED

In preparing the data from which the mortality rates were drawn, it was first necessary to examine each of the claim files to determine whether the nature of disability was really permanent and total, or whether the case was a permanent partial that had been granted permanent total compensation. Thirty-five of this latter type were found and accordingly excluded from the experience. It will also be noted that only the mortality on lives disabled prior to age 60 is shown in the first exhibit. The experience was divided at this point for two reasons; first, because various forms of insurance are now issued where only disability occurring prior to age 60 is covered, and secondly, because a large number of the permanent total cases over age 60 are caused only partly by the accident and partly by the age of the injured. It is not unusual for a doctor to pronounce an old man unable to return to work, when in reality he has fully recovered. The explanation is that the man would be able to work only a few years longer in any event before he would be disabled by old age, and both the doctor and he believe the pension to be of greater value than any possible future wages. Of course, great care is taken on the part of all insurance companies to guard against such claims, but it is impossible to prevent a few of them. In the experience used there were over 90 lives included where disability occurred after age 60, and in all probability a considerable number of these were recoveries not reported.

PERMANENT TOTAL DISABILITY MORTALITY EXPERIENCE
(Travelers Workmen's Compensation Experience)

AGE	SECOND YEAR			THIRD YEAR		
	Exposure	Actual Deaths	Hunter's Expected	Exposure	Actual Deaths	Hunter's Expected
16-20	5.00	0	1.9	3.91	0	.8
21-25	12.17	0	3.8	7.16	1	1.2
26-30	21.83	1	5.8	16.25	1	1.3
31-35	30.50	3	7.6	25.41	1	3.0
36-40	22.58	0	5.0	11.83	0	1.3
41-45	30.33	0	6.7	25.58	1	3.0
46-50	18.41	2	3.9	18.41	2	2.7
51-55	22.08	3	4.5	19.16	0	2.5
56-59	23.16	0	4.5	10.66	0	1.4
	186.06	9	43.7	138.37	6	17.2

	FOURTH YEAR			MORE THAN FOUR YEARS		
16-20	1.00	0	.1	.00	0	.1
21-25	4.00	0	.4	1.50	0	.1
26-30	12.11	0	1.1	6.58	0	.4
31-35	18.25	0	1.5	19.41	2	1.1
36-40	9.91	0	.7	4.00	1	.2
41-45	17.33	0	1.4	23.33	1	1.3
46-50	13.91	0	1.3	18.16	1	1.2
51-55	15.83	0	1.6	12.16	0	.9
56-59	6.58	0	.7	8.16	0	.7
	98.92	0	8.8	93.30	5	6.0
Total all years	516.65	20	75.7			

COMPARISON OF ACTUAL AND EXPECTED MORTALITY

There were over 330 cases in the experience before the two limitations of age and permanent partial disability were applied, or in all about one-tenth the exposure used by Mr. Hunter. A comparison with the latter's table shows that even though the Travelers' data is meagre, it is, nevertheless, consistent throughout in its indications of low mortality. Mr. Hunter's table was used for comparison not only because it is the generally accepted standard in this country, but also because it shows lower rates than either Mr. Meade's or Mr. Pipe's, and is 9 per cent. lower in the aggregate than the German government tables.

The totals of the figures show 20 actual deaths as against 76 expected. The actual number of compensation deaths might have

increased considerably before the mortality would have become even one-half that of Mr. Hunter's. Judging from these figures, it would appear safe to assume that the mortality from the second to the fifth year of disability is not more than half the expected, according to Hunter's table.

There was some question as to just what rates of mortality to use as Mr. Hunter's in order that the figures might be directly comparable.* The rates used in preparing the following comparison are the lowest which it was believed might reasonably be taken for this purpose. The experience on lives over age 60 is also given as well as a comparison of actual and expected deaths using the American Experience mortality rates.

TOTAL DISABILITY MORTALITY EXPERIENCE
(Travelers Workmen's Compensation Experience)

SECOND AND SUCCEEDING YEARS COMBINED				
Age	Exposure	Actual Deaths	Expected Hunter	Expected (Amer. Exper.)
16-20	9.91	0	2.28	.08
21-25	24.83	1	4.24	.20
26-30	56.77	2	6.97	.47
31-35	93.57	6	8.62	.82
36-40	48.32	1	4.20	.45
41-45	96.57	2	8.31	1.02
46-50	68.89	5	6.12	.86
51-55	69.23	3	6.62	1.13
56-59	67.88	1	7.23	1.56
60 and over (taken as 63)	121.77	7	13.77	4.13
	657.74	28	68.36	10.72

ACCIDENT VS. DISEASE MORTALITY

From the last tabulation it is seen that the death rate on accident permanent totals, although much lower than the expected according to disability tables, is still considerably above that of the American experience. The conclusion to be drawn, if any were possible, would be that the accident permanent total mortality rate is not more than half that of disease permanent totals, and, taking Hunter's as the best example of the latter, this would reduce

*Mr. Hunter has assumed the application for disability to be made on the anniversary date of the policy. An interpolation of the values given by him is therefore necessary before a comparison can be made with the data given in this paper.

to the more specific statement that accident permanent total mortality rates for the first five years of disability may be taken as one-half the rates shown in Hunter's analyzed table. (That Hunter's table is not high for disease cases has been shown by the results of two or three investigations of life insurance companies.)

One of the life actuaries has suggested that although the mortality for the first few years may be heavier on disease permanent totals than upon accident, nevertheless, after the lapse of several years, this may not be true, and may even be the opposite, owing to the fact that a large percentage of the then remaining disease permanent totals will be blind and insane persons, upon whom the mortality will be not far from that of the general population. This last if true would undoubtedly be perplexing; but perhaps the answer is, at least it so appears from the distributions in this paper, that the percentage of blind invalids is not large, and the mortality of insane persons is actually a great deal heavier than that of the general population. Some interesting data tending to support this last conclusion have been added as an appendix to this paper.

MORTALITY CURVE FOR FIRST YEAR OF DISABILITY

Another interesting tabulation taken from available workmen's compensation experience is the distribution of deaths throughout the first year of disability. Four hundred and fifty-one deaths from accident, occurring from two days to one year after the date of accident, were investigated.

It was assumed that all of these cases were of permanent total disability, as each was disabled from the accident till the time of death. Mortality rates were calculated for several different periods throughout the year. The results are interesting, as they show the remarkable drop in the mortality rate with the lapse of time after accident. As the exposure was the same as that used in the investigation of the mortality after one year, these long term cases have been included in the number exposed. Mortality rates for all ages combined are shown for each period. Mr. Hunter's analyzed table shows the decrease in the rates with each succeeding year. This tabulation with the accompanying graph offers a

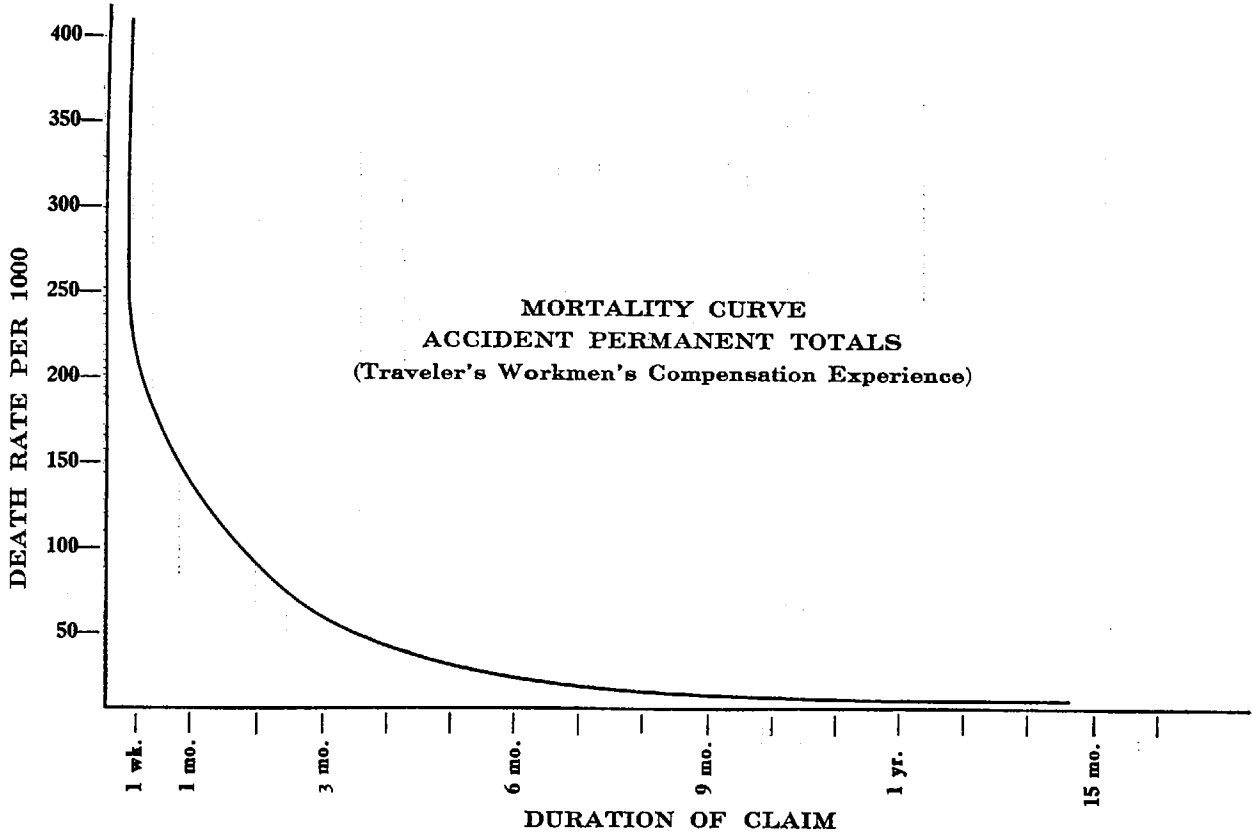
picture of the way the mortality curve runs during the first year. It should be noted that the periods used in the tabulation are of increasing length.

DISTRIBUTION OF DEATHS BY PERIODS

LIVES DISABLED BY ACCIDENT

(Travelers Workmen's Compensation Experience)

DURATION	No. DEATHS	EXPOSED	MORTALITY RATE
2-7 Days.....	157	637	.246
8-15 Days.....	97	480	.202
16-30 Days.....	64	383	.167
2nd Month.....	48	319	.150
2nd Two Months.....	35	271	.129
3rd Two Months.....	30	236	.127
3rd Three Months.....	15	206	.073
4th Three Months.....	5	191	.026
2nd Year.....	9	186	.048
3rd Year.....	6	138	.043
4th Year.....	0	9	.000
More than 4 Years.....	5	93	.054



MORTALITY CURVE
ACCIDENT PERMANENT TOTALS
(Traveler's Workmen's Compensation Experience)

DISTRIBUTION OF DISEASE PERMANENT TOTALS BY TYPE
OF DISABILITY

In support of the statement that Mr. Hunter's table is probably based primarily on disease cases, it might be mentioned that in an investigation of 333 permanent total disability claims approved by the Travelers' life department, only nine were the result of accident. Likewise, Mr. Craig's distribution, Mr. Henderson's, and others that have been published, invariably show a small percentage of the disability cases arising from accidents. As there is no appreciable factor connected with any of these experiences which would tend to cause an unduly large number of either type of claim, it may be assumed that Mr. Hunter's experience is largely composed of disease victims.

The distribution of the Travelers claims is here given:

CAUSES OF TOTAL PERMANENT DISABILITY
(CLAIMS APPROVED BY THE TRAVELERS'
LIFE DEPARTMENT)

	Individuals	Policies
<i>General Diseases</i>		
Tuberculosis of Lungs.....	106	123
Other Varieties of Tuberculosis.....	5	5
Cancer and Other Malignant Tumors.....	18	24
Other General Diseases.....	14	15
	143	167
<i>Diseases of the Nervous System</i>		
Locomotor Ataxia.....	10	10
Other Diseases of the Spinal Cord.....	17	20
Cerebral Hemorrhage and Apoplexy.....	17	27
Paralysis without Specified Cause.....	5	6
General Paralysis of the Insane.....	38	43
Other Forms of Mental Alienation.....	47	61
Epilepsy and Non-Puerperal Convulsions..	3	3
Other Diseases of the Nervous System....	9	11
Blindness.....	8	8
	154	189
<i>Diseases of the Circulatory System</i>		
Organic Diseases of the Heart.....	7	8
Diseases of the Arteries.....	4	5
	11	13
<i>Diseases of the Respiratory System</i>	3	4
<i>Diseases of the Digestive System</i>	1	2
<i>Diseases of the Genito-Urinary System</i>		
Bright's Disease.....	3	6
<i>Diseases of the Bones</i>	3	4
<i>Affections Produced by External Causes</i>		
Traumatism.....	6	11
Fractures, Cause not Specified.....	2	6
Other External Violence.....	1	1
	9	18
<i>Cause of Disability Not Specified</i>	6	6
Total (February 1, 1922).....	333	409

MORTALITY RATE VARIES WITH TYPE OF DISABILITY

It might also be well to mention at this point that the mortality rate may be expected to vary according to the nature of disability. This is brought out strongly in the next three distributions prepared from practically the same workmen's compensation experience as was used for the previous tabulations. It will be seen that some causes of disability, such as "Burns," have practically no long term cases, while others show a large percentage in the distribution for over one year. Thus, it can readily be seen that having produced a table of mortality rates on disabled lives, its applicability to any other permanent total disability experience will depend largely upon the degree to which the original nature of disability distribution is reproduced in the particular experience to be considered. It is possible that, in the distant future, experience will be available in sufficient volume to permit the tabulation of exposures and deaths for each of the more frequent forms of invalidity and the preparation of separate reserve tables for each. Such refinement, however, is rather visionary, and for a long time to come a single standard accident permanent total mortality table is all that can be hoped for, and, in fact, is all that would now be practical.*

*A comparable problem exists in life insurance. It is generally admitted that the mortality rates differ for various sections of the country, but the practice prevails of using one mortality table for the entire United States. Clerical expense, travel privileges, lack of experience, and many other considerations make the use of more than one table impractical.

PERMANENT TOTAL DISABILITY

DISTRIBUTION BY NATURE OF DISABILITY OF LIVES TOTALLY DISABLED
BY ACCIDENT
Surviving *Less than Three Months* after Accident
TRAVELERS WORKMEN'S COMPENSATION EXPERIENCE

Nature of Disability	Age at Accident			
	Under 60	60 and Over	Unknown	All Ages
Loss of, or Loss of Use of Both Feet	1	..	..	1
Paralysis of Legs	1	2	..	3
Other Paralysis	1	1	..	2
Hernia	8	1	..	9
Back or Spine Injury	34	3	2	39
Tuberculosis	1	..	..	1
Hip Injury	15	6	3	24
Fractured Skull	51	16	6	73
Nervous Shock	2	..	..	2
Abdominal Injury	7	4	1	12
Neck Injury (Broken, etc.) .....	..	1	..	1
Septicaemia	31	18	6	55
Tetanus	2	2	3	7
Gangrene	2	2	2	6
Burns	38	2	8	48
Gassed	1	..	1	2
Trauma to Body	16	5	..	21
Meningitis	3	1	1	5
Hemorrhage	5	4	..	9
Pneumonia	11	..	..	11
Peritonitis	4	..	..	4
Internal N. O. C.	30	5	13	48
Other N. O. C.	25	8	7	40
	289	81	53	423

DISTRIBUTION BY NATURE OF DISABILITY OF LIVES TOTALLY DISABLED
BY ACCIDENT
Surviving *More Than Three Months and Less Than One*
Year After Accident
TRAVELERS WORKMEN'S COMPENSATION EXPERIENCE

Nature of Disability	Age at Accident			
	Under 60	60 and Over	Unknown	Total
Loss of, or Loss of Use of Both Feet	1	..	..	1
Paralysis of Leg	1	..	..	1
Hernia	1	1	..	2
Back of Spine Injury	8	2	..	10
Tuberculosis	2	..	..	2
Hip Injury	5	1	2	8
Fractured Skull	5	1	..	6
Nervous Shock	1	..	..	1
Abdominal Injury	2	..	..	2
Septicaemia	4	2	2	8
Gangrene	1	..	1	2
Internal N. O. C.	7	2	2	11
N. O. C.	8	2	2	12
	46	11	9	66

DISTRIBUTION BY NATURE OF DISABILITY OF LIVES TOTALLY DISABLED
BY ACCIDENT*

Surviving *One Year* After Accident

TRAVELERS WORKMEN'S COMPENSATION EXPERIENCE

Nature of Disability	Age at Accident			Total
	Under 60	60 and Over	Unknown	
Loss of, or Loss of Use of Both Eyes...	31	2	3	36
" " " " " Feet...	27	14	2	43
" " " " " Hands..	17	9	0	26
" " " " One Hand and One Foot	4	2	0	6
Mentally Affected.....	11	3	0	14
Paralysis of Legs.....	12	1	1	14
Other Paralysis.....	12	4	0	16
Hernia.....	2	3	0	5
Back or Spine Injury.....	37	14	4	55
Tuberculosis.....	4	0	0	4
Hip Injury.....	10	14	3	27
Fractured Skull.....	15	6	3	24
Nervous Shock.....	4	1	1	6
Head Injury—Dizziness.....	6	1	0	7
Abdominal Injury.....	1	3	0	4
Heart Affected.....	2	1	0	3
Neck Injury (Broken, etc.).....	4	0	1	5
Trauma to Body.....	3	0	1	4
Other N. O. C.....	24	12	0	36
	226	90	19	335

*All cases of permanent partial disability, even though awarded permanent total compensation, were excluded from this experience.

MEDICAL OPINION ON ACCIDENT VS. DISEASE MORTALITY

An interesting experiment was here tried relative to the difference in mortality on accident and disease invalids. It was believed that if there really was such a difference as the foregoing limited experience seemed to indicate, a study of the two distributions by nature of disability should reveal the reason. Accordingly, the disease and the "over one year" accident distributions were submitted to three different doctors and each was asked to indicate after each nature of disability the average number of years which he believed persons so disabled might be expected to live, assuming all had been disabled just one year. Weighing these estimated durations by the number of cases, it was found that all three doctors had estimated that the accident victims would live approximately twice as long on the average as the diseased men. The

fact that three prominent doctors concurred in their opinions on this point should not be taken too lightly. In fact, it should be a rather conclusive argument that the true value of the accident mortality rates may be expected to lie somewhere between the disease rates and those for the general population. The result also tends both to substantiate the statements which a number of actuaries have made from pure judgment without actual distributions, and to indicate that the results produced by the experience here presented are probably not far different in the aggregate than would be produced by a more extensive investigation.

PERMANENT PARTIALS INCLUDED AS PERMANENT TOTALS

A review of the permanent partial claims which had been compensated as permanent totals disclosed the fact that 17 had been granted awards under the claims of loss of both hands, 13 under loss of both feet, and one each under paralysis, hip injury, and loss of one hand and one foot.

ACCIDENT AND HEALTH EXPERIENCE

Another but smaller volume of experience which might possibly be compiled is that of the regular accident insurance companies, but, judging from the results of an investigation made of the experience of the Travelers, it seems doubtful whether the entire volume of regular accident experience in this country would be sufficient to give any indications of value.

CONCLUDING REMARK

Although the statistics here presented do not represent a very great exposure, still, as previously stated, if a number of persons who may have workmen's compensation experience available will contribute it, sufficient data may be gathered to make possible the preparation of a dependable table of mortality rates on lives permanently and totally disabled by accident.

APPENDIX
ON THE MORTALITY OF INSANE LIVES

1. *Australian Experience.*

An examination of the table below will show that in Australia the mortality of insane persons is higher than for healthy lives. The figures and the quotation are taken from the report of the Actuary of the Australian Mutual Provident Society, as printed in the *Economic World*, Nov. 19, 1921, in an article on "Insanity in an Applicant's Family History from the Life Insurance Standpoint."

"Bulletin No. 10 of Social Statistics recently published by the *Commonwealth Statistician* gives some interesting data regarding insane patients during the year 1918. From the information therein given I have calculated the ratios of death to population for the various groups of ages and have compared the results with the corresponding ratios for the general population, and find them to be as follows:

INSANE PATIENTS		AUSTRALIAN MALE POPULATION	
Ages	Deaths to Population	Ages	Deaths to Population
		2	.00677
Under 5	.01772	3	.00441
5-10	.09666	7	.00209
10-15	.02604	8	.00196
15-20	.08102	12	.00184
20-30	.05190	13	.00199
30-40	.04135	17	.00304
40-50	.05037	18	.00332
50-60	.05592	25	.00449
60-70	.08352	35	.00636
70-80	.17997	45	.01089
80-90	.27746	55	.01832
90	.26667	65	.03934
		75	.10097
		85	.21911
		92	.37990

"I think we may conclude from this: (1) That excepting at extreme old ages the mortality of insane persons is very much heavier than that of the general population. (2) That even the care received in modern hospitals cannot overcome this excessive

mortality. (3) That any tendency to insanity revealed by family or personal history, or by examination, should be regarded as a serious impairment."

2. *Experience of New York State Institutions.*

The thirty-first Annual Report of the New York State Hospital Commission shows that the four outstanding causes of mental diseases except those of heredity are syphilis, contributing 14.2 per cent., senility 10.8 per cent., arterio sclerosis 12.3 per cent. and alcohol 6.4 per cent. Certainly none of these types of insane persons can be expected to show longevity. The average death rate for ages taken from the records of all State institutions is .098, and the average age of the patients is about 40, the sex being about 52 per cent. female and 48 per cent. male. The average death rate is thus considerably higher for New York State insane institutions than the general population death rate for the average age given.

The doctor at the Manhattan State Hospital, from whom this data was obtained, advised that, "Any judgment of these figures should be tempered by the fact that in institutions managed by the State there are segregated a great many of the debilitated old as well as alcoholics, syphilitics, arterio-sclerotics and seniles."

3. *United States Census Statistics.*

The United States Census Report 1910 gives a tabulation of the mortality rates upon insane lives. The average mortality rate is given as .1008 which is somewhat higher than the figure for New York State institutions.

4. *Remarks.*

It is generally true of insanity that the more violent forms are accompanied by very heavy mortality and lighter forms by light mortality. Most of the mentally unbalanced included in the accident distribution of permanent totals are of a mild form and therefore, according to the theory just stated, may be expected to show lighter mortality than the average. This conclusion has been drawn after an individual consideration of each of the cases of mental affliction included as permanent totals in the distribution of the preceding paper.

U. S. CENSUS REPORT—1910
Mortality of Insane

Age	Exposure	Rate
Under 15	668	.1290
15—19	4,851	.0930
20—24	13,502	.0758
25—29	21,110	.0653
30—34	26,386	.0705
35—39	30,351	.0732
40—44	29,790	.0756
45—49	28,555	.0750
50—54	25,762	.0884
55—59	19,751	.0907
60—64	15,601	.1269
65 & over	28,042	.2439
Unknown Age	4,191	.1150
Total	248,560	

UNEMPLOYMENT INSURANCE*

So much progress has been made in the last decade in the popular discussion of unemployment insurance and in actual experimentation with it, that I feel it a great privilege to be able to come here and tell what little I know about the experiments in unemployment insurance in other countries, and particularly about the slight experiments now being conducted in the United States.

As one interested in social progress in this country, I should feel much happier if I could devote a greater part of my time to a discussion of the American experience in unemployment insurance, but unfortunately this experience is so slight and so recent that I cannot talk as long about it as I should like.

Now, so far as I know, the experiments in unemployment insurance that antedated the passage of the British Unemployment Insurance Act in 1911, bore little fruit for those who were interested in unemployment insurance. The experiments conducted on the continent of Europe and in England were of the character of assessment insurance, and of benefit funds built up by voluntary associations, with very little or practically no actuarial basis, and very little statistical experience of any kind. Before the passage of the Unemployment Insurance Act in England, in 1911, there was a great deal of discussion in England and in other countries as to the solution of the unemployment problem. The great British Poor Law Commissions met and discussed the problem back and forth, and unemployment was classified and re-classified, and the classification covered many, many pages of the Poor Law reports, but the results were not illuminating. Apparently they were no nearer to the solution of the problem after the Poor Law Commission had met than they were before. So when Lloyd George's political power began to rise in England, the first great step in the direction of real unemployment insurance was made. In 1911 the British Unemployment Insurance Act was passed. This Act, of course, was experimental and highly tentative, but it has been in operation for ten years. It has encountered all types of economic

*Address of Professor Leo Wolman, of the New School for Social Research, by invitation of the Committee on Program. Published by authorization of the Council and with permission of the speaker.

conditions. It has been modified to meet new social and economic situations, and the results are bound to influence similar experiments in other countries, even though these other experiments be radically different from the original British plan.

Before the Act of 1911 was passed the administration had to determine its jurisdiction. In England, just as there would be in the United States under the same circumstances, there was a great deal of political wire pulling. Some people felt that they could easily carry their own unemployment risks and others felt that they ought to receive some kind of government support. It was decided, after considerable discussion, that it was to apply only to those trades and industries in which the rate of unemployment seemed to be greatest. The first Act, then, applied to more than 2,000,000 wage earners employed in the engineering and building and construction trades.

The principles on which the British Unemployment Act rested were simple. Considering the conditions prevailing at that time, it is clear that only those principles could have been included in the legislation. No attempt was made at differential rates. The rates of benefit were the same for everybody. No differentials were allowed for men who were married; no distinction was made between older employees and employees who had been on the job for only a short period. The Act remained in that form until 1916, when it was deemed advisable to extend its jurisdiction over munition workers, thus raising the number of persons under the Act from two million to three and one-half million.

In 1918, a few months before the demobilization of the Army and of the workers engaged in the war industries, the problem of unemployment again became a matter of serious discussion before the British Cabinet. It was felt that unless something was done to facilitate demobilization there was likely to be trouble in England. A number of plans were suggested to meet this impending problem of unemployment. Finally, in 1918, because they had not been able to anticipate their future problem, they adopted a temporary device. They suspended their Unemployment Insurance Act and put into effect the out-of-work donations scheme. Everybody who had been in a war industry or in military service and was now out of work, was

permitted to draw his out-of-work donation for certain periods specified by rules issued by the British Ministry of Labor. This scheme, which required no contributions from anyone except the State, lasted from November, 1918, to November, 1919, for civilian workers, and into 1920 for soldiers and sailors. After the out-of-work donations activities ceased, it was evident that the problem was still pressing. England was threatened with another very violent depression and another great wave of unemployment. Again attention was turned to the unemployment problem. It was then decided that the Unemployment Insurance Act should be extended to cover all of the twelve million wage earners in England. Accordingly in the winter of 1920, the Unemployment Insurance Act of 1920 was passed, extending the jurisdiction of the Unemployment Insurance Act over all industrial workers,—a little less than twelve million workers.

The actual operation of the British unemployment insurance system can be best surveyed by referring to certain of its features. First of all, there was very little of a desire, when the first Act was passed, to emphasize the preventive features of unemployment insurance. The English Government at that time was in a frame of mind where they wanted to proceed along the simplest possible lines. They, therefore, apparently concluded that since the unemployed workers could not be asked to pay for their own unemployment insurance, the scheme would have to be a subsidized scheme and the subsidy would have to be furnished by the State.

Contributions of equal amounts were exacted from the employees and from the employers, and an additional contribution somewhat less than the contribution of the employers and employees, was made by the State. In this respect the Act has not changed from 1911 to the present time, except for very slight modifications in the rates. With regard to benefits the same rules were followed. Flat benefits were given to everybody; again with the exception of slight variations during the operation of out-of-work donations, and since the adoption of the 1920 Act.

The rate of benefit was changed from time to time to allow for changes in the cost of living and again later to protect the solvency of the unemployment fund. The benefits, started at

seven shillings a week for men and women, were raised during the out-of-work donation scheme to twenty-nine shillings, and under the 1920 Act they were reduced to fifteen shillings. Now the men receive fifteen shillings a week and the women twelve shillings.

From the time the Act came into operation the administration faced every conceivable type of economic condition. Beginning in 1911 and continuing through to 1918, when the first economic collapse came, the sailing was good. Business conditions were good. People were contented with rising prices coupled with substantial business profits, so that everything went well with unemployment insurance, just as it did with all business in that period.

At the end of 1920, making no allowance for the extra amount expended by the Government in 1918 and 1919, the Unemployment Insurance Fund had accumulated a surplus of twenty million pounds. Then, at the end of 1920, the Act was extended to cover those persons who had not come under the Act before.

When the British Actuary made his estimates and calculations for the future for the fund, he decided that the sailing would be just as clear in the future as it had been in the past. He was not able to forecast the impending industrial depression. During the early months of 1921 things went well, but very soon after the collapse came. Immediately large drafts were made on the Unemployment Insurance Fund so that in a few months the whole twenty million pounds of surplus was gone. Under such circumstances, of course, the first step is to increase the rate of contributions and reduce the rate of benefits, and both of these expedients were adopted. Unfortunately, however, the rate and duration of unemployment was growing so rapidly that these measures were soon found to be insufficient. The drafts on the Unemployment Fund continued and it was made necessary to receive financial assistance from some quarter. The Fund was, consequently, authorized to borrow from the Government a sum approximating ten million pounds. This authorized borrowing has since been increased from ten to twenty and then from twenty to thirty million pounds, so that at the present time the unemployment insurance fund is indebted to the British Government for something less than thirty million pounds.

When the British Actuary was making his forecast for 1922 and 1923, he predicted that the fund would again be solvent in 1923. He predicted that the rate of unemployment would drop and with the reduced rates of contribution and of benefit, solvency would be restored. He found, however, that he was over optimistic about the future. For at his last writing, only a few months ago, he states that he does not know when the Fund will be again solvent. Financially, these are the outstanding features in the history of the British scheme.

There were a number of conditions that contributed towards making the fund insolvent and these conditions are important because they are conditions that are likely to be confronted by any kind of general unemployment insurance scheme. The fund became insolvent not only because there was a great increase in the volume of unemployment, but also because it was found necessary to suspend a great many of the safe-guards which were erected in the Acts. For instance, in defining unemployment, in determining the period of unemployment pay, the various Acts provided that the maximum period of benefit be fifteen weeks: that there must be preserved a fixed ratio between the number of weeks benefit received to the number of weeks contribution paid. The Acts also specified a waiting period.

Now, when this great avalanche of unemployment came at the end of 1920, at the beginning of 1921 and all through the year 1922 the demands for unemployment benefit became more and more insistent. Again and again in Parliament, representatives of trades unions and representatives of unorganized labor groups complained that the people were not being supported by the insurance scheme which was designed to solve the unemployment problem in England. From time to time during this whole period from 1920 to 1922, these various safe-guards were temporarily repealed, and then the period of repeal was extended, and at the present time they are still in a state of repeal. The maximum is no longer fifteen weeks. Special benefit periods of time were provided which greatly extended the term of benefit payment. The one to five ratio was suspended. The waiting period was entirely removed, and certain provisions were modified in such a way as to make it easier for a man to receive his unemployment insurance. The great rise in unemployment, making necessary certain modifications of the rules, contributed

in producing the present state of insolvency of the unemployment insurance fund.

It is only reasonable to expect in any system which has a political foundation that it should from time to time be subject to various types of pressure. In 1920, for example, when it was desired to extend the unemployment insurance scheme to cover practically the whole of industry, there were groups like the textile workers, for instance, who did not want to come into the general unemployment insurance scheme on the same terms as the others. Finally, however, they did come in.

Accidents happened to unemployment insurance in England. The first accident was that these various people who objected to coming in, on the ground that they did not need unemployment insurance, were soon very hard hit by unemployment. They found themselves in a position in which they were drawing on funds which had not been accumulated by them but by those insured under the old 1911 Act.

When the Act of 1920 passed, a provision was inserted into this Act which made it possible for certain industries to contract out, that is, to carry their own insurance under conditions specified by the Act and agreeable to the Ministry of Labor. When the first wave of unemployment had been passed, these people who wanted to contract out under the 1920 Act, came to the Ministry of Labor and asked that they be allowed to carry their own unemployment insurance.

They thought they had passed the severe phase of unemployment in their industries and that they should then be allowed to go it alone, receiving the same rate of benefit and paying a lower rate of contribution. Then the difficulties of the Ministry of Labor began. The Ministry of Labor contended that it would not be wise to permit these trades to contract out. It was the Ministry's opinion that they ought to stay in long enough to participate in wiping out the deficit of the unemployment fund, and perhaps, in assisting to build up a new surplus. In May, 1921, this provision of allowing trades to contract out was repealed; so that, at the present time, only one industry in England, the insurance industry, is operating its own unemployment insurance.

The experience of the insurance industry with its own unemployment insurance is indicative of what some industries might

achieve if they were allowed to carry their own unemployment insurance. Everybody in the insurance industry is as adequately insured as are people under the regular insurance scheme. But the rates of contributions are lower and the Fund has accumulated a surplus. Unemployment in this industry is, of course, considerably less than in industry generally. The attempt, therefore, to establish insurance by industry was dropped because of the insolvency of the Fund, and because these particular trades who wanted to carry their own insurance had drawn on the accumulated surplus of the other trades.

Now England, in the administration of its unemployment insurance, has been confronted with many interesting problems of administration. While England has solved these problems pretty well, it is doubtful whether the same kind of problems could be solved as easily in the United States. When I describe some of her problems, it will be reasonably clear why the situation may be more difficult in this country.

One of the most puzzling problems in planning any kind of unemployment insurance arises in the definition of unemployment. Those who have attempted to define unemployment realize how cautious they must be in the matter. They must prevent malingering and at the same time make its beneficiaries feel that the system is fair and not harsh. The people have to be made to feel that they are getting the unemployment insurance which is due them and that confidence must be earned. In order to meet these conditions—these difficulties—there were inserted into all of the British Acts, certain clauses specifying the conditions under which unemployment insurance should be paid.

If a man left his job without just cause, or because of misconduct, he should not receive unemployment insurance. If he refused to take suitable employment, he was likewise disqualified. If he lost his job as a result of a trade dispute, he should not receive unemployment insurance.

Under the British Act, the machinery for carrying out the unemployment insurance was erected with a great deal of skill, just as the English carry out most of their administrative enterprises. An unemployed person has to appear before the Unemployment Exchange and register. At the Unemployment Exchange there is a public official known as the Insurance Officer.

He passes on the claim for unemployment insurance. If he grants the man's claim, he receives his unemployment benefit. If the claimant is turned down, he can either abide by the decision of the Insurance Officer or appeal to the Court of Referees. If the Court of Referees agrees with the decision of the Insurance Officer, then the decision stands. If, on the other hand, the Court of Referees disagrees with the Insurance Officer, then an appeal is proper to an individual known as Umpire who is directly appointed by the Crown, and the Umpire's decision is final.

Decisions of the Courts of Referees are not available. But the decisions of the Umpire have been tabulated and at the present time fill about five very thick volumes. They are a most illuminating source of information on the types of problems that administrators of unemployment insurance are likely to encounter. In the early days most of the cases centered around the definition of mis-conduct and leaving a job without just cause. More than half of the cases were concerned with the definition of mis-conduct and leaving without just cause. Judged by the reports of the cases they were all adjusted fairly, with a great deal of common sense.

About 1918 or 1919, after the Armistice, the emphasis on the definition shifted from just cause and mis-conduct to suitable employment. During the War a great many people had come into employment who had never worked before, and they came into employment on very favorable terms. When demobilization came, such persons presented themselves first before the Out-of-work Donation Authorities and later before the Unemployment Insurance Authorities, and insisted on receiving unemployment insurance pay. It developed that in the largest proportion of these cases, the women and men could not get work at the same rates of pay at which they had worked during the War period. In fact such employment had in large measure disappeared. The great mass of cases that came before the Courts and Umpires during the post-War periods were cases bringing into question the matter of suitable employment. Was it, for instance, justifiable to take a girl who had worked as a servant girl before the War and as a factory worker during the War and pay her unemployment insurance or to insist that she go back to her pre-War occupation? This was the situation until the beginning of the great crisis of 1921.

Then, in England, as in the United States, great numbers of people were thrown out of work, and an attempt was made by employers to regulate labor and to deflate wages. The great problem presented to the Administration was what would be the action of the insurance administration with reference to this deflation. Deflation is never accomplished peacefully; it is always accompanied by strikes. It became necessary for the Court of Referees to determine what was meant by the clause in the original Insurance Act stating that men will not receive unemployment insurance if they are unemployed by reason of a trade dispute, since there were a great mass of claims for unemployment insurance by persons who were unemployed because they were directly or indirectly involved in trade disputes. The interpretation of this provision has created considerable dissatisfaction. Only a few weeks ago there was appointed a Commission of Inquiry whose function it will be to determine the policy with reference to this phase of unemployment,—namely, that arising out of the existence of trade disputes.

In spite of difficulties of this kind, in spite of a great deal of dissatisfaction with the interpretations of all these clauses,—“without just cause,” “suitable employment,” and so on,—the general feeling that one gets by talking to Englishmen who have been concerned with the administration of the Act and by a study of the documents, is that in general they are satisfied that the Act has been administered fairly and competently.

So, to summarize the thing very briefly, we find the British system now extending over twelve million workers; the plan has had considerable administrative success in controlling fraud and malingering; the system has been forced to face insolvency on account of the adverse conditions from 1920 to 1922; the period of insolvency is not yet over nor can its end be safely predicted; and finally, little, if any, prevention of unemployment has been achieved.

In the United States there have been a number of interesting experiments which are new and may develop successfully. They are of three types.

The first type of the experiment is illustrated in the establishment by a few private employers of insurance funds from which unemployment insurance is paid to their unemployed workers. The most notable examples of this type of insurance are to be

found in the Dennison Manufacturing Company of Framingham, Massachusetts, in the Rockland Finishing Company of West Haverstraw, New York, and in the Dutchess Bleachery at Wappinger Falls, New York. All three plans are similar in general principle although they differ somewhat in detail.

Insurance funds of varying amounts were set aside by the Directors of these various companies. Provision was made for conditions under which unemployment benefits would be paid to idle workers, and benefits range in the plants from 50 per cent. to 90 per cent. of the average earnings of the unemployed worker. In one important respect, these plans possess great interest. They represent attempts not only to tide workers over their periods of unemployment, but also to regularize business and to reduce substantially the volume of unemployment. The degree to which it was possible to regularize unemployment is indicated by the fact that in the Dennison Company the total amount of unemployment compensation paid during both 1920 and 1921 represented less than 1 per cent. of its total pay-roll. The experience in the two other establishments was not so favorable and it is doubtful whether the common run of industry in this country would show, in any case, as low a rate of unemployment as was shown by these three Companies.

Experiments of this type have not been extensive in this country. Only a few months ago a group of manufacturers in the City of Philadelphia began the study of the feasibility of undertaking the establishment of similar systems of unemployment insurance in their own plants. So far as I know, this study has not yet developed into concrete proposals. It is only evidence of the fact that a larger and larger number of employers are turning their attention to the problem of unemployment insurance.

The second type of experiment is carried on in the city of Cleveland under the joint auspices of the local branch of the International Ladies Garment Workers and the cloak and suit manufacturers in that city. By collective agreement between employers and employees, there was established in June, 1921, a procedure whereby each manufacturer agreed to guarantee his regular workers twenty weeks of employment in each six months. Because of the prevailing volume of unemployment at that time it was further agreed that the employers'

liability for unemployment pay was to be limited to $7\frac{1}{2}$ per cent. of their total labor pay-roll during each period of six months. The funds so collected were set aside to the account of each employer and were deposited weekly at the office of the arbitrator in the industry. Those workers who do not receive their quota of 20 weeks employment draw unemployment pay at the rate of two-thirds of their minimum wage from the respective unemployment funds until the fund becomes exhausted, when the payment of unemployment benefit ceases. This system, of course, is limited in extent. It covers somewhat roughly four thousand workers, but its experience has been very interesting.

The cloak and suit industry in Cleveland as elsewhere, is roughly divided into two parts. Part of the industry is carried on by large manufacturers and part by the small contractors. While there are exceptions to the rule, it will generally be found easier to regularize the business of a large manufacturer than that of a contractor, and this has been the experience in Cleveland. The accounts of the experience of the fund during its first six months of operation from June to December, 1921, show that few of the large manufacturers exhausted or used even a substantial part of their unemployment funds, whereas a very large proportion of the contractors exhausted their total funds. The plan, as inaugurated in June, 1921, was modified in an important manner the following year, when the Board of Arbitration, in a wage decision, raised the guarantee of each employer to 25 per cent. of their weekly labor pay-roll in exchange for a 10 per cent. reduction in wages.

The third type of experiment in unemployment insurance in the United States has not yet left the field of discussion. Bills providing for the establishment of general and compulsory unemployment insurance were presented to the State Legislatures of Wisconsin and Pennsylvania in 1921, and Massachusetts in 1922. In most of their essential features these proposed Bills differ very slightly from the Acts in operation in England. In fact, many of the English phrases have been transferred bodily into the proposed American Legislation. Provisions defining unemployment, establishing the administration of insurance, providing for waiting periods, and limiting the period during which unemployment benefits should be received, are almost exact reproductions of similar features of the British system. In two important respects,

however, the proposed American Legislation differs radically from that now in force in England. Unemployment funds are not provided by joint contributions from State, employers and employees as in England, but are imposed wholly on the employer; nor are the rates of contribution flat, and the same for all industries and for all employers. It is proposed in this American Legislation to set up agencies which will study the unemployment risk in different industries and in different establishments, and which will work out the necessary premium rate structures. In the second place, the carriers of the unemployment insurance are not State Funds as in England, but are either mutual insurance companies or liability insurance companies, or both. It is, of course, difficult to tell what the future of such proposed Legislation will be. When the Wisconsin Act was first introduced there seemed to be a good chance that it would be passed, but in its course through the State Legislature an amendment was introduced extending its provisions to agriculture. This brought against the Bill the opposition of the farmers, and it was defeated. In Massachusetts the Bill was disposed of by the creation of an unemployment commission to study the problem of unemployment and its various remedies. In Pennsylvania the Bill received hardly any attention at all.

Judging by the extensive and sustained interest in unemployment insurance, however, it seems reasonable to believe that it will be only a short period of time before one or more of the American Commonwealths will embark on the experiment of compulsory unemployment insurance just as, several decades before, they had embarked on similar experiments in the field of accident insurance.

The problems will be difficult. Many of the obstacles to the successful working of insurance in the field of unemployment will be new and of a more troublesome nature, perhaps, than have been encountered in other fields of insurance; but it is no exaggeration to say that for the student of insurance and for the administrator of insurance enterprises, no field in this country at the present time offers a more fascinating and constructive opportunity for facing new problems and for solving them than does that of unemployment insurance.

LEGAL NOTES

BY

RICHARD FONDILLER

(MEMBER OF THE NEW YORK BAR)

ACCIDENT AND HEALTH

Representations.—(Smith vs. North American Accident Ins. Co., Supreme Court of Nevada, 205 Pac. Rep. 801.) The beneficiary of an accident insurance policy claimed that the insured died as the result of accidental injuries and brought this suit to recover. The insurance company maintained an avoidance of the policy, by reason of the insured's misrepresentation of material facts stated in his application and also his concealment of material facts. As a further defense, the company claimed that the direct cause of death was tuberculosis (from which the insured suffered) which compelled the amputation of his foot, resulting in his death. The insured had met with an injury to his foot the day before his death, but it was not clear from the evidence whether an operation would have been necessary were it not for the presence of tuberculosis. This, however, is not the controlling feature of the case, which turns upon the form and nature of the alleged misrepresentations.

The important questions and answers in the application were the following:

"1. Do you understand that the insurance, if granted, is to be based upon the following statements and the falsity of any statement herein shall bar the right to recovery if any such statement is material either to the acceptance of the risk or the hazard assumed by the company or made with intent to deceive? Yes.

"14. Have you ever . . . had . . . tuberculosis (naming fifteen other ailments) . . . or any bodily or mental infirmity, except as herein stated? Four toes left foot gone.

"15. Are your habits of life correct and temperate, and are you in sound and healthy condition mentally and physically, except as herein stated? Yes.

"17. Have you now or have you had during the past year any local or constitutional disease, except as herein stated? No.

"18. Have you received medical or surgical attention within the past two years, except as herein stated? No.

"20. Are the foregoing answers true and complete? Yes."

The undisputed evidence showed that the insured had tuberculosis in both lungs. He had been treated for that disease twice in a sanitarium, the last time within less than a year preceding his application, which proved his misstatement as respects the answer to question 17. He had a bad family history of consumption and he had changed his occupation to better withstand that disease, from which he suffered for the six years preceding his application.

The insured's statements were in the form of written answers in response to written questions, and the authorities hold that in such a case the contracting parties have shown that the matters inquired about are material.

"The law does not forbid parties to contract for accident insurance, as in life insurance, to determine what facts or representations shall be deemed material, and that this may be done without putting the representation on a footing with a warranty."

In questions 1 and 14 above, the materiality of the insured's representations is emphasized by direct questions as to whether he had ever had tuberculosis, or had any disease during the past year. It was obviously material to the insurance carrier to receive a truthful answer to the various questions mentioned above. In reference to the questioning repetition in the application as to any ailments, the court wrote:

"It may be that the purpose of submitting the questions in the form presented was to determine if any conflicting statement would be made. Had the applicant in answering question 14 stated that he was not afflicted with and had not been afflicted with, tuberculosis, it would not have been necessary for the applicant to restate such fact in answer to questions 15 or 17, as such answers would have been made unnecessary by the phrase, "except as herein stated," incorporated in the question, and it is clear that the purpose of the phrase quoted was to obviate a restatement of a fact in answer to a question which had already been stated; it could contemplate nothing else."

The court held in favor of the defendant company, since as a matter of law materiality had been established. The risk had been accepted when it might otherwise have been declined; the

hazard carried was greater than appeared on the face of the application. In a well considered opinion, the court wrote:

"Taking the most favorable view of the contract to the insured, it is manifest that the parties themselves understood that the insurance, if granted, was based upon the truth of the statements made in the application, and that the falsity of any statement therein should bar the right to recover, if any such statement was material to the acceptance of the risk or the hazard assumed by the company or made with intent to deceive. Where the contract itself does not stipulate the effect that a particular false statement or representation shall have on the contract, or where it stipulates merely that the misrepresentation or suppression of a material fact shall void it, it may be conceded that the fact misrepresented or suppressed must have been material as an inducement to enter into the contract; and, as the materiality must be shown by matters outside the terms of the contract, it is a question of fact. But in the case at bar it is manifest that the parties stipulated that the effect of any false statement barred recovery, and the hypothesis if material to the risk, etc., does not take the case out of the rule established by the authorities."

Change of Occupation:—(Cerny vs. Hawkeye Commercial Men's Assn., Supreme Court of Iowa, 187 N. W. Rep. 467.) At the time that the insured became a member of this mutual accident association, he was a traveling salesman. He was classified as a select risk and the premium paid entitled him to \$5000 insurance in the event of accidental death.

A by-law which was in force during his membership read:

"The classification of risk in case of change of occupation shall be in accordance with classification of risks adopted . . . and the benefits to which members shall be entitled under such classification shall be as follows: Select, amount provided in the by-laws for benefits. Preferred, four-fifths of the amount provided. . . . Ordinary, three-fifths of the amount provided. . . . Medium, two-fifths of the amount provided . . . Special, one-fifth of the amount provided. . . ."

Some years later, the insured made his home on a farm, where he did some carpenter work, having originally been a carpenter by trade. Although the by-laws required a member to give notice of change of occupation, the insured failed to do so. The association first received the notice of the change, in connection with a claim filed by the insured for benefits for temporary disability

arising out of an accidental injury. In the subsequent correspondence, the insured admitted the change of occupation, the authorized officer of the association offered the continuation of the coverage by a transfer for the same premium to the medium classification with \$2000 insurance and the insured assented to the transfer.

The policy having become a claim by accidental death, the plaintiff (beneficiary) contended that the insured had not changed his occupation, that the association's act in changing the classification was fraudulent and that even if the insured had been working as a carpenter at the time of correspondence, he was not so engaged at the date of death. At the trial, the court held that the various letters between the insured and the association were ample evidence that the insured had in fact changed his occupation and that therefore the beneficiary was entitled to only \$2000. The insured was living on his wife's farm, but he did no farming and had no occupation at the time of his death. It was his duty to notify the insurer of this fact, in order to secure a more favorable rating; his failure to so do, in view of the correspondence four months previous to his death is taken as being conclusive of the insured's feeling that he was still a carpenter.

WORKMEN'S COMPENSATION

Alien Dependent.—(Frasca vs. City Coal Co., Supreme Court of Errors of Connecticut, 116 Atl. Rep. 189.) An Italian citizen met with death while engaged at his employment, in Connecticut. His widow, a resident and citizen of Italy, was awarded one-half of the compensation that would have been awarded her had she been a resident of the United States or Canada. She claimed, that by reason of a treaty existing between the United States and Italy, that her compensation should not be so reduced. She admitted that her husband was bound by the Workmen's Compensation Act and that the aliens of all nationalities fell within the definition of "employee" in the Act.

The court points out that the deceased, having elected to come under the Act, also became bound by the compensation benefit scale. This scale provided for only half benefits to alien dependents, and is operative as respects the claimant herein.

The clause in the treaty relied upon by the claimant read:

"The citizens of each of the high contracting parties shall receive in the states and territories of the other the most constant security and protection for their persons and property and for their rights, including that form of protection granted by any state or national law which establishes a civil responsibility for injuries or for death caused by negligence or fault and gives to relatives or heirs of the injured party a right of action, which right shall not be restricted on account of the nationality of said relatives or heirs; and shall enjoy in this respect the same rights and privileges as are or shall be granted to nationals, provided that they submit themselves to the conditions imposed on the latter."

In this clause the words "which right shall not be restricted on account of the nationality" make no mention of non-residence. Furthermore, the clause applies to relatives and heirs, and these are not necessarily the dependents who may claim under the Compensation Act. For these reasons, the court confirmed the award of only one-half the compensation.

An extract from the opinion follows:

"We concede that these treaties should be as broadly construed as they reasonably may be construed. But, if we could admit that their provisions are applicable to the amount of compensation to be paid to this non-resident Italian claimant, it would not follow that she should receive the same amount as a resident of the United States or Canada. At most she may enjoy only the same rights and privileges as are granted to our dependent nationals. Exactly those rights and privileges are granted to her by the clause of our act which is in question. It limits the compensation to be paid to "alien dependents" unless they are also residents—that is, to dependents who themselves are non-resident aliens. Whether the workman on whom they were dependent was an alien or a citizen does not concern this limitation. If he was a citizen his non-resident alien dependents may be awarded only one-half the compensation indicated in the act for his resident dependents; if he was an alien, his non-resident alien dependents will be treated in the same manner. The restriction affects the alien dependents of nationals and Italians alike. There is no discrimination unfavorable to the subjects of Italy or of any foreign country because of nationality. The resident alien dependents of any nationality are not affected. The alien dependent who resides in a foreign country might reasonably be regarded by the Legislature less favorably than the alien who lives in our country subject to our laws and conditions of living, and dependent for protection, and perhaps upon our institutions and our peoples."

Street Risks:—(Katz vs. A. Kadans & Co., Court of Appeals of New York, 134 N. E. Rep. 330.) The claimant was a dairyman's chauffeur and after delivering some goods was stabbed by an insane man while driving the car.

The court held that the Workmen's Compensation Law covered an employee passing through the streets on his employer's business if the work involves exposure to the perils of the street and injury while thus exposed necessarily arises out of the employment. In holding that the claimant was so exposed to street risks as to become entitled, the court wrote:

"Cases may arise where one is hurt in the street, but where the risk is of a general nature, not peculiar to the street. Lightning strikes fortuitously in the street; bombs dropped by enemy aircraft do not expose to special danger persons in a street as distinguished from those in houses The danger must result from the place to make it a street risk but that is enough if the workman is in the place by reason of his employment, and in the discharge of his duty to his employer. . . .

"The risk of being stabbed by an insane man running amuck seems in a peculiar sense a risk incidental to the streets to which claimant was exposed by his employment. . . . The fact that the risk is one to which every one on the street is exposed does not itself defeat compensation. Members of the public may face the same risk every day. The question is whether the employment exposed the workman to the risks by sending him on to the street, common though such risks were to all on the street."

This is a very close case and the judges, by a vote of four to three, affirmed the award of compensation.

Permanent Total Disability:—(Superior Smokeless Coal & Mining Co. vs. Bishop, Supreme Court of Oklahoma, 205 Pac. Rep. 497.) In this proceeding the Commission found that the claimant had lost the use of his right foot and right hand, as well as the partial use of his left ankle. Holding this to be a case of permanent total disability, the Commission awarded him eighteen dollars a week for the period of five hundred weeks.

The insurance carrier appealed from this award on the ground that there was insufficient evidence to sustain the award, as to which contention the court held that the decision of the Commission as to all matters of fact is final, if there be evidence to support it. There being sufficient evidence to support the Commission's findings, the court declined to disturb the award on this ground.

The injured employee had returned to work for the same employer at a greater wage than he had previously received and this was insisted upon by the carrier as proving that he was not in fact permanently and totally disabled. In the following extract from the opinion, it is apparent that the court departs from the loss of wages theory to adopt the specific indemnity theory.

"It was also shown that, while the new employment was of a different nature than the former and required greater skill and commanded an increased wage, it did not require the use of the plaintiff's injured members.

The question thus arising was recently before this court for decision in *Winona Oil Co. vs. Smithson*, 205 Pac.—. In that case the claimant suffered an accidental injury to his eye, for which the Commission allowed him compensation, although he continued in the service of his employer without loss of time or any diminution in wages or salary. The court held that the fact that his employer continues his employment, or that he secures employment from some other person at an increased or decreased wage, in no way affects the right of an injured workman to the compensation specifically provided for in the act.

If the injured employee receives such an injury as is specifically provided for in the act, such as the loss of a hand . . . the same constitutes a permanent partial disability for the simple reason that the act specifically so provides and the injured employee is entitled to the compensation as provided in the schedule of the act. So we must conclude that, when it appears that an injured workman suffers the loss of both hands or both feet or both legs or both eyes or any two thereof or the permanent loss of the use of such members, he cannot be denied the compensation provided in the act because he obtains employment even at better wages at a task which he is physically able to perform."

MISCELLANEOUS

Automobile Theft Insurance:—(*Bird vs. St. Paul Fire & Marine Ins. Co.*, Supreme Court of Michigan, 187 N. W. Rep. 265.) The plaintiff lent his car to a friend, from whom it was stolen. It was found damaged and the plaintiff had it repaired, thereafter bringing suit to recover his expenses.

In compliance with the provisions of the policy, the plaintiff gave the agent of the defendant company written notice of the loss. An employee of the agent went with the plaintiff to an adjuster, who stated that there was no liability because the car was not

stolen. The defendant contended that the adjuster was not authorized as their agent to waive proof of loss; the court held that the plaintiff having been accompanied by the agent's employee, the denial of his claim by the adjuster excused the plaintiff from proving his loss.

The further objection raised by the defendant was that there was no evidence that the car had been stolen or that there had been an intent to steal it. The court concluded that the plaintiff had established his case to the satisfaction of the jury, which found that the car had been stolen. The court affirmed the plaintiff's judgment for the expense of repairing his car.

Embezzlement:—(Belgium State Bank *vs.* Maryland Casualty Co., Supreme Court of Wisconsin, 187 N. W. Rep. 667.) The policy issued by the insurance company to the plaintiff bank contained the following clauses:

"Now, therefore, in consideration of a certain premium to be paid annually in advance during the term of this bond, and of the employer's written statements relative to the employee, his duties and accounts, it is hereby agreed that the Maryland Casualty Company, a corporation of Maryland, hereinafter called the company, will, within two (2) months after the receipt of satisfactory proof of loss, reimburse the employer for any loss, not exceeding twenty thousand and no/100 dollars (\$20,000.00) of the money, securities or other personal property (including that for which the employer may be responsible to others) which the employer shall have sustained by reason of any act or acts of fraud, dishonesty, forgery, embezzlement, wrongful abstraction or willful misapplication on the part of the employee, while in the performance of his duties as cashier in the service of said employer, and occurring during the continuance of this bond.

4. That the employer and the company shall share any recovery (excluding insurance and reinsurance), made by either on account of any loss, in the proportion that the amount of the loss borne by each bears to the total amount of the loss."

The employee who was bonded, embezzled \$100,000. He later returned \$40,000 to his employer, the plaintiff in this suit. The plaintiff's demand for the entire \$20,000 indemnity under the bond having been refused, it brought suit therefor. The insurance company offered to pay \$12,000 under its construction of the pro-rata clause, clause 4 above; that is, that the bank was entitled to \$20,000 less twenty one-hundredths of the \$40,000 recovered,

or only \$12,000. The court held that the face of the bond was payable for the reasons given in the following extract from its opinion:

"The questions raised . . . relate entirely to the interpretation and application of clause 4 to the facts in this case; the facts being practically undisputed. The agreement of the defendant company is "to reimburse the employer for any loss, not exceeding twenty thousand dollars, which the employer shall have sustained by reason of any act or acts of fraud, dishonesty, forgery, embezzlement, wrongful abstraction or willful misapplication. . . ." The language of the fourth condition is that the employer and the company shall share any recovery in proportion that the amount of the loss borne by each bears to the total amount of the loss. Under the terms of this bond the only loss which the defendant company bears is that which it sustains by reason of the payment contracted to be made. Until such payment has been made the defendant company has borne no loss. The plaintiff bank sustained its loss when the embezzlement took place. The amount which it may claim from the defendant company is the amount of the embezzlement less the amounts returned by or recovered from the defaulter. If, after the payment by the defendant company of a loss, a recovery is thereafter made, then in accordance with the terms of the fourth condition the recovery would be shared in the proportion that the amount of the loss borne by each of the parties bears to the total amount of the loss. We are of the opinion that "the total amount of loss is the loss which the defendant company may be called upon to pay not exceeding the amount of its bond"; that therefore it is the total amount of the embezzlement, less any recoveries from or returns by the defaulter made prior to the time that the employer makes demand upon the indemnitor and payment has been made pursuant thereto, that constitutes the loss. This seems to us to be the plain meaning of the contract. So construed, every word in the contract is given its proper significance."

ABSTRACT OF THE DISCUSSION OF PAPERS READ AT
THE PREVIOUS MEETING

REMARRIAGE EXPERIENCE OF PENNSYLVANIA COMPENSATION
INSURANCE CARRIERS

POLICY YEARS 1916-1919—E. H. DOWNEY

VOL. VIII, PAGE 201.

WRITTEN DISCUSSION

MR. M. M. DAWSON:

Dr. Downey's paper sharpens our keen sorrow that he should have been taken from us so soon; for it seems, indeed, "but earnest of the things that he would do," to paraphrase Tennyson.

It is quite correct, as he says in the first paragraph, that "the Dutch table is based upon a very limited exposure and is of doubtful applicability to American conditions." This was obvious to me when I recommended it for use in valuing the probabilities of remarriage by the New York authorities when provision was made in the Workmen's Compensation Law for pensions to widows during widowhood; yet there were many evidences that it would probably be nearer to American experience than German or Austrian tables, and certainly it was safer than they for use in the United States.

Dr. Downey's investigation, which also, however, deals with a limited exposure, indicates that for general use the table accords fairly well with the Pennsylvania experience; *i. e.*, with an annual remarriage rate of 3.46 per cent. for all ages, durations and ordinary industries in which the deceased husbands were employed, as against 3.28 per cent. But wide discrepancies were shown as regards widows of different ages, durations of widowhood and industries, and, except in the most general way—which, however, probably answers fairly for valuation purposes—the Dutch Remarriage Table does not conform with the facts as regards remarriage among the various classes of widows.

That the Dutch Remarriage Table is proving safe, so far as the

Pennsylvania experience shows, appears from this comparison of the rates deduced by Dr. Downey with the rates of the Dutch experience:

Age of Widow at Husband's Death	Dutch Experience	Pennsylvania Coal Mining	Experience Other Industries
All ages	3.46	7.38	3.28
Under 21	10.68	19.83	14.06
21-26	9.79	10.33	8.13
26-31	7.84	9.06	5.90
31-36	5.56	7.08	3.57
36-41	3.45	4.03	1.87
41-46	1.92	3.18	1.66
46-51	.95	....	.93
51-56	.42	1.63	.56
56-61	.15	....	.66

In the valuation of pensions to widows of coal miners, the Dutch rates overvalue the pension; in the valuation of pensions to widows of other employees, it undervalues them. Upon the average, and applying the table to each of them, it would obviously bring out an aggregate reserve, adequate for the purpose.

Dr. Downey was quite right in urging that the valuable data upon the subject to be found in the experience under the New York Workmen's Compensation Law should be compiled and investigated. It is to be hoped that the data of that experience will soon be available to supplement the material which Dr. Downey has brought to our attention, and either confirm the Dutch remarriage table as safe or replace it by a more suitable table derived from American experience.

Why should not the Industrial Commissioner cause the data of the experience under the New York law to be compiled and put in charge of the actuary of the State Fund for investigation by and with the advice of a committee of this Society? It is to be lamented that Dr. Downey has not survived to head that committee; but, though he can have no successor in a literal sense, he left others who are worthy to take up the work.

If the remarriage rates are to be determined by American experience, resort must necessarily be had to something more than data deduced from remarriages of widows in receipt of compensation under the Pennsylvania law for the payment of such compensation ceases at the end of six years. The only body of data covering beyond the sixth year is that of the New York experience; and is also the most considerable body of data covering the six years.

The contrast between the high remarriage rates among widows of coal miners and the lower rates among widows of other employees is striking; it is no doubt due to customs and social conditions of the countries from which the coal miners came, persisting as yet in this country. The other rate, although itself composite, is more important here.

That New York should not neglect investigation and use of its own experience is plainly indicated by the fact that its reserves for these claims are based upon the Dutch table. In Pennsylvania no account is taken of remarriage rates in computing reserves or commuting compensation, but instead only compound discount at the rate of 5 per cent. interest per annum.

MORTALITY FROM EXTERNAL CAUSES AMONG INDUSTRIAL
POLICYHOLDERS OF THE METROPOLITAN LIFE INSURANCE
COMPANY, 1911-1920

LOUIS I. DUBLIN AND EDWIN W. KOPF

VOL. VIII, PAGE 213.

WRITTEN DISCUSSION

MR. B. D. FLYNN:

In this paper, Messrs. Dublin and Kopf have completed their study of mortality from external causes for the ten year period 1911-1920, inclusive. The data are examined in broad divisions: (1) accidents, including unspecified violence, (2) suicides, (3) homicides, and (4) war deaths. Under each group further studies are made; as, for example, in accidents, including unspecified violence, the mortality rate by calendar year according to race and sex is shown and, also, the rate by age group, race and sex. Then follows an examination of accidents in this broad division, according to nature of accident, with various subdivisions to year of accident, age group, race and sex.

The authors have interpreted the statistics so thoroughly that there is practically no further comment which can be made. The most interesting form of discussion is undoubtedly to compare findings with indications of other mortality data based upon other insured lives. This, the writer has endeavored to do, by examining

the record of accidental deaths incurred in the experience of The Travelers Insurance Company in its commercial accident business during the same ten year period.

The mortality data in the paper consisted of some 98,000 deaths from accidental violence of all kinds among policyholders of the Metropolitan in the industrial class. It is difficult to estimate the average occupational hazard ratings which this class would carry. Undoubtedly, however, from our knowledge of the class of workers carrying industrial insurance, the average rating would be fairly hazardous. On the other hand, the great bulk of the policyholders of commercial accident insurance in the Travelers are in the preferred or non-hazardous class. The accidental death rates of the industrial group, therefore, should run much higher than that for the non-hazardous group; further, the experience of the Travelers shows practically nothing of value in the main divisions of death due to suicide, homicide and war, because of policy restrictions in many of the commercial accident contracts. Then again, there have been few exposures under the commercial accident contracts, except in the class of white males between the ages of 18 and 69.

Because of the above limitations of the Travelers' experience, nothing of value could be shown in a comparison of the total accidental death rates. The same general trend of the Metropolitan rates during the ten year period, however, is indicated by the Travelers' figures. The rapid decrease in the rates for the years 1919 and 1920 indicated the value of a rough examination to learn the probable rate for 1921. The number of accidental deaths in the Travelers' experience was compared with the premium volume for the years 1920 and 1921. The result was that the latter year showed approximately 25 per cent. increase in the total accidental death rate. The factors entering into this examination were, of course, not best suited to give an accurate rate, but the same data was used for both years and the marked increase in the rate in 1921 is clearly indicated. This information is given for what it may be worth, as indicative of the probable sharp upward trend in 1921 in the accidental death rate.

A comparison of rates according to nature of accident for white males in the Travelers' experience with the rates for the same subdivision in the Metropolitan industrial experience is interesting. In most of the divisions unusual results are shown, clearly due to the fact that the occupational ratings of the Metropolitan in-

dustrial policyholders differ from those among Travelers policyholders. This condition is clearly brought out in the following tabulation of mortality from traumatism by fall.

MORTALITY FROM TRAUMATISM BY FALL
DEATH RATES PER 100,000 PERSONS EXPOSED
1911-1920

Year	Travelers Commercial Accident Department
1911-1920	8.5
1916-1920	8.3
1920	6.3
1919	9.3
1918	8.5
1917	11.8
1916	5.8
1911-1915	8.7
1915	10.8
1914	8.5
1913	4.0
1912	10.1
1911	10.2

The Metropolitan rate for the ten year period is 15.9 per 100,000, being nearly double the Travelers rate of 8.5. Undoubtedly, the marked difference in this rate is due to the occupations of industrial policyholders. Carpenters, painters, and persons engaged in various kinds of construction work are, of course, more exposed to injury from falls than the commercial accident policyholders—such as clerks, businessmen and professional men—of the Travelers. It is interesting to note that the Metropolitan rate for the five year period, 1916-1920, is about 25 per cent. lower than the previous five year period, while the Travelers rate for the two five year periods is practically the same.

The following table, based on Travelers' experience covering mortality from traumatism by fall by age periods verifies the indications of the Metropolitan experience which showed a sharp increase in rate in the older ages.

MORTALITY FROM TRAUMATISM BY FALL
DEATH RATES PER 100,000 PERSONS EXPOSED
1914-1918

Age Period	Travelers Commercial Accident Department
18-19	28.9
20-24	....
25-34	4.5
35-44	8.8
45-54	8.0
55-64	16.3
65-69	61.9
All Ages, 18-69	9.0

A comparison of the mortality from automobile accidents of the Travelers with the Metropolitan again brings out differences which are undoubtedly due to the difference in the exposure of the two groups. The experience of the Travelers has been divided into two groups: (1) accidents and injuries to occupants of automobiles, and (2) pedestrians injured by automobiles.

MORTALITY FROM AUTOMOBILE ACCIDENTS
DEATH RATES PER 100,000 PERSONS EXPOSED

Year	Travelers Commercial Accident Department		
	Occupants	Pedestrians	Total
1911-1920	16.6	2.1	18.7
1916-1920	19.4	2.0	21.4
1920	24.0	1.4	25.4
1919	18.5	2.6	21.1
1918	17.6	2.3	19.9
1917	16.9	2.8	19.7
1916	19.1	1.1	20.2
1911-1915	13.4	2.2	15.6
1915	15.3	3.4	18.7
1914	12.4	1.7	14.1
1913	11.5	2.3	13.8
1912	17.3	1.2	18.5
1911	9.5	2.5	12.0

The Travelers total automobile rate (18.7) for the ten year period is about 50 per cent. higher than the Metropolitan rate (12.6). The Metropolitan rate for 1920 (18.9) is over four times as large

as the rate for 1911 (4.0). The Travelers rate doubled in the ten year period, being 12.0 in 1911 and 25.4 in 1920. It will be noted, however, that the Travelers rate for automobile accidents to pedestrians remains stationary throughout the ten year period, while the rate for occupants of automobiles is almost trebled—being 9.5 in 1911 and 24.0 in 1920. It would be interesting to learn if the rapid increase in the Metropolitan automobile accidental death rate was due to the increase in the rate of accidents to pedestrians or to occupants. In this connection, it should be pointed out that the great increase in the accidental death rate of occupants of automobiles may be due to the larger percentage of the number of policyholders who are exposed to the hazard, as automobile drivers. Undoubtedly there has been an ever increasing percentage of policyholders operating cars. This is true of the experience upon the industrial policyholders of the Metropolitan as well as the commercial policyholders of the Travelers. If a division of the Metropolitan's experience could be made, it might throw light upon this factor as a cause for the rapid increase in the total automobile accidental death rate.

The tabulation of the mortality from automobile accidents, by age groups, for the five year period, 1914-1918, is as follows:

MORTALITY FROM AUTOMOBILE ACCIDENTS
DEATH RATES PER 100,000 PERSONS EXPOSED
1914-1918

Age Period	Travelers Commercial Accident Department		
	Occupants	Pedestrians	Total
18-19	14.4	14.4	28.8
20-24	12.0	...	12.0
25-34	12.9	.4	13.3
35-44	17.2	.4	17.6
45-54	17.8	3.3	21.1
55-64	19.9	6.3	26.2
65-69	18.6	18.6	37.2
All Ages, 18-69	16.3	2.2	18.5

The total rate stays fairly level up to age 35 and then a steady increase begins rising to the maximum which is attained in the age group 65-69. The rate of mortality from automobile accidents to occupants is constant up to age 35 when there is an increase of about 50 per cent. The rate from age 35 to 69

remains practically level. Mortality of pedestrians from automobile accidents is clearly highest at the older ages. The rate for the group ages 18-19, 14.4 per 100,000, is due to one death claim and does not carry any particular significance.

Further comparison of the mortality from accidents could be continued throughout the various causes of accident, but because of the variation in the occupational hazard rate of the two groups, differences similar to those which have been brought to light in the comparison of mortality from traumatism by falls and mortality from automobile accidents would undoubtedly be encountered.

AGRICULTURAL INSURANCE—V. N. VALGREN

VOL. VIII, PAGE 186.

WRITTEN DISCUSSION

MR. E. R. HARDY:

In connection with this matter I have developed some material the principal part of which is an exceedingly interesting letter from a western correspondent who represents a company that has tried out, so to speak, agricultural insurance. I am proposing, therefore, as my contribution to the discussion, to quote the salient points in this letter, which are as follows:

"It was found that the demand for this class of insurance came very largely from the semi-arid sections, or from sections subject to the frost and freeze hazards, or from sections infested with insect pests, or where land was subject to overflow.

In the semi-arid sections, where crops are matured on an average of but two years in every five, an adequate rate could not be collected. In sections subject to the frost and freeze hazards, or sections infested with insect pests, also in sections where the land was subject to overflow, the companies likewise were not able to collect an adequate rate.

It was found that farmers desired to carry insurance for an amount representing the cost of production and garnering, plus interest on a sum representing the cash value of the land.

It has been said (and truthfully so) that the average farmer, if he were compelled to hire at current prices the labor for planting, cultivating and garnering his crops, and were to add thereto the

cost of seed and interest on an amount representing the cash value of his land, would find that his crops would not (in ordinary times) bring a return equal to the cost of their production.

One of the troublesome elements which developed in the attempt to write crop insurance was the fluctuation in the value of farm products.

For example: In one season at planting time, also after the new wheat had sprouted and stooled and had become an insurable risk, threshed wheat was selling for approximately \$2.00 per bushel. Naturally, the cost for producing the next year's crop was based on the returns which the farmer was then receiving for his wheat. The crop which was planted during the fall, when the wheat was sold at the high price, was harvested and threshed the next fall and sold at less than \$1.00 per bushel.

The form of coverage used had been written on the basis of cost to produce at the high selling price, and, therefore, notwithstanding the fact that the crop yield in bushels was better than a normal one, the companies faced a claim for loss under practically each and every policy issued. The returns to the farmer, on account of the low selling price, were considerably less than the cost of production at the high prices for labor and seed which prevailed the previous fall.

The companies from their experience found that they could not afford to insure crops upon the basis of cost as above set out, nor under the form of policy then in use, as they were in effect not granting indemnity, but rather were guaranteeing the price of wheat.

The companies were forced the following season to reduce to an arbitrary basis the amounts of insurance which they would write on a given acreage.

One company issued policies containing what might be termed an "upset" price for grain. The "upset" price fixed the limit of liability per bushel on grain for which the company would be liable. For example: The "upset" price might have been fixed at \$1.10 per bushel. At the time settlement was claimed under the policies the price of wheat on the market might have been \$1.50; nevertheless, the "upset" price named in the policies was the one used in determining the company's liability.

When the companies undertook to reduce the amount of protection which they would grant per acre to a low and arbitrary

amount, or attempted to sell policies containing an "upset" price per bushel on grain, it was found that there was no demand for crop insurance except in those sections where an adequate rate could not be collected no matter what amount of protection was granted, nor what form of policy was used.

We believe that in time some plan will be evolved under which stock fire insurance companies may meet the situation. We also believe that it will be necessary to educate the farmer to the idea that crop insurance must be for protection only and speculative features must be entirely eliminated. In other words, the farmer must be satisfied with an arbitrary amount of insurance per acre, which amount must be small. Later on, and as the companies gain in knowledge and also in experience, such changes can be made as are warranted by their experience and by the rate of premium charged.

In the semi-arid sections, overflow sections and pest-ridden sections we are of the opinion that crop insurance cannot be successfully written. The rate which it would be necessary to charge in such sections would be prohibitive."

REVIEWS OF PUBLICATIONS

RALPH H. BLANCHARD, BOOK REVIEW EDITOR

Intermediate Report of the (New York) Joint Legislative Committee on Housing. Albany, N. Y. 1922. Pp. vi, 257.

This report, covering the work and legislative recommendations of the committee generally known as the Lockwood Committee, devotes nearly one hundred pages to observations, statistics and recommendations relating to banks and insurance companies. After considering such subjects as the shortage of housing accommodations, rent laws, extortions and abuses by labor union officials, combinations to fix prices and restrict competition, open price and other associations in restraint of trade, the report discusses the relation of insurance companies to the general housing situation from two main points of view:

1. The effect on the mortgage loan situation of the general investment policy of the companies—life, fire and casualty, and
2. Fire, workmen's compensation, public liability, fidelity and surety and other insurance as a factor in the cost of housing, both during construction and after completion.

Under the first of these heads the report seeks to show (p. 149) that "One of the chief causes leading to the housing shortage has been the withdrawal of funds of the insurance companies from the loan market with the notable exception of the Metropolitan Life Insurance Company." In support of this contention and as a basis for the recommendation of legislation increasing the stringency of the statutes regulating and limiting the investments of insurance companies, the committee caused an elaborate investigation to be made into the investments of state banks and trust companies and of insurance companies of all classes, covering the fourteen years 1906-1919 inclusive. As an indication of the extent of the investigation it is stated that the work covered upwards of a year and that there were at times as many as fifty or more accounting assistants employed. The results are sum-

marized in twelve conclusions too lengthy to be cited in full but the gist of which is as follows:

- a. Investments in mortgage loans have returned interest at a rate averaging approximately one per cent. higher than other classes of securities.
- b. The proportion of the assets of life insurance companies invested in mortgage loans has tended to decrease and in the case of fire and casualty companies such proportion is negligible.
- c. The heavy investments of the companies in Liberty Bonds during the war was largely at the expense of new investments in mortgage loans rather than of new investments in bonds and stocks.
- d. Insurance companies of other states have, in proportion to their available resources, invested more freely in mortgage loans than have New York State companies.

Broadly speaking, the results of the committee's statistical research serve to confirm what was already known to those familiar with insurance company investments. The work, however, is not without value, in that it lends a greater quantitative precision to our knowledge in this field. The technical details of the methods employed by the accountants in computing interest yields are not given although it is stated that these methods are explained in a separate document. Such methods would be of special interest to actuaries and statisticians and in the absence of any clear explanation accompanying the tables it is impossible to form an independent judgment of the degree of credence to be attached to the results. We need to know exactly how all adjustments in book value have been treated, how mortgage loan and other investment expenses—both specific and general—have been treated, the formula used in computing the interest rate, and so on.

It is to be regretted that no investigation was made to show by calendar years and classes of investment the net average yield on the basis of which the new investments of the companies were made. When old investments are included with current ones and the results averaged we are far from getting a true picture of the investment situation as it proceeds from year to year. A

study of new investments by calendar years could easily have been made, as the form of Schedule D of the Convention Blank is well adapted to such an investigation.

A legal compulsion to invest in mortgage loans at least 40% of the company's future investable funds, until the aggregate mortgage loans shall equal 30% of the company's total assets, is recommended, (the chairman and one other member of the committee dissenting) on the apparent theory that the companies are bound by considerations of public policy over and beyond their obligations to their policyholders to invest their funds in such manner as to promote the building of dwelling houses and apartments, and it is assumed that legislation to compel such investments for the indefinite future is warranted by the committee's findings. Such proposed legislation is in marked contrast to the limitations imposed upon domestic life insurance companies by the Armstrong laws which, while they interfered to a hitherto unprecedented extent in the freedom of choice of investments by the companies, did not impose restrictions for the benefit of some class of persons other than the policyholders. The recommendations of the report under review, on the contrary, contemplate legislation for the benefit of one class in the community—namely, the rent payers—at what might prove to be the expense of another class in the community—namely, the policyholders. For the fact that during the period covered by the report the average return on mortgages was higher than on stocks and bonds is no proof that such a condition will necessarily persist in the future. While the report makes out an excellent case for a more liberal voluntary investment in mortgages at the present time, it will leave many unconvinced that there is logical ground for statutory interference.

The companies which have freely invested in mortgage loans—particularly housing loans—are singled out by the committee for high praise, while companies which have seen fit to reduce their mortgage loan investments and favor other types of security are unsparingly condemned. While there seems to be no legal or theoretical justification for the attitude taken by the report, the strong popular appeal which it undoubtedly makes indicates the practical foresight and wisdom of those insurance managers who, without in any way prejudicing the interests of their policyholders, seized an opportunity to perform a valuable public service and

to give themselves and their companies a high place in popular esteem and, as it proved, in the esteem of the committee.

The brief statement indicating the dissent of a minority of the committee from the compulsory investment proposal should not be overlooked as it emphasizes the dangerous stimulus to legislative activity throughout the country generally which the passage of a compulsory investment law might prove to be.

We now come to that part of the committee's report dealing with fire, workmen's compensation and other insurance as a factor in the cost of housing. One of the accounting experts employed by the committee testified that in his opinion the total proportion of the cost of building construction absorbed by insurance of various kinds is as much as five or six per cent., which perhaps accounts for the large share of attention devoted by the committee to the investigation of insurance rates.

Of first importance is the committee's treatment of the subject of cooperative rate-making and of the state supervision and control of rate-making bureaus. The committee accepts—albeit with some misgivings—the established policy of the state in recognizing the right of insurance companies to combine for rate-making purposes but it contends (p. 198) that the present degree of control exercised by rate-making bureaus is “practically a control that was not contemplated by the statute” and that “legitimate cooperation has been abused in New York State with the result that competition has been impaired and the insurance buyer has no choice but to pay the uniform price charged by all companies even though excessive.”

“Rate-making,” continues the report (p. 224) “upon the endless items of property that enter into the insurance business is exceedingly difficult and expensive. It requires a large organization and expert knowledge and experience. No single company, however large, can afford to make rates for itself alone. That and the fact that the business was one peculiarly affected with a public interest have always been the burden of the arguments advanced by the insurance companies for being permitted to combine in these rate-making bodies.”

While the report presents much interesting data relating to the rate-making situation, the economic theory of that important subject is left in a highly nebulous state. Indeed, a major weakness of the report is that, aside from expressions of naive faith

in the efficacy of unrestricted competition, its authors seem quite unaware that any economic theory is involved.

The premium for an insurance risk in a wholly unregulated market would be the resultant of numerous conflicting forces. Among these would be:

- (1) The degree of choice exercised by the insured—independently or under the influence of salesmanship—in seeking out a contract at a favorable rate.
- (2) The degree to which insurance companies, in their struggle for premium income, make special concessions to large insurers.
- (3) The degree to which the struggle for business takes the form of increased brokerage or commissions to agents rather than of reduced premiums.
- (4) The degree of intensity of the competition between two companies of the same type as, for example, between two stock companies—as compared with the competition between companies of different types as, for example, between a stock company and a mutual.

Certain it is that in past years free competition tended to result in (1) failure of smaller and weaker companies, (2) discrimination in favor of insurers with a large buying power, and (3) increased acquisition expense rather than reduced rate level. None of these results can be prevented by any single company acting alone, however public spirited its intentions may be. Cooperation of some sort is absolutely essential in the public interest.

It is somewhat disappointing, therefore, to find that none of these points was considered by the committee. To be sure, the report recommends legislation providing complete state supervision over all rate-making bureaus; and most thoughtful students of insurance economics are coming to believe that the solution of the present difficulties lies in that direction since the effect of increasing the stringency of state supervision is to make it easier for companies desiring to quote a rate based strictly upon statistical data and disregarding competitive influences to do so without being penalized by loss of premium volume. But there is no mention of the difficulties of complete state supervision throughout the nation arising from the fact

that it would give rise to over forty independent and more or less autocratic supervisory authorities, each seeking, perhaps, to get as favorable a schedule of rates as possible for his own jurisdiction. One cannot help feeling that the troubles of the insurance business are not nearly so simple in reality as they are in the mind of the committee and of its distinguished counsel.

A number of miscellaneous matters of interest to actuaries are discussed in the report. It is impossible to refer to them all but the vigorous attack on the time-honored method of computing the premium reserve without allowance for acquisition expense and disregarding interest may be cited as a single example. The phraseology in which this attack is couched is unfortunate. Such a loose statement, for example, as the following (p. 208) has no place in any public document. "This unearned premium reserve and the vast yearly income it yields is being taken by the companies year by year to themselves, when in fact both the surplus reserve and particularly the interest on the total reserve belong to the policyholders. These are a part of the funds that are being put into speculative securities."

One does not look for an attitude of scientific detachment or suspense of judgment in a report of this sort, nor does he find it in this instance. If the report possessed these rare qualities it might lack the compelling power that leads to action.

It must, therefore, be read with the utmost discrimination, particularly by students who have little previous background in the subject. Its outstanding merit is that it contains a large amount of information which it is important that every one interested in insurance rate-making should have and which nothing save a legislative investigation would have been likely to bring effectively into the light.

J. H. WOODWARD

The Experience Grading and Rating Schedule (Revised Edition).
E. G. Richards. D. Van Nostrand Co., New York, 1921.
Pp. xiv, 157.

The keynote of Mr. Richards' book is in the opening sentence: "No progress has been made by fire underwriters during the past fifty years toward bringing their ratemaking methods to a scientific basis of true cost." And the intimation clearly is that

the absence of progress has been due to the lack of pressure from outside the business to force the fire companies to realize that the public point of view is favorable to rates determined from analyzed statistics as an improvement over guesswork.

Anyone familiar with anti-compact legislation and with the various legislative investigations into fire insurance ratemaking must recognize the weakness of the position in which the business finds itself. What are the basic objections to price-fixing in general? They are that agreements to fix prices often result in abuses which take the definite form of "gouging" and "unfair discrimination" (through rebates or otherwise). We know from observation that legislation directed against the maintenance of uniform rates has grown out of the discovery of abuses of this kind. The privilege of maintaining rates by combination or association of competing units involves a corresponding right, which the public reserves, to be "shown" that the rates are inherently right. We need not go so far as to say that the public may require proof that the actual quantitative results are correct, although that too may be implied. But the important thing for any business to appreciate is that the general philosophy under which it is conducted must be in agreement with public sentiment.

Fire insurance as depicted by Mr. Richards has lagged behind public opinion. It would appear that for long years it has been common knowledge that fire insurance premium rates are the result of an empirical procedure pretending to build up the hazard value of a risk by attaching arbitrary degrees of significance to various physical features enumerated in a so-called schedule or schedules. No statistical analysis has been attempted to determine whether the values in these schedules have any necessary or consistent relationship to the hazards themselves or whether there may be some true indication of loss cost per unit of exposure buried away in the archives of underwriting experience.

All this Mr. Richards would change and "The Experience Grading and Rating Schedule" is his constructive suggestion of how to proceed. It shows more than deep thought and knowledge of the business. It expresses the profound conviction of a practical underwriter that conditions must be made right if the business is to prosper against the attacks made upon it by a poorly informed and half suspicious public. To get right con-

ditions Mr. Richards believes the fire insurance business must go in for actuarial analysis and base its rates upon actual experience rather than underwriting "hunch."

Although this is a revised edition of the book originally published in 1915 the argument still suffers somewhat from faulty arrangement. The continuity is broken by introduction of such matters as those dealt with in Chapter V where consideration is given to technical details of computing writings for purposes of recording experience, in Chapter XII which treats of co-insurance, and in Chapter VIII on underwriting profits. We think Mr. Richards would have been clearer had he taken up separately the questions of pure cost and of expense (including profit). The primary need, as he states, is for a showdown on pure loss cost. This he proposes to meet by a thorough analysis of experience under a standardized scheme of observation.

In evaluating this book prime emphasis must be placed on two or three fundamental considerations. The author, himself a seasoned underwriter of wide practical experience, stands out among his colleagues in the business as a believer in the entire practicability of making fire insurance rates from statistical evidence. This idea until recently was quite revolutionary in fire insurance although it has been an accepted principle of the casualty business for many years. It has not yet been found necessary in the fire business because the form in which the states have legislated to regulate that business is entirely different. In fire insurance, legislation has been chiefly of the anti-compact sort and along the general line of theory of the Sherman Anti-trust Statute. In casualty insurance the trend of that type of legislation was suddenly halted in Massachusetts where, in 1912, a law was enacted requiring the companies to charge "adequate" rates. Competition had been severe in the liability insurance business and the year which saw this law go into operation also marked in a number of states the passage of workmen's compensation legislation. For the protection of claimants under these laws and also to protect new companies (chiefly mutuals) the theory of rate legislation then adopted became actually helpful to the companies instead of hostile as it had been theretofore,—particularly as to fire insurance. Rate regulation has also influenced the scientific development of ratemaking in the casualty field whereas in fire insurance this incentive has been

lacking. Now, however, there are signs that fire insurance may come under somewhat similar conditions of regulated competition. In that event the crime will consist in failure to combine for ratemaking and rate maintenance—not in doing it. Thus swings the public viewpoint from one extreme to the other.

Mr. Richard's book develops a definite technique for the sorting of risks into grades and for analyzing the losses according to what he styles the "elemental hazards." The proof of this proposed system will be in its practical operation. A very natural query arises, however, whether the analysis is not carried too far to admit of substantial practicability, even if "experience" were to be available covering a period of twenty or even fifty years. In all probability it would be found that most of the data would naturally come from a relatively small number of classes. This would leave for empirical rating the remaining (and most numerous) risks since these could not be graded on experience but only by some method of analogy. In short, we think Mr. Richards has tried to accomplish too much in one process.

If we may reason from the experience in casualty insurance we should say that in order to justify rates to the public there are three prime essentials. First, the aggregate experience must conform to the loss ratio that the rates are designed to achieve. Second, there must be a method of allocating the loss cost by states after spreading the conflagration loss cost. Third, the rate for any individual risk must be a definite departure (up or down) from the rate produced by class experience, and the departure must be made according to some logical philosophy unrelated to competitive exigency. These are all essentials; the manner in which the results are to be obtained is detail.

To develop the aggregate rate level Mr. Richards proposes to apply the test of past experience covering a period of years and to make a "continuous" review of this aggregate experience for the purpose of ascertaining the changes required in general rate levels. At least this seems to be the intent although it is not self-evident in the exposition. The suggested treatment of the conflagration hazard seems reasonable but we get the impression that he means to establish key rates for the several states upon the basis of their general experience without regard for "exposure constitution." That is, no apparent distinction is made between states where inherently hazardous risks may predominate and

those where the risks are chiefly non-hazardous. If weighted allowance is to be made for such differences in risk distribution, then the key rate system is sound, otherwise it is not. The book is not convincing in that the proposed scheme would result in an equitable distribution of loss cost according to class, using the term not in the sense of a minute division of the experience, but rather in the sense of groups of risks having a like degree of hazard. It must nevertheless meet this test which is bound to be applied by supervising officials in their judgment of rates. If the rates in general are keyed to a standard loss ratio of, say 55%, then that is the figure which must be realized not only on the entire business but on each large section or group of risks having like hazard characteristics.

What the fire insurance business appears to need primarily is an analysis of experience along broad lines of classification to ascertain the classified loss cost. Rates for specific risks are a secondary matter and might be made, as at present, on an arbitrary basis until the analysis could be carried further in the light of preliminary examination. As a first step the class rate might be made subject to an empirical schedule designed to vary that rate within certain well defined limits. The big uncertainty about rates in the public mind, in the absence of proof to the contrary, is whether entire classes are overcharged. Such a question can only be settled by the production of statistical evidence in classified form.

While the projected plan as a whole seems logical we think it must be more simply presented before it can be "sold." "The Experience Rating and Grading Schedule" has a timely interest for all students of ratemaking—whether their inquiry be especially directed to fire insurance or to some other branch of the business. There is a movement under way, fostered by the National Convention of Insurance Commissioners, to bring about centralization in fire insurance ratemaking which, if measurably successful, can hardly fail to stimulate the business away from its chronic attitude into a greater toleration of scientific research as the basis for fire premium rates.

HARWOOD E. RYAN

United States Life Tables. 1890, 1901, 1910 and 1901-1910.

Prepared by James W. Glover. Bureau of the Census, Government Printing Office, Washington, D. C., 1921. Pp. 496.

This volume is the second official publication issued by the Bureau of the Census on Life Tables prepared from the population and death statistics of the original registration states—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Indiana, Michigan, and the District of Columbia. The Life Tables, therefore, do not show the rates of mortality in the general population of the United States but rather the rates in the northeastern section where the manufacturing populations are most dense.

The first volume "United States Life Tables—1910" published in 1916 was reviewed in the *Proceedings* of the Casualty Actuarial Society, Volume III, page 275. The present volume reproduces the 1910 Tables with similar Tables for 1901. It also contains Tables by color and sex based on the populations of 1901 and 1910 and the deaths of the intervening period. In some instances Life Tables are given by state and by principal city for 1901 and 1910 and for Massachusetts alone for 1890.

The volume is divided into eight parts of which the first five are non-technical and designed for the general reader. The remaining three parts are for students and actuaries who wish to study the formulas used in the construction of the Life Tables, the methods employed in the numerical calculations and the original statistics from which the Tables were derived. The methods of construction and graduation are discussed in a review in the *Transactions* of the Actuarial Society of America, Volume XXIII, page 269.

These United States Life Tables have been arranged in convenient form for comparing the mortality rates of 1901 and 1910. The trend is summarized as follows: "There seems to have been a general improvement in mortality for all classes for the younger ages, that is, to about age 40 for men and age 50 for women, except for the Negro population. Above those ages there is no improvement, and in some cases the mortality in 1910 was actually less favorable than it was in 1901."

Similar Life Tables for foreign countries and Mortality Tables

based on the experience of life insurance companies are included for comparison. Features of the various Tables are illustrated by graphic charts. In order that the new Tables may be used in the settlement of estates and in other ways, Monetary Tables are given showing net single premiums for a Life Annuity, single and annual premiums for Life Insurance and commutation columns at various rates of interest.

The entire work has been carefully prepared and contains an enormous mass of valuable information.

JOHN M. LAIRD

Ready Reference Digest of Accident and Health Insurance Law.
Myron W. Van Auken. Matthew Bender & Company,
Albany, 1922. Pp. vi, 367.

This volume supplies a brief summary of a large number of legal decisions on the interpretation of Accident Insurance policies. Owing to the large number of cases included it would seldom happen that the claims department of an accident insurance company would fail to find any particular case up for decision paralleled by some case in the volume.

The chief aim of the volume is to enable a distinction to be drawn, for the purposes of accident insurance, between accident and disease. Where an accident has occurred and death or disability follows, due in part at least to disease, a doubt inevitably arises as to the liability of the insurer under its accident policy. The gradual building up of a series of decisions has, of course, greatly clarified the matter and the cases recorded in this volume show that the insurer is definitely liable where disease begins after the accident and more or less as a result thereof. Where disease was latent prior to the accident but was causing no trouble until the accident stirred it into activity, the general trend of the decisions is toward making the insurer liable. Where, however, disease was active prior to the accident and the accident merely hastened a fatal termination, the insurers have generally been held not liable.

Not in every case, however, can the above general rules be said to have been definitely determined. In the case of sun-stroke, for instance, totally opposed decisions are given and each is supported by other cases.* The point at issue is whether

*Pp. 2, 6, 7.

sunstroke occurring without any exceptional exposure is caused by "external, violent and accidental means." It has been held that under any circumstances sunstroke is an unusual event not normally to be anticipated from an individual's going about his usual vocation, although it has also been held that sunstroke not preceded by some unusual and accidental condition is not sunstroke caused by "external, violent and accidental means." While the phraseology was not identical in all the policies, some merely referring to sunstroke due to "accidental means," the difference in phraseology seems to have been unimportant as affecting the court decisions. On the whole, the balance seems to fall on the side of the view that sunstroke is unusual and, therefore, to be regarded as abnormal and qualifying under the phrase above quoted.

Among the cases quoted will be found several British decisions. It is doubtful if these are of material value in connection with cases brought before the United States courts in view of the fact that in the United States there appears to be a very definite desire to give the insured all that can possibly be awarded him by the most liberal interpretation of his policy. This desire on the part of the courts to protect the insured has, in some cases, produced extraordinary results, ludicrous except from the point of view of the insurance companies affected and, although such cases are, of course, very rare, the general tendency in United States courts is toward an interpretation of the policy contract decidedly more favorable to the insured than is to be found on the other side of the Atlantic.

Owing, possibly, to considerations of space and the very large number of cases quoted, only a very short summary is given of each. In many cases it must result that some of the details omitted are not without importance as affecting the decision. An instance of this occurs in the volume itself, where, on the lower half of page 16, a case is stated and a decision noted, while on page 17 a fuller account of the reversal of the decision is given, and the facts as set forth on page 17 are substantially different from the summary given on the preceding page. This would appear to be the sole ground for criticism of this very valuable work, but it must be regarded as a serious defect.

The volume is supplied with a table of cases and a very excellent topical index so that any desired case, or series of cases, on any particular point, may be referred to without difficulty.

JAMES F. LITTLE

Lectures on Insurance, delivered before the Insurance Society of New York. The Weekly Underwriter, New York, 1922. Pp. 151.

One of the excellent features of a series of lectures is the variety of treatment afforded by the different lecturers. Another is the wealth of illustration which is usually supplied by specialists, each in his particular field. These features await the reader of this volume and with them the usual disadvantage of such a series, the lack of coherence and of logical development of the subject.

The first three lectures by Mr. Falconer are exceptionally good and present just the amount of legal material which is most serviceable to those studying insurance rather than law. He shows the basis of the law of negligence; the responsibilities of an employer, owner or tenant; the liability of a principal for the acts of his agents; the status of contractors. Lecture Three on the liability of owners and occupiers might be read with profit by every agent, as it suggests many business-getting possibilities.

Lectures Four, Five and Six deal with automobile insurance and are inadequate. Mr. Ryder's lecture on ratemaking, however, is excellent and deserved more space. Lectures Four and Five appear to have suffered from lack of a good plan; a defect possibly not to be ascribed to the lecturers. Lecture Five attempts a brief summary of material well covered by Mr. Ryder. Lecture Six devoted some space to a description of coverage which should have been reviewed at length in preceding lectures. Lectures Four and Five, however, present a number of very interesting underwriting problems. The deficiencies of this section appear to be due, not to the lecturers, but rather to the unfortunate nature of their assignments.

With respect to compensation insurance the volume is disappointing. In the absence of any satisfactory text-book, an adequate treatment of this subject would have been of great value to the studious employees in the business, agents, and candidates for admission to this Society. Mr. Senior contributes an exceptionally clear and concise review of liability and compensation legislation, into which he has succeeded in compressing a few quick glances at the important economic considerations underlying the liability and compensation business. This is logically followed by Mr. Ryan's very good article sum-

marizing the defects of the negligence system and the necessity of the compensation principle in modern business. The first half of Mr. Ryan's lecture should have been included (and part of it is included) in Mr. Senior's lecture. The latter part of Mr. Ryan's paper on the customary provisions of a compensation law and the tests of a good law is a contribution. These lectures leave the reader, of course, just on the threshold of compensation insurance proper. Nothing is said as to the various methods of protection open to an employer; no analysis of the compensation policy is given; no description of ratemaking methods is there; no survey is made of the regulation of the business by the State.

The subject of accident and health insurance is well covered by Mr. Bellinger's lectures. The first describes the development of the policy from the early crude forms to the modern type of policy, emphasizing the broadening of the coverage; the second discusses the common types of policies and the protection they afford; the third is one of the very few discussions in print of the factors which enter into the making of accident and health premiums. The material here and in the following section is more logically presented and the proportionate allotment of space more appropriate than in any other section of the book, probably because the entire subject was covered by the same lecturer.

Lecture Thirteen defines certain terms and hazards, and outlines the scope of residence and mercantile burglary and theft insurance. It also discusses underwriting problems and methods, including the co-insurance question. Lecture Fourteen deals at greater length with the mercantile open stock policy and safe and burglary insurance. In this lecture policy provisions are rather fully discussed. Lecture Fifteen covers bank burglary and hold-up insurance, and insurance against burglary and robbery of securities and jewelry from safe deposit boxes. This section of the book is very well done.

Lecture Sixteen on the subject of "Effective Business Letter Writing" is contributed by Mr. Mann.

This volume is well worth reading for the various views expressed by the lecturers on underwriting problems and business practices as well as for the concise summary given of certain branches of the casualty business. It is an admirable introduction to the study of casualty lines, and is sure to arouse interest

in further study, which was probably the principal object of the lectures. It is evident that the lecturers are not responsible for the sub-headings which have been inserted, which are confusing rather than helpful.

ROBERT RIEGEL.

Special Annual Insurance Section. The Statist, C, 2315.
London, July 8, 1922. Pp. xcii.

In addition to the regular review of every phase of economic influence upon business and finance, this number includes an analysis of the business of insurance companies for the year 1921 and also for the period 1901 to 1921 inclusive. The figures are given at intervals of five years and are for all lines. Comparisons are made by means of percentages. Following the tables individual companies are described in short reports giving location of offices of the company, details with regard to capital stock, also a short history of the company with figures from the financial statement covering each line of business written.

Quoting from the preamble "The first few pages contain a general survey of the results during 1921 of insurance in its various branches, pointing out the troubles and difficulties which have been experienced, and also, fortunately, being able to indicate some signs of coming improvement in certain respects." The conditions as outlined resemble the situation in this country where the lean year of 1921 succeeded the full year of 1920. The curtailment of business activity affected companies writing workmen's compensation, or employers' liability insurance as it is designated in Great Britain, and the same increase in rates for motor insurance as well as burglary and theft followed as a result of losses suffered during the crime wave.

In some cases, where a company writes different lines, it was not possible to show separate figures for each line. This is particularly regrettable inasmuch as there seems to be no restriction, as we have here, on the writing of all lines of insurance by one company. The importance of such a division is also brought out in connection with some of the unique features which had their inception in the past year, notably a new form of insurance issued against personal accident and disease in coupons given with a subscription to newspapers. It would be interesting

to determine, if possible, the volume of the business received by the companies as well as the resulting claims.

The spectacular failure of a reinsurance company early in 1922 casts a doubt as to the advisability of accepting reports of this kind which are not vouched for by governmental authority or supported by some other evidence as final, although in the words of the reviewer regarding this failure "there is nothing in the table to indicate that reinsurance business, *per se*, has proved during the last year or two to be more unprofitable than direct insurance business." It is true that the tables do not show any alarming figures for this company as compared with those of other reinsurance companies. It was one of the largest of the many that sprang up during and subsequent to the war, taking the place of German companies which ceased writing at that time. Perhaps it is the inherent difference between this form of insurance and the business of the direct writing companies which makes it impracticable to give too much credence to the figures shown in the revenue accounts.

The survey in its entirety is most complete and should prove valuable as a reference for information on the financial standing of insurance companies of Great Britain. The Statist should be assured of the success of its aim as stated in the introduction: "We have every hope and confidence that our efforts to produce a publication containing up-to-date and valuable information will meet with the approval and support of our readers, and that we shall reap our reward in the knowledge that our Insurance Section is recognized and utilized as a reliable guide to the conduct and progress of insurance business in this country."

EMMA C. MAYCRINCK

Statistical Analysis of Workmen's Compensation Insurance in Pennsylvania from January 1, 1916 to December 31, 1920.

Compiled by the Statistical Department of the Pennsylvania Compensation Rating and Inspection Bureau. Philadelphia. Pp. 62.

This publication is the most substantial achievement of its kind which we have seen to date. The data exhibited embrace:

a. *Aggregate Experience.* This comprises premiums, losses and expenses for the entire period for all carriers; for participating

and non-participating carriers; for coal mining and for all other business (Table I). These data, as well as pure premiums, and compensable accidents and their rate for each kind of injury, are shown for each policy year (Table III). There also appears absolute compensation cost for the period on basis of 1920 benefit scale, distributed by severity of injury (Table IV).

b. *Experience by Carriers.* Under this heading appear premiums, losses and expenses in the calendar year 1920 (Table II). The data are given separately for coal mining and for all other industries.

c. *Experience by Industries.* For broad divisions of industry and for the principal classifications, payrolls, losses (1920 level), pure premiums and compensable accidents according to nature of injury are presented (Table V). Table VI shows for each such classification payroll, compensable accidents (classified as to "severity"), and accident rates for the following categories: "all compensable," "death and permanent total," "major permanent partial," and "temporary compensable."

d. *Auxiliary Data.* One of the most valuable exhibits is that showing the wage distribution of compensable accidents by calendar years (Table XV). Table VII distributes fatal cases as to number of dependents and consequent cost. Table VIII shows for the leading Pennsylvania industries the averages of cost of death benefits and number of dependents. In Table IX fatal cases appear according to interval between accident and death. In Table X is presented a distribution of dependent children by age, and in Table XII the remarriage rates experienced in Pennsylvania compared with the rates of the Dutch Royal Insurance Institution. These remarriage data are further exhibited according to years elapsed after the husband's death. An age distribution of persons fatally or permanently injured is given in Table XIII.

e. *Nature and Cause of Injuries.* In Table XIV permanent total disabilities are analyzed by nature, and in Table XVI a similar analysis is made of "permanent partials." A cause distribution of accidents resulting in two or more deaths is shown in Table XVII. Table XVIII is an extensive analysis, by cause, of all classes of serious accidents.

This small book, crammed with the kind of information presently needed for purposes of experimentation in the making of workmen's compensation rates, is a monument to the clear vision, resourcefulness, and driving power of the late Dr. E. H. Downey. It is to his everlasting credit that the first really comprehensive array of compensation insurance statistics to be published in the United States was prepared under his direction. This is said without detracting from the substantial contribution which Mr. Gregory C. Kelly made to the work.

In spite of the confident words uttered by Dr. Rubinow in 1914, scientific rate making is still a goal rather than an accomplishment. It is essential to the continuance of the business in its present hands that statistics comparable to those developed in Pennsylvania be made available for the country at large. It is pleasing to note that the National Council on Workmen's Compensation Insurance has taken concrete steps in this direction. All far-sighted company executives should cooperate in the program.

It is to be admitted that when adequate statistical machinery has been developed it will probably involve a duplication of other machinery operated by the State and Federal authorities. The time is approaching when it will become imperative that the various labor departments, state funds, insurance companies and insurance ratemaking organizations cooperate upon some program which will minimize duplication of work and maximize the utility of statistics, particularly statistics published by governmental agencies. It is a fact that government has spent vast sums of money upon the development and publication of data which should be useful to the insurance companies and, by saving the companies' money, save that of the public. In most cases such government statistics are compiled on a basis which unfits them for any practical insurance use. The sooner the task of correcting this situation is undertaken, the better.

W. W. GREENE

Comparison of Workmen's Compensation Insurance and Administration. (Bulletin of the United States Bureau of Labor Statistics No. 301). Carl Hookstadt. Government Printing Office, Washington, 1922. Pp. iv, 194.

The first part of this work is a reprint of an address delivered by the author before the seventh annual meeting of the International

Association of Industrial Accident Boards and Commissions at San Francisco, September, 1920. This address had previously been published under the title "Comparison of Compensation Insurance Systems as to Cost, Service, and Security" in the *Monthly Labor Review*, December, 1920.

The present work contains, in addition to the address, information and data gathered by the author during the field work which covered the states having exclusive state funds and competitive state funds, and four states having no state funds. The new part of the work may be classified under these headings:

- Function and Work of Commissions
- Solvency of State Funds
- Accident and Compensation Statistics
- Effect of Weekly Maximum on Compensation Benefits
- Methods of Computing Average Wages
- Description of Claim Procedure in:
 - Exclusive State Funds
 - Competitive State Funds
 - Industrial Commissions

In this work the author has brought together interesting and useful information. The gathering, compilation and analysis of such material are necessary preliminary steps to the determination of the relative merits of Workmen's Compensation Insurance as conducted by the state and by private organizations.

At present the material seems too limited for a statistical solution of this problem. Those elements entering into the problem which have not yet been measured and which now depend on individual judgment may more than offset any indications of the data.

PAUL DORWEILER

CURRENT NOTES

S. B. PERKINS, CURRENT NOTES EDITOR

The Editor wishes to acknowledge the wholehearted response of a number of the members of the Society to his request for contributions on items of current interest. Among those who have helped materially in the preparation of the following notes are Messrs. W. H. Burhop, R. H. Blanchard, H. Farrer, F. S. Garrison, A. L. Kirkpatrick, E. W. Kopf, H. O. Van Tuyl and W. R. Williamson. The Editor offers his apologies to Dr. Wolman and Mr. Pike for an unintentional duplication of the subject matter which they have covered at greater length. The program for the Current Notes Section was prepared independently of the program for the annual meeting and the duplication was a coincidence.

THE NEW YORK RATING LAW

The provisions of the New York Insurance Law affecting rates and rating associations, now in force as the result of amendments adopted at the last session of the legislature, form a striking illustration of the present tendency in regard to state supervision of insurance rates.

It is being conceded more and more that equitable rates for any line of insurance can be determined only from the results of a wide exposure. To obtain sufficiently broad experience, the underwriting results of more than one company must be combined. Accordingly, the cooperation of companies in the making of rates is permitted and even encouraged in many states. The action of certain states in adopting anti-compact laws and in rigorously prosecuting companies that use rates obtained through cooperative methods, is in sharp contrast to the policy followed by the leading insurance states and particularly as exemplified by the New York State Law.

When companies are allowed to combine for ratemaking purposes and then to maintain a uniform scale of rates, the element of competition in rates as between such companies disappears and the question at once arises as to whether such rates

may not be excessive. To guard against this it is necessary that some form of state supervision and regulation be provided for. Meanwhile the right of a company to make and use its own scale of rates, if it so chooses, is generally considered to be fundamental. Exceptions to this rule, however, exist in cases where minimum rates are prescribed.

The main provisions of the New York Insurance Law affecting rates are found in sections 141, 141a and 141b. A brief summary of these provisions follows:

Each rating organization is required to file with the Superintendent of Insurance a copy of its articles of agreement and a list of its members and is subject to examination by the Superintendent as often as he deems expedient. All rate manuals and rating plans promulgated by a rating organization are likewise required to be filed.

Every insurance company is required to file its rates. In practice, the companies are allowed to make such filing through a rating organization or other filing agency, provided specific authorization to so file is furnished by the company. The charging of a premium by an agent, broker or insurance company which deviates from the rate fixed is prohibited and violations are punishable by a forfeit of from \$25.00 to \$1,000.00 for each offense.

Rating organizations are required to admit to membership or furnish service to any insurance organization applying therefor upon agreeing to comply with the reasonable rules thereof. No insurance organization shall be a member of, or adopt as a standard the rates of, more than one rating organization for rating the same class of risks for the same hazards.

Every insurance organization is required to comply with the rates and rules of the rating organization of which it is a member and membership in a rating organization which fails to obey the law is forbidden.

The term "rate" as defined in the law "shall include all of the elements and factors forming the basis for computing the consideration for insurance." Unfair discrimination in rates is forbidden. The schedules, rules and methods used in computing rates must be *reasonable*, as well as *adequate*. The Superintendent is empowered to order an adjustment of the rates whenever the profit derived is found by him to be excessive, inadequate,

unjust or unreasonable. The experience of at least the five years immediately preceding is to be used in the case of fire insurance and consideration is to be given to the conflagration hazard.

Classification schedules of premiums earned and losses incurred must be filed by each insurance company with its rating organization on or before July 1st of each year, such schedules to be in a form approved by the Superintendent of Insurance.

The kinds of insurance to which sections 141, 141a and 141b of the law are applicable are explicitly stated therein. Generally speaking, the provisions above cited apply to fire insurance and all the various forms of casualty insurance. Life insurance and marine insurance are specifically excepted as well as companies organized under certain sections of the Insurance Law, such as fraternal and assessment companies.

Besides the general control established by the above sections there is separate provision under section 67 whereby the rates for workmen's compensation insurance must be approved as to adequacy. Similar provisions in sections 329 and 350, referring respectively to mutual automobile fire insurance companies and mutual automobile casualty insurance companies, provide that the rates for these companies must be approved by the Superintendent as to adequacy.

The power granted to the Superintendent of Insurance of the State of New York under these laws would seem to be ample for the protection of the interests of New York State policyholders. The effect of the administration of these laws will, however, extend beyond the confines of the state and will have its influence upon the conduct of insurance throughout the country.

SAVINGS AND INSURANCE COMBINATIONS

Life insurance companies which write level premium life insurance have in a way combined savings with insurance. Under a level premium contract there is a certain reserve accumulated over and above the cost of insurance. The title to these reserves to the extent of the cash surrender value is granted to the insured life. Particularly in short term endowment insurance is the savings element stressed. These policies have very clearly competed with savings banks or the savings department

of commercial and national banks because the insurance agent could present his endowment contract as a permanent savings plan. Premiums could be paid annually, semi-annually or quarterly, and the experience of most men confirmed the statement of the insurance agent that the premiums would be paid with more certainty than would deposits in the saving bank be made.

A recent development in insurance is represented by the activities of a group of insurance advisers whose activities in a large measure have been directed against the endowment contract as a form of insurance and in favor of limiting insurance coverage more strictly to life protection.

Of an entirely different order is the development of insurance and savings handled coordinately through an agreement with a bank and an insurance company. Numerous plans for the joint development of insurance and bank savings have been tried out, yet they all agree in applying the force of a periodic payment plan to the savings part of the program while distributing the payment of the life insurance premium practically through monthly payments to the bank. Thus, the depositor once a month makes a payment to the bank out of which insurance premiums are met and the residue is accumulated to the credit of the depositor.

In all of these plans the major part of the monthly payment is for savings, a comparatively small portion for insurance. To be successfully developed the plan requires the use of individual solicitors who sell the idea of constructive savings, backed by life insurance, in the same manner that an insurance agent sells the various types of life insurance contracts. The development of the proper sales method for permanently successful operation is still largely in the future.

At least thirteen life insurance companies have given some attention to the plan, their activities having been directed in general along the lines of one of the four following plans:

I.

Insurance. Ordinary Life with or without permanent total disability in \$1,000 units with premiums payable monthly to the bank for transmission to the insurance company. Regular cash surrender values payable or policy may be continued by payment of premiums throughout the life of the depositor.

Savings. Special savings account planned to accumulate to \$1,000 at the end of 10 years. Payments for deposit are made monthly to the bank when insurance premiums are paid (\$6.78 a month will accumulate to \$1,000 at the end of 10 years at 4% interest compounded semiannually). At the end of 10 years \$1,000 is payable by the bank. The depositor may start a similar account for another 10 year period on the basis of the original rate, and the original insurance policy may be continued in force.

II.

This is a Plan similar to Plan I. except that the amount of savings are so adjusted that when combined with the cash surrender value of the Ordinary Life insurance policy at the end of 10 years, the total amount of cash payable equals approximately \$1,000. Therefore, the amount which is deposited monthly as well as the monthly insurance premium varies with each age at entry. This plan is not as simple as Plan I.

III.

A third plan makes use of the 10 Year Term policy for a level amount of \$1,000 instead of the Ordinary Life. This policy, of course, expires at the end of 10 years without value. It is usual for a policy of this sort to contain a conversion clause effective during the first seven or eight years of the policy. If the depositor should take advantage of this conversion clause it would, of course, complicate to a certain extent the handling of the combination thereafter.

IV.

This plan is distinct from the previous three in that a decreasing amount of insurance is used instead of a level amount.

Insurance. Decreasing Term insurance for an amount which at all times is equal to the difference between \$1,000 and the amount credited to the depositor in his special savings account. The premiums may be payable annually or in installments. They are usually deducted from the credit shown in the bank book. At the end of 10 years the insurance has decreased to 0 and expires.

Savings. A special savings account which will amount to \$1,000 at the end of 10 years. Monthly payments covering both the insurance and savings are usually paid to the bank, the total amount being credited in full to the depositor. From this credit premiums are paid by the bank to the insurance company when due. At the end of 10 years \$1,000 in cash is payable by the bank.

DENGUE FEVER

It is reported that an epidemic of dengue fever has been sweeping the South during the last few months and a recent issue of the Insurance Field contained the following account of its progress.

"Dengue fever, a disease originating and prevalent for many years in Africa, which is sweeping the South at this time, is leaving in its wake a volume of health claims. The malady, which is transmitted by a certain species of mosquito, has been attended, so far, without any noticeable percentage of fatalities, but the widespread prevalence in the South has created a heavy claim ratio for companies writing health insurance. The duration of the claims for illness averages between ten days and two weeks, which is generally the period of illness from the disease.

The malady became an epidemic in the South the latter part of August and has gained in intensity since September 15. In the early part of its prevalence it was confined principally to Southern ports, such as Galveston, New Orleans, Jacksonville and Savannah. Interior points are now becoming infested and several hundred cases are reported in Atlanta, which is approximately four hundred miles from the sea.

No preventive or combative serum has been discovered for the plague and the only means of eradication is the first killing frost which brings death to the transmitting mosquito. This frost generally falls in the South from October 20 to November 15.

Except for the lack of fatalities the malady might be said to have all the appearances of yellow fever, in most cases, and has been classified by some medical experts as "a second cousin to yellow fever." The disease has existed in the South for many years, but has not previously reached such enormous proportions. It was originally known as "African fever," and now bears the laymen's term of "broke bone fever" or "break bone fever."

The disease develops in its victim with a temperature ranging from 102 to 105 degrees, which continues for a period of four or five days. Normal temperature follows for several days, when a secondary fever develops with temperature not quite so marked. This fever continues for from four days to a week. Eruption on the face, chest and hands often accompanies the attack. There are no complications or after-effect unless the victim is suffering from a chronic disease of another nature.

The disease is transmitted by what is known as the "zebra mosquito," an insect which bites only in the day and does not sing. Under microscopic examination can be seen the zebra stripes and circles on the legs of the mosquito. The hands and ankles of the victim are the mosquito's point of attack. Immunity from the disease follows one attack.

The present epidemic in the South originated from human carriers of the disease arriving at Southern ports from foreign countries, mostly African. It was immediately transmitted through the bite of the zebra mosquito. The malady appeared first at Galveston, later reaching Dallas inland, where as many as 3,000 cases were reported at one time with a daily increase of nine hundred new victims

New cases are being reported daily at New Orleans. At Savannah recently the entire personnel of the police and fire departments was on the hospital list at one time. Macon, Ga., with a population of 65,000 had 300 cases of dengue fever on October 11."

NOTES ON RAIN INSURANCE

Thirteen companies are now writing rain insurance whereas in 1920 only two companies, and in 1921 only four companies would issue policies and then only under restricted cover.

Rain insurance which was primarily intended for outdoor exhibitions, such as agricultural fairs, baseball and football games and races, has been extended from time to time until now it is possible to procure a policy covering the following: amusement parks, concessions, refreshment stands, carnivals, circuses, beach resort concessions and stands, parades, rodeos or roundups, pageants, Chautauquas, lawn parties, church fairs or bazaars, civic celebrations, national celebrations, home-coming conventions, dances (single or seasonal), county and

district fairs, state fairs, expositions, aviation meets, automobile or horse races, field or track meets, baseball, football, basketball, golf matches, tennis matches, prize fights, boat excursions, streetcar rides, live stock sales, real estate sales, merchandise sales (special and holiday), county gasoline stations, summer and resort hotels, picnics or outings, clam-bakes and fish-fries, tag days. In fact, rain insurance can be obtained to cover any investment, either in business or entertainment, the success of which depends to any extent on fair weather.

The amount and time of rainfall which may cause a loss varies. In some cases on risks subject to abandonment on account of rain, insurance is issued against any rainfall causing such abandonment. In other cases, a minimum of one-tenth inch or a minimum of two-tenths inch of rain causing a loss of income is insured. The rainfall must happen during a period of hours agreed upon and specified in the policy which is usually that period when rain will do the most harm to the business.

The amount of rainfall is measured on the basis of the depth of water which would accumulate on a level surface if all of it remained as it fell without loss by evaporation or otherwise. Snow and hail are measured both on the basis of the actual depth of the precipitation, and more accurately by melting the snow or hail and obtaining the equivalent depth in water. The apparatus generally used in measuring rainfall consists of a copper bucket, a funnel, a cup and a glass graduate. The graduate is divided into tenths of inches with a capacity of one-half inch of rainfall. The rain enters the bucket, flows through the funnel and drops into the cup which is enclosed in a practically airtight chamber. After the rainfall the cup is removed and emptied into the graduate for measurement. The graduate being of a diameter that is much smaller than that of the bucket permits of a very accurate measurement.

The exposure and location of rain gauges is a very important matter. Two rain gauges within a few yards of each other may record a difference of twenty per cent. in rainfall unless properly located.

COMPULSORY AUTOMOBILE LIABILITY INSURANCE

There are a number of factors contributing to the tendency throughout this country towards compulsory automobile liability

insurance, which first took the form of law in the recent New York statute. In the first place, the greatly increased number of automobiles in operation has contributed largely to the increased number of automobile accidents. It is probably true that in the majority of these accidents the driver of the car was at fault. Or at any rate, accidents seem to be inseparable from automobiles.

In the second place, the production of automobiles has reached the point where a car is within the reach of a man of very moderate means and a second hand car is within the reach of almost any one. Consequently automobiles are driven by persons having little or no surplus funds. Many of these owners have no tangible assets other than the car which they drive. In case of accident for which they are liable, they are not able to satisfy the judgment which is rendered against them.

Public opinion takes the stand that a person injured by the operation of an automobile ought to be able to recover the damages caused by the accident. There is a good deal of logic to the argument that every owner of an automobile should furnish a satisfactory guarantee that he will pay damages for which he is justly liable. This guarantee might take the form of an insurance policy or a corporate surety bond.

In requiring a guarantee, the question naturally arises as to the maximum amount which should be required. How much real loss can one automobile cause? Should the guarantee be for the maximum amount possible or for some assumed average amount? And should it cover liability for property damage as well as personal injury? The New York law fixes the amount of this guarantee at \$2500. And yet we read accounts of accidents as a result of which, the injured person or his dependents has been awarded a judgment as high as \$25,000. Verdicts seem to vary from about that amount down to nothing. Yet common sense tells us that the actual loss caused by these accidents does not differ by any such amounts. Evidently, the award of the court is not always a fair compensation. It has sometimes been suggested that perhaps a solution to this trouble would be to fix by law the amount of damages which should be paid in case of liability for an injury of any given kind. From a practical standpoint, such a law might be a fair solution. But it is a little hard to see just how an automobile owner could be compelled to pay a statutory amount of damages, when it can be shown that the damage done, was a very different sum.

It seems as if we must come back to the fixing of some average or reasonable amount for the guarantee, *i. e.*, an amount which would be sufficient to pay the large majority of judgments and yet would not put a prohibitive burden upon the automobile owner.

From the standpoint of the public a guarantee in the form of an insurance policy or a surety bond would be satisfactory. But from the standpoint of the insurance company the policy would be preferable to the bond. Such a bond would be a financial guarantee of probably the most dangerous kind. It is doubtful if any surety company would issue such a bond without full cash collateral. And yet the man who could meet the requirements of the surety company would be in a position and would probably prefer to pay the higher cost of the insurance.

STATISTICS OF PUBLIC ACCIDENTS IN THE UNITED STATES

The National Safety Council is planning this year to establish a Registration Area for Public Accidents and to include in this Area a group of cities whose police officials agree to adopt the set of uniform reporting blanks outlined by the Council's Committee on Public Accidents. Members of the Society interested in the improvement of statistics of public accidents should secure and read the 1922 report of the Committee. Copies may be had upon application to Mr. Fred M. Rosseland, Chief, Public Safety Division, National Safety Council, 168 North Michigan Avenue, Chicago, Illinois.

Five forms have been drafted by the Committee and approved by the Executives of the Council. Each form is in two parts: the first, a preliminary form for the use of the police or safety officer reporting the accident; the second, a somewhat more detailed form for the use of court and headquarters clerks in abstracting the more complete statements obtained in court proceedings up to the disposition of the case. The latter form is recommended for preparing statistics for local purposes, a carbon copy to be sent to the Public Safety Division of the National Safety Council for use in publishing comparative statistics for the cities included in the Registration Area.

The Committee's report contains copies of the forms. The Committee is composed of: Dr. Louis I. Dublin (Chairman); Mr. Herbert W. Stellwagen; Mr. A. W. Koehler; and Mr. E. W. Kopf.

NEWSPAPER SCHEMES OF INSURANCE

The recent offer of a large New York daily newspaper to provide accident insurance for its readers upon payment of a nominal fee has directed attention to the experience of British companies who have been experimenting with this type of insurance for some time. The insurance of the New York newspaper is offered only to annual subscribers at an additional cost of \$.75. The benefits provide \$1,000 for accidental death or the loss of both hands or both feet, or both eyes, or one hand and one foot or one hand and one eye. For the loss of one hand or one foot or one eye, \$500 is payable. Total disability for 13 weeks at \$10. per week is also provided with the provision that where total disability is seven weeks or less in duration the amount of weekly payment shall be \$7.50.

In Great Britain Lord Northcliffe was one of the first newspaper publishers to employ various schemes of life and accident insurance as an inducement for the British public to buy his newspapers. The result was a remarkable increase in the circulation, but the recent revival of this system has not met with the same success: The newspapers entered into the scheme with the object of increasing circulation as a means of increasing the returns from advertising. The public were attracted by the prospect of cheap insurance and the insurance companies by the opportunity to increase their premium volume materially during a period when expenses were mounting rapidly.

After several months of operation it was found that the disadvantages of the scheme outweighed the anticipated benefits. Too many publishing companies adopted the scheme to make it of much value as a competitive weapon. The newspapers found it was impossible to advance advertising rates in proportion to the increase in circulation because of the fact that people who were attracted by free insurance were not good prospective purchasers of other commodities. Again it became a not infrequent practice for people to buy several newspapers for the sake of the insurance benefits and then to read only one.

There was more or less misunderstanding of the offered coverage on the part of the public. Because of the necessarily low cost of the insurance offered, the benefits were hemmed in by wide conditions. The public received a wrong conception of the purpose of insurance. In many instances it was regarded as a "get-rich-quick" scheme and the exposures to risk on the part of the public was encouraged. A large number of fraudulent claims arose and the insurance companies were placed on the defensive. This condition was further aggravated by the newspapers which gave wide publicity to claims for the purpose of increasing the popularity of the scheme. In many cases the newspapers themselves added additional benefits to those provided by the insurance company with the result that the adjustment of claims by the insurance company was complicated to a large extent. Perhaps the greatest damage occurred in the tendency of the public to cancel its ordinary accident policies in the belief that they were amply covered by the newspaper coverage. These reactions with an unfavorable loss ratio have caused the British companies to become generally dissatisfied with the scheme. The outcome in America is awaited with interest.

UNEMPLOYMENT INSURANCE

Unemployment is one of the greatest, if not the greatest, problems of labor. It is of greater importance than accident or sickness because it affects, during certain times, a larger proportion of the laboring class, and the worker has no power to defend himself nor curtail the period of unemployment by any precaution that he may exercise or anything that he may do.

It is generally conceded that the chief cause of unemployment is over-expansion of industry. Seasonal occupations and labor turn over are responsible for some unemployment, but are not as serious as a general depression in industry following a period of prosperity and expansion. Men entering seasonal employment are aware of the fact that the tenure of their employment is limited and are usually able to go from one industry to another as the seasonal work is completed. Praiseworthy efforts are also made by employers in so-called seasonal industries to provide work for their wage earners throughout the year. In many

cases this has actually been accomplished for the benefit of the employer and the worker alike.

The chief fear of the worker, however, is general unemployment due to curtailment of manufacturing and other occupations. This leaves him jobless because the many thousands thrown out of work cannot all be taken care of by the few classes of employment that are less affected by a depression.

Those who favor systematic, compulsory relief for the unemployed maintain that industry, and not labor, is responsible for unemployment, and industry, therefore, should assume the burden. There is no question that labor is quite free from responsibility for industrial depressions, but industry must also be considered blameless unless by a reorganization it can avoid those causes that bring about unemployment. The first question, therefore, that must be answered is, can industry as now constituted be reorganized to avoid periods of depression and thereby insure uninterrupted employment to all labor willing to work?

It is contended that during a prosperity period there is a great demand for labor; a competition for labor that creates higher wages and better working conditions. During such a period manufacturers enlarge their plants and rush production in every way possible in order to meet the demand for their goods. When suddenly this demand is satisfied there comes the period of curtailment and the increased manufacturing capacities can no longer be continued. The consequence is that a general dismissal of workers results. If industry had not extended its productive capacities and had not made every effort to rush manufacturing, the demand would not have been so rapidly satisfied and continued work would have resulted. But even if all the foregoing is accepted, the answer of how to avoid overexpansion has not been found.

Manufacturers must sell their goods in the open market under competition. When there is an increase in orders, the manufacturer naturally makes every effort to produce enough to fill the orders. Additional business means an increase in his profits and he knows that under present conditions his competitor is increasing his output and that if he cannot take care of his orders, his competitors will secure the additional business and profit.

In dealing with this subject Professor Commons of the University of Wisconsin presents the argument that the banking system can stabilize industry to a far greater extent than the employers themselves are capable of doing. Credit is necessary to industrial expansion, and the banking system is the center of the credit system. If the banks universally refused to grant credit when in their opinion an over-expansion would result, stabilization of business would be greatly aided thereby. However, the stabilization of business and employment is a difficult problem and cannot be accomplished by individual employers or single systems. If it can be accomplished at all, it must have the united support of industry and the credit system.

Relief systems for the unemployed exist in many foreign countries. England has treated the subject on a wider scale than any other country, and the present system in England is widely discussed. The system in that country has its supporters who aim to extend the plan and increase the benefits, and it has also its opponents who declare the entire scheme a failure and advocate its abolishment. A thorough study of the British plan and its actual operation will be of interest to students of the problem and should be of benefit to those who propose unemployment relief in the United States.

During the last few years unemployment relief legislation has been considered by the Legislatures of Wisconsin and Massachusetts. Both of these proposals, in many respects alike, failed to pass but developed lengthy argument and discussion. The proposals place upon industry the burden of unemployment and the benefits to be paid are to be borne entirely by the employer. This is unlike most European systems wherein the employer, the worker and the State contribute. The benefits provided in the proposals of Wisconsin and Massachusetts vary from \$1.00 to \$1.50 a day and are limited to a specified number of weeks. The unemployed is not entitled to aid if he refuses a situation in an employment in which he is fitted and at the usual rate of pay in such occupation. The unemployed is not required to accept work tendered in a plant in which there is a strike or a lockout, nor does he forfeit his right to benefits if he refuses a position at a lower rate of pay than that usually prevailing, or if he refuses work in another district at lower wages or in another district unless his railroad transportation is paid by the employer or insurer.

Any system of unemployment relief must necessarily be linked with a plan of labor exchanges or employment offices. These offices form the main administrative organization of the entire scheme, and it is their function to find work acceptable, under the provisions of the plan, to the unemployed. This indispensable machinery is one of the main problems of unemployment relief and its organization and functioning has been the source of much trouble and dispute in other countries, particularly Great Britain.

One of the arguments presented in favor of unemployment relief legislation is that such a plan would tend to reduce unemployment just as work accident indemnity legislation has greatly aided in the reduction of industrial accidents. It is contended that if it becomes profitable to industry to prevent accidents, industry will make greater effort to prevent them. Likewise if unemployment is costly to industry, or, conversely, if it becomes profitable to industry to prevent unemployment, means will be found to prevent it. In other words the first fundamental of unemployment relief is to prevent unemployment, but if this cannot be done, it will aid those who can find no gainful occupation.

THE VALUE OF AUTOMOBILE INSPECTIONS

The past year has seen important changes in the methods of underwriting and selecting automobile risks. One of the methods employed is the securing of inspection reports from companies organized for obtaining information of a personal nature in all lines of insurance. It is only quite recently that these reporting companies have begun to specialize in automobile reports; consequently the value of the reports is bound to grow as their efficiency increases. More and more of the insurance companies, both fire and casualty, are realizing the importance of learning something definite about the policyholder, because, after all, it is the personal qualifications which determine desirable risks and produce satisfactory loss ratios. At first, the practice of the companies was to select for inspection only certain new assured whose occupation or business was such as to cause suspicion, or was indefinite, or whose application was in large amounts covering all forms. It was felt that by selecting these applicants for the reports, the majority of the undesirable risks would be elimi-

nated and the cost of the inspections kept at a minimum. The companies, however, which have changed their practice to the inspection of all new risks, regardless of business or amount of insurance, have been greatly surprised at the number of unacceptable risks hiding behind respectable occupations or giving addresses in desirable neighborhoods. Startling information has been unearthed in some instances on risks previously insured but made subject to the inspection test. It is believed by those who have tried it that the cost of inspecting all new risks is fully justified and really an economy in the long run.

The companies have viewed this proposition not only from the standpoint of their own profit, but they have prominently had in mind their obligations to the general automobile insuring public. It has been charged that any one, from the best citizen in the land to the criminal or gangster, could obtain insurance by merely applying for a policy—so eager were the companies for premium volume. The selection was left largely to the agent or broker and unfortunately his attitude was reflected to a great degree by the commission. The examination of moral and physical hazards today is becoming a most important part of the business. Rates are determined from the experience of previous risks, and it can only be by the most careful selection that the conscientious automobile owner will feel that his rate is not excessive.

Reference has been made to the main objection at first of cost to the wholesale ordering of reports. Even considering economy of operation, this is no longer the big factor.

Most of the companies are keeping detailed records of the canceled or sub-standard risks and the analysis of the record of one company produces the following results:

Period under observation—six months.

Total number of reports resulting in rejection, cancellation, or requiring correspondence, 949—divided as follows:

Alleged bootleggers.....	253
Poor moral hazard, associates, etc.....	187
Reckless or careless drivers.....	127
Physically impaired.....	124
Users of intoxicants and drugs to excess....	114
Miscellaneous.....	144

In the miscellaneous group come the assured whose credit is poor, who have had previous losses without disclosing them in the application, who used their cars for livery purposes not known to the company, wrong addresses, etc.

The majority of these risks would have escaped detection were it not for the inspection and the chances are that most of them would have been loss producers. The responsibility which the companies have is great and the only practical way in which to meet it is by means of inspection.

OVERCOAT INSURANCE

A new form of property insurance has recently been advanced by a prominent fire insurance company in a policy designed to cover the loss or damage to overcoats sold by the policyholder. The policy is sold to retail clothiers who issue certificates of insurance to purchasers of overcoats, similar to the marine certificate under a marine policy. By the policy terms the company agrees to indemnify the purchaser for direct loss or damage by burglary, theft, larceny or robbery as well as for damage by fire and lightning. The garment is insured for the full value of the purchase during the first thirty days. After that time the coat commences to depreciate but the insurance is kept in force for two hundred days more, and should a loss occur in that time the assured will receive settlement based on the sound value of the garment. Under the present system of selling, a blanket premium is paid by the store purchasing the cover and this premium is loaded on to the selling price of the article. By this method the store obtains a record of each and every purchaser with their home address, information which is very hard for retail stores to obtain on a cash sale.

FOREIGN CREDIT INSURANCE

An interesting development in specialized insurance is that of the American Manufacturers Foreign Credit Insurance Exchange. This institution, operated on the reciprocal plan, is managed by the American Manufacturers Foreign Credit Underwriters, Inc., as Attorney-in-Fact. These organizations were established in 1919 under the auspices of the Illinois Manu-

facturers Association. The Exchange insures its subscribers against loss due to the insolvency of foreign debtors and acts as a service institution for gathering credit information and for collection of bad debts.

Each subscriber, on paying a deposit premium, receives a "master policy" which entitles him "to insure his specific credit sales, resales, consignments or shipments of merchandise to buyers in any part of the World, provided that such buyers are rated and accepted by the American Manufacturers Foreign Credit Underwriters, Inc." The Exchange establishes a maximum individual line and a maximum total line which it is willing to cover on an individual buyer. When a specific transaction is accepted for insurance a negotiable insurance certificate is issued and the subscriber's deposit premium account is debited in an amount computed on the basis of the following table of rates, the three basic rates indicating varying degrees of credit standing:

TABLE OF PREMIUM RATES

Sight or Time Drafts						Open Account				
Basic Rate	60 days or less	90 days	120 days	150 days	180 days	60 days or less	90 days	120 days	150 days	180 days
1%	1%	1 $\frac{1}{8}$ %	1 $\frac{1}{4}$ %	1 $\frac{3}{8}$ %	1 $\frac{1}{2}$ %	1 $\frac{1}{4}$ %	1 $\frac{3}{8}$ %	1 $\frac{1}{2}$ %	1 $\frac{5}{8}$ %	1 $\frac{3}{4}$ %
1 $\frac{1}{8}$ %	1 $\frac{1}{8}$ %	1 $\frac{1}{4}$ %	1 $\frac{3}{8}$ %	1 $\frac{1}{2}$ %	1 $\frac{5}{8}$ %	1 $\frac{3}{8}$ %	1 $\frac{1}{2}$ %	1 $\frac{5}{8}$ %	1 $\frac{3}{4}$ %	1 $\frac{7}{8}$ %
1 $\frac{1}{4}$ %	1 $\frac{1}{4}$ %	1 $\frac{3}{8}$ %	1 $\frac{1}{2}$ %	1 $\frac{5}{8}$ %	1 $\frac{3}{4}$ %	1 $\frac{1}{2}$ %	1 $\frac{5}{8}$ %	1 $\frac{3}{4}$ %	1 $\frac{7}{8}$ %	2%

The term of insurance is stated in the certificate which is automatically renewed at expiration for thirty days without extra charge. The certificate is further automatically renewed for successive periods of 30 days each until notice is given by the subscriber that coverage is no longer required, 1/8th of 1 per cent. being charged for each of these renewal periods.

A foreign debtor becomes insolvent and losses are paid in full, subject to 100 per cent. co-insurance, when:

(a) A petition in bankruptcy or insolvency (voluntary or involuntary) shall have been filed in good faith against the debtor according to the laws of the country in which the debtor resides or has his business establishment.

(b) The debtor shall have made an assignment of his assets for the benefit of his creditors.

(c) The debtor's stock in trade shall have been sold under a writ of execution or attachment.

(d) A writ of execution or attachment in the jurisdiction where the principal place of business of the debtor is located, in favor of the subscriber or any other creditor, shall have been returned unsatisfied.

(e) The debtor shall have compromised with his creditors for less than the amount of his indebtedness to them.

(f) A receiver for the debtor shall have been appointed and confirmed.

(g) The debtor shall have absconded.

(h) The debtor shall have transferred or sold in bulk his stock in trade, without having made due and proper provision for full settlement of his indebtedness.

(i) A claim on account of goods sold and delivered to debtor shall be reported "not collectible by law" and such report shall have been verified in accordance with proof of loss hereinafter set forth or a certificate shall have been obtained from the Legal Department of the American Manufacturers Foreign Credit Underwriters, Inc.

(j) The Exchange receives substantiated information, as hereinafter defined under proof of loss, of an act of insolvency or any other act not herein enumerated committed by the foreign debtor which impairs the debtor's ability to make payment.

Note:—Moratorium declared by any foreign government shall suspend but not release the liability of the Exchange. There shall be no additional premium charge during the interim of moratorium.

Losses resulting solely from a trade dispute, disputed account, or rejected shipment are not covered.

The Exchange has, at present, files on approximately 100,000 rated foreign buyers, over 600 subscribers, and a yearly premium income of \$250,000 covering sales of approximately \$23,000,000.

THE LOSS RESERVE OF REINSURANCE CARRIERS

The attention of the National Convention of Insurance Commissioners has recently been directed to the subject of loss reserves for workmen's compensation catastrophe reinsurance carriers by President T. B. Donaldson who has distributed an article on the subject prepared by the late Dr. E. H. Downey. The following excerpts from the memorandum are interesting:

"The premiums paid for catastrophe reinsurance are very small in relation to the total premium for the full compensation liability—generally from one-half of 1 per cent. to 5 per cent., depending upon the classification covered, the volume of premiums and the bargaining ability of the parties.

"The point I am trying to emphasize is that the occurrence of catastrophes is very irregular and that the experience of a five year period would give no trustworthy indication of catastrophic hazard. We have, therefore, found it necessary to derive our catastrophe pure premium from the experience of a period of fifteen years in order to obtain a reasonably stable and broad experience.

"Our reserve law requires a company to hold 65% of the premiums earned in a three year period, less losses and loss expenses actually paid. Reserves for years more than three years prior to the date of valuation are the losses actually incurred. This rule would provide an utterly inadequate reserve for catastrophe reinsurance.

"We have had both in our coal mine and in explosive experience in this state several individual accidents which would have cost more than \$500,000 under our Compensation Act and a few which would have cost more than \$1,000,000.

"Catastrophe reinsurance is a necessity to the smaller insurance carriers of Workmen's Compensation liability. It is, therefore, very important to maintain the solvency of the reinsurers. Our present reserve rules as applied will not maintain the solvency of reinsurance companies.

"I believe the National Convention should by general rule require every company which does a catastrophe reinsurance business to set up as reserve 65% of premiums earned during a period of fifteen years, less losses actually paid. This compels such companies to accumulate a substantial sum against the

losses which will sooner or later occur in the experience of any reinsurer."

The unusually large catastrophes which have occurred in the mining industry lately, add emphasis to these thoughts. The Argonaut Mine disaster which happened in Amador County, California, last August resulted in forty-seven deaths. There were 71 killed in the explosion of the mine of the Reilly Coal Company near Spangler, Pennsylvania, on November 6. The dependents of the deceased in this case included 27 widows and 80 children. And in the explosion of Dolomite Mine No. 3 of the Woodward Coal Company near Birmingham, Alabama, which occurred during the latter part of November there were 84 deaths and 60 injured.

BURGLARY EXPERIENCE RATING

An experience rating plan has been adopted recently for certain classes of Burglary Insurance risks. The need for such a plan has been felt for a long time, principally in connection with the unusually large risks which, because of their good experience, have dropped their insurance or perhaps never have carried it at all, but also in connection with large risks which have had a bad experience and which could not be profitably carried at manual rates. The latter class includes such risks as automobile service stations, many of which no company will accept because of the high loss ratio on them, but which undoubtedly can be carried at a profit by applying experience rating.

Chain stores probably are the best type of risk to prove the value and necessity of experience rating. Prior to the adoption of this plan, some companies had written certain large risks at rates above manual, which rates were estimated or made by rule of thumb. Other companies had refused to insure such risks at all. Under the experience rating plan it will be possible to fix an equitable rate for all risks which qualify under the plan. In devising the plan, probably the most serious question which arose was that of the qualifications a risk should have to be eligible for experience rating. Many of the companies objected to applying this plan to a single risk. Therefore, the Residence and Bank lines were automatically eliminated, and it was agreed that the plan should

apply only to Mercantile Safe risks having at least 100 locations, Office or Store Robbery risks having at least 100 locations, Mercantile Open Stock risks having at least 100 locations, and Messenger or Paymaster Robbery risks having at least 100 custodians.

The next question was whether each of the four lines for a given assured should qualify separately, or would the qualification of one line be sufficient to include the other three. It was agreed that each line should qualify separately for the reason that they are different forms of insurance, and also that an assured frequently carries one or two of the four forms of insurance and not the others; or one line may be carried in a non-Bureau company and another line in a Bureau company.

The next question was whether or not one modification factor could be applied to all lines except Open Stock if all such lines qualified; but in view of the different nature of the four kinds of insurance, it was decided that a separate modification factor must be applied to each line separately, based on the experience on that line alone.

While Mercantile Open Stock Insurance covers merchandise and not money or securities, the other three lines invariably cover money and securities exclusively; but Mercantile Safe Burglary Insurance on money is quite different from Messenger or Paymaster Robbery Insurance on money, and it would seem perfectly proper to treat each line as a separate and distinct proposition.

There are many large risks which heretofore have been specially rated by the Burglary Insurance Underwriters' Association, because they were of such an extensive and complicated nature that they did not fall within the manual classifications; and in some cases where the necessary information might possibly have been obtained to apply manual rates, it was a foregone conclusion that it would take many months for a staff of clerks to compute the premium on such a risk at manual rates. It is the understanding that the premium based on the special rate granted for such risks will be used as the manual rate to which may be applied the modification factor developed by the experience rating plan.

Some risks have already been rated under the plan and the indications are that it will prove beneficial, enabling the companies to hold good risks on renewals which they might otherwise lose, and also to furnish adequate rates for risks which have carried a high loss ratio at manual rates. There may be some necessary

changes to be made in the future after the plan has been in force for a sufficient length of time, and in the meantime it will be interesting to observe the results of the application of experience rating to burglary insurance risks.

LIBRARY ESTABLISHED IN HARTFORD, CONNECTICUT

Through the efforts of Robert J. McManus, local member of the Educational Committee, there has been collected in Hartford a set of the publications recommended for study by the Society, in so far as these are obtainable. The collection has been placed in the Library of the Insurance Institute of Hartford through the courtesy of that organization and is available for use by students preparing for our examinations. The funds for purchase of these publications were contributed locally. It is suggested that Hartford's example might well be followed in other centers.

PERSONAL NOTES

S. B. Ackerman has resigned his position as Assistant Actuary in the New York City office of the New York Insurance Department to conduct the classes in insurance at the New York University.

J. L. Barter, new address; Hartford Accident and Indemnity Company, 430 California Street, San Francisco, California.

Ralph M. Brann, new address; 20 Trinity Street, Hartford, Conn.

M. A. Burt, new address; 25 Frankfort Street, New York.

Miles M. Dawson, new address; Bar Association Building, 36 W. 44th Street, New York City.

E. H. Dearth, new address; First National Bank Building, Detroit, Michigan.

Saul Epstein, new address; Hamilton National Bank, Denver, Colo.

C. W. Fellows is now General Manager and President of the Associated Industries Insurance Corporation, Wells Fargo Building, San Francisco.

Frank M. Fitch, new address; P. O. Box 547, Hartford, Connecticut.

Richard Fondiller has established himself as Consulting Actuary at 43 Cedar Street, New York.

T. B. Graham has been made Assistant Secretary of the Metropolitan Life Insurance Company.

E. S. Goodwin, new address; 720 Main Street, Hartford, Connecticut.

C. H. Holland is President of the Independence Indemnity Company, Philadelphia, Pennsylvania.

A. L. Kirkpatrick has resigned as Actuary of the Michigan Mutual Company.

J. F. Little has been advanced to Associate Actuary of the Prudential Insurance Company.

E. C. Maycrinck is now Examiner, New York Insurance Department, 165 Broadway, New York.

D. R. McClurg, new address; 430 Peters Trust Building, Omaha, Nebraska.

M. Meltzer, new address; 120 West 42nd Street, New York City.

G. F. Michelbacher, new address; 120 West 42nd Street, New York City.

Henry Moir has become the Managing Director of the United States Life Insurance Company, 105 Fifth Avenue, N. Y.

Louis H. Mueller is Actuary-Statistician, Associated Industries Insurance Corporation, Wells Fargo Building, San Francisco.

William Newell is now Superintendent, Compensation and Liability Department, Sun Indemnity Company, 55 Fifth Ave., New York.

L. A. Nicholas has been advanced to Assistant Secretary of the Fidelity and Casualty Company.

S. L. Otis is now Referee of the Bureau of Workmen's Compensation of New York State.

O. E. Outwater, new address; 120 West 42nd Street, New York City.

W. T. Perry has been advanced to Assistant Manager of the Ocean Accident and Guarantee Corporation at the Home Office in London.

William F. Poorman is now Manager, Underwriting Dept., Farmers National Life Insurance Company, 3401 Michigan Ave., Chicago, Ill.

R. B. Robbins has left the Albany office of the New York Insurance Department to go to Ann Arbor, Michigan, where he intends to perform consulting actuarial work and assist in the conduct of the insurance courses at the University of Michigan.

I. M. Rubinow, new address; Care of Zionist Organization of America, 55 Fifth Ave., New York.

H. C. Thiselton, new address; Care of Harris & Dixen, 81 Gracechurch Street, London, E. C. E., England.

E. R. Welch is now Secretary, Associated Industries Insurance Corporation, Wells Fargo Building, San Francisco.

A. W. Whitney, new address; 120 West 42nd Street, New York City.

General S. H. Wolfe, Finance Officers Reserve Corps, has been ordered to active duty to assist the Director of the Bureau of the Budget in the consideration of the estimates for the budgets for the current year. General Wolfe was recently awarded the Distinguished Service Medal by the Secretary of War.

J. H. Woodward has established himself as Consulting Actuary at 43 Cedar Street, New York.

Charles N. Young, Globe Indemnity Company, Washington Park, Newark, New Jersey.

NEW ASSOCIATES

John L. Barter, 2701 Hearst Avenue, Berkeley, California.

Joseph P. Gibson, Jr., c/o J. B. Whitehead, 303 Trust Building, Rockford, Ill.

Harold J. Ginsburgh, Aetna Life Insurance Co., Hartford, Connecticut.

Charles M. Graham, Nat'l. Council Work. Comp. Ins., 16 E. 40th St., N. Y. C.

H. L. Hall, Life Actuarial Dept., Travelers Insurance Co., Hartford, Conn.

Carl L. Kirk, Zurich General Accident & Liability Insurance Co., 431 Insurance Exchange, Chicago, Illinois.

D. Ralph McClurg, University of Michigan, 513 Hoover Avenue, Ann Arbor, Michigan.

R. A. McIver, Assistant Actuary, American National Insurance Co., Galveston, Texas.

Samuel M. Michener, American Telephone & Telegraph Company, 195 Broadway, New York City.

William F. Poorman, University of Michigan, 710 East Ann Street, Ann Arbor, Michigan.

Floyd E. Young, University of Michigan, 408 East Jefferson Street, Ann Arbor, Michigan.

OBITUARY**EZEKIEL HINTON DOWNEY**

Born, December 27, 1879.

Died, July 9, 1922.


By the untimely death of Dr. E. H. Downey, July 9, 1922, by drowning at Avalon, New Jersey, not only has this Society lost an eminent charter member, but there has been taken from the field of the theory and practice of Workmen's Compensation Insurance one of its most creative and dominant workers.

Dr. Downey was born at Selma, Iowa, December 27, 1879, of Scotch-Welsh parentage. After thorough schooling he received his degrees of Bachelor of Arts in 1907, and Master of Arts in 1908 from Iowa State University, having specialized in economics. He was awarded a fellowship in political economy at the University of Chicago. Later he became successively Associate Professor of Economics at the State University of Missouri, Edwin M. Staunton Professor of Economics at Kenyon College, and Instructor of Economics at the University of Wisconsin, receiving the degree of Doctor of Philosophy in 1913 from the last named institution. He was also Research Associate of the State Historical Society of Iowa and member of the honor society of Phi Beta Kappa. He early began the writing of technical pamphlets and has left some thirty, all characterized by forcefulness and clarity of exposition. He was one of the first to contribute a comprehensive treatise on Workmen's Compensation Insurance and the inadequacies of common law, and just before his death had completed a volume on the history of Workmen's Compensation Insurance, which will be published by Macmillan.

From 1913 to 1915 he was Statistician to the Wisconsin Industrial Commission. In the latter year he was called to Pennsylvania as Special Deputy of the Insurance Department. It is noteworthy that he enjoyed at all times the utmost confidence of the successive Commissioners of Insurance under whom he served. With their unflinching support and by his own prodigious personal application he succeeded in effectuating in Pennsylvania a plan, perhaps more satisfactory than any yet devised, of reliable reporting

of the underlying fundamental facts necessary for the control of the conduct of the intricate business of Workmen's Compensation Insurance. It was but part of the price that he was always willing to pay that he personally scrutinized and adjusted thousands of original reports, ever developing an uncanny intuitiveness that enabled him to picture and define conditions of industry and of individual plant employment and circumstance of accident. Out of it all, he conceived that the most appropriate assignment of the economic burden of industrial injury to employment cause demanded the welding of the more than 1,500 manual classifications of 1916 into those of the present Pennsylvania manual which distinguishes less than 200 and stands as a memorial to his insight and energy and devotion. In this achievement, he was not unopposed; but there continues in the minds and hearts of the most vigorous opponents of his views the same unqualified enduring respect in which he is held by his closest associates.

He is survived by Mrs. Elsa K. Downey and a young son and daughter.



CASUALTY ACTUARIAL SOCIETY

THE COUNCIL.

* <i>Officers:</i>	HARWOOD E. RYAN.....	<i>President</i>
	G. F. MICHELbacher.....	<i>Vice-President</i>
	EDMUND E. CAMMACK.....	<i>Vice-President</i>
	RICHARD FONDILLER.....	<i>Secretary-Treasurer</i>
	OLIVE E. OUTWATER.....	<i>Editor</i>
	EDWARD R. HARDY.....	<i>Librarian</i>
† <i>Ex-Presidents:</i>	JOSEPH H. WOODWARD.....	1923
	BENEDICT D. FLYNN.....	1924
	ALBERT H. MOWBRAY.....	1926
† <i>Ex-Vice-Presidents:</i>	GEORGE D. MOORE.....	1924
	WILLIAM LESLIE.....	1925
	LEON S. SENIOR.....	1926
† <i>Elected:</i>	ALBERT W. WHITNEY.....	1923
	MERVYN DAVIS.....	1923
	CHARLES G. SMITH.....	1923
	A. L. KIRKPATRICK.....	1924
	EVERETT S. FALLOW.....	1924
	HENRY MOIR.....	1924
	SANFORD B. PERKINS.....	1925
	WINFIELD W. GREENE.....	1925
	JOHN M. LAIRD.....	1925

*Terms expire at the annual meeting in November, 1923.

†Terms expire at the annual meeting in November of the year given.

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ABSTRACT FROM THE MINUTES OF THE NINTH
ANNUAL MEETING, NOVEMBER 17, 1922.

The ninth annual and nineteenth regular meeting of the Casualty Actuarial Society was held at the Hotel Pennsylvania, New York, on Friday, November 17, 1922.

President Mowbray called the meeting to order at 10:30 A. M. The roll was called, showing the following forty-one Fellows and fifteen Associates present:

FELLOWS

BLANCHARD	GRAHAM, W. J.	OUTWATER
BUDLONG	JACKSON, C. W.	PALLAY
CAMMACK	KIRKPATRICK	PERKINS
COGSWELL	LAIRD	PINNEY
CRAIG, J. D.	LEAL	SCATTERGOOD
DORWEILER	LITTLE	SENIOR
DUNLAP	McMANUS	SMITH, C. G.
ELSTON	MADDRILL	STRONG, W. M.
FALLOW	MAYCRINCK	TARBELL
FONDILLER	MILLIGAN	VAN TUYL
FARRER	MOORE	WAITE, A. W.
FLYNN	MOWBRAY	WILSON
GOULD	MULLANEY	WOODWARD
GRAHAM, T. B.	NICHOLAS	

ASSOCIATES

ACKERMAN	GINSBURGH	PIKE
BARBER	GRAHAM, C. M.	SMITH, A. G.
BLACK, N. C.	HALL	THOMPSON, A. E.
CONSTABLE	HULL	WEBBER
EGLI	NEWELL	WILKINSON

The President's address was presented.

The minutes of the meeting held May 17, 1922, were approved as printed in the *Proceedings*.

The Secretary read the report of the Council and upon motion,

it was adopted by the Society. L. D. Cavanaugh, J. C. Montgomery and J. M. Powell had been enrolled as Associates without examination. Diplomas had been sent to the nineteen Fellows who have been admitted by examination. The memorial notice of E. H. Downey, appearing in this number, was read.

The Council recommended the following for election to Fellowship in the Society without examination under the terms of Article III of the Constitution.

A. R. LAWRENCE, Chairman, New Jersey Rating & Inspection Bureau, Newark, New Jersey.

A. T. TRAVERSI, Government Actuary for New Zealand, Wellington, New Zealand.

After ballot these nominees were declared duly elected Fellows.

The Council reported that the following Associates had passed the necessary examinations and had been admitted as Fellows:

C. S. COATES

S. D. PINNEY

J. S. ELSTON

The Council also reported that the following candidates had passed the necessary examinations and had been enrolled as Associates:

J. L. BARTER

D. R. McCLURG

J. P. GIBSON, JR.

R. A. McIVER

H. J. GINSBURGH

S. M. MICHENER

C. M. GRAHAM

W. F. POORMAN

H. L. HALL

F. E. YOUNG

C. L. KIRK

The report of the Secretary-Treasurer was read and accepted.

The Auditing Committee (Mr. W. H. Gould, Chairman) reported that the books of the Secretary-Treasurer had been audited and his accounts verified.

The Educational Committee (Mr. R. H. Blanchard, Chairman) submitted a report which was read and accepted.

The Examination Committee (Mr. E. S. Fallow, Chairman) submitted a report, of which the following is a summary:

1922 EXAMINATIONS—SUCCESSFUL CANDIDATES

The following is a list of those who passed the examinations held by the Society on May 3rd and 4th, 1922:

ASSOCIATESHIP—PART I

BARTER, J. L.	McIVER, R. A.
DARKOW, A. C. (Miss)	MICHENER, S. M.
FITZ, L. L.	POORMAN, W. F.
GIBSON, J. P., JR.	ROBINSON, E. E.
GRAHAM, C. M.	ROCKWELL, C. P.
KIRK, C. L.	WETHERALD, D. (Miss)
McCLURG, D. R.	YOUNG, F. E.

ASSOCIATESHIP—PART II

BARTER, J. L.	KIRK, C. L.
GIBSON, J. P., JR.	McCLURG, D. R.
GILDEA, J. F.	McIVER, R. A.
GINSBURGH, H. J.	MICHENER, S. M.
GRAHAM, C. M.	POORMAN, W. F.
HALL, H. L.	YOUNG, F. E.

FELLOWSHIP—PART I

COATES, C. S.	WATERS, L. L.
PINNEY, S. D.	

FELLOWSHIP—PART II

COATES, C. S.	JENSEN, E. S.
ELSTON, J. S.	PINNEY, S. D.

A motion was carried that the order of business be suspended to permit of the consideration of the Constitutional Amendments which had been proposed and approved by the Council and brought before the Society in due and regular form. These amendments were, on motion, adopted to read as follows:

ARTICLE III—MEMBERSHIP

The Fellows of the Society shall be the present members, and those who may be duly admitted to Fellowship as hereinafter provided. Any Associate of the Society may apply to the Council for

admission to Fellowship. If the application shall be approved by the Council with not more than three negative votes the Associate shall become a Fellow on passing such final examination as the Council may prescribe. Otherwise no one shall be admitted as a Fellow unless recommended by a duly called meeting of the Council with not more than three negative votes followed by a three-fourths ballot of the Fellows present and voting at a meeting of the Society.

ARTICLE IV—OFFICERS AND COUNCIL

The officers of the Society shall be a President, two Vice-Presidents, a Secretary-Treasurer, an Editor and a Librarian. The Council shall be composed of the active officers, nine other Fellows and, during the four years following the expiration of their terms of office, the ex-Presidents and ex-Vice-Presidents.

ARTICLE V—ELECTION OF OFFICERS AND COUNCIL

The officers shall be elected by a majority ballot at the annual meeting for the term of one year, and three members of the Council shall in a similar manner be annually elected to serve for three years. The President and Vice-Presidents shall not be eligible for the same office for more than two consecutive years, nor shall any retiring member of the Council be eligible for reelection at the same meeting.

The terms of the officers shall begin at the close of the meeting at which they are elected, except that the retiring Editor shall retain the powers and duties of office so long as may be necessary to complete the then current issue of *Proceedings*.

ARTICLE VIII—QUORUM

Seven members of the Council shall constitute a quorum. Twenty Fellows of the Society shall constitute a quorum.

ARTICLE IX—EXPULSION OR SUSPENSION OF MEMBERS

Except for non-payment of dues, no member of the Society shall be expelled or suspended save upon action by the Council with not more than three negative votes followed by a three-fourths ballot of the Fellows present and voting at a meeting of the Society.

The annual elections were then held, and the officers and members of the Council, as stated below, were elected in the following order:

President.....HARWOOD E. RYAN
 Vice-President.....G. F. MICHELbacher
 Vice-President.....EDMUND E. CAMMACK
 Secretary-Treasurer.....RICHARD FONDILLER
 Editor.....OLIVE E. OUTWATER
 Librarian.....EDWARD R. HARDY

MEMBERS OF COUNCIL	TERM EXPIRES
CHARLES G. SMITH.....	1923
A. L. KIRKPATRICK.....	1924
EVERETT S. FALLOW.....	1924
HENRY MOIR.....	1924
SANFORD B. PERKINS.....	1925
WINFIELD W. GREENE.....	1925
JOHN M. LAIRD.....	1925

On motion of the Society, the following cablegram was immediately sent to Dr. I. M. Rubinow, the first President of the Society:

Rubinow,
 Director, American Zionist Medical Unit,
 Jerusalem, Palestine.

CASUALTY ACTUARIAL SOCIETY ON EIGHTH
 ANNIVERSARY SENDS GREETINGS AND BEST
 WISHES TO ITS FIRST PRESIDENT.

MOWBRAY

A vote of thanks was tendered by the Society to the retiring officers and members of committees.

Recess was taken until 2 P. M.

By invitation of the President, Dr. Leo Wolman, a member of the "Economic Advisory Committee of the President's Unemployment Conference," addressed the Society upon "Unemployment Insurance."

The papers printed in this number were read or presented.

The papers read at the last meeting of the Society were discussed.

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

JERUSALEM, PALESTINE.

November 20, 1922.

Mr. A. H. Mowbray,
President, Casualty Actuarial Society,
New York City, U. S. A.

My dear Mr. Mowbray:

Upon my return from an extensive trip to Galilee, I found your cordial cablegram on behalf on the Casualty Actuarial Society. To say that I was grateful would underestimate the warmth of the feelings aroused by this very precious evidence that I am not altogether forgotten by my co-workers of many years ago. It was too late to reply by cablegram to your meeting, but I very much hope that at the next annual, or semi-annual, meeting of the Society, I shall be able to express my gratitude and best wishes personally.

My trip to Galilee was my last one. In a few weeks I shall start on my way home to the United States after four years of very extensive work in, and in behalf of, the Holy Land. There are many impressions in my mind which may be of interest to my old friends. Although the restoration of the Holy Land and its medical and sanitary problems cannot constitute a part of the regular proceedings of the Casualty Actuarial Society, I still hope that I shall have an opportunity, in an informal way, of telling you the story at our next meeting, to which I am thus inviting myself at once.

Very cordially yours,

I. M. Rubinow.

PROCEEDINGS

MAY 25, 1923

MORE SCIENCE IN CASUALTY INSURANCE

PRESIDENTIAL ADDRESS, HARWOOD E. RYAN

While the field sought to be embrace^d in the activities of this Society includes all the so-called casualty insurance lines as well as that ill defined term "social insurance," it so happens that during the nearly nine years of its existence the attention of our members has been largely directed to problems that have made their appearance in a particular branch of casualty insurance, namely, workmen's compensation. It has been during this brief period in the history of insurance that a new concept has arisen of the relationship of insurance to governmental regulation. With this concept and its general acceptance by those responsible for the management of the business has developed the specialized technique which we know as casualty actuarial science. This technique for the most part appears to have found a readier acceptance on the part of government than among the casualty companies themselves and the gradual education of managers and underwriters to the need or desirability of introducing scientific principles into a business so essentially commercial and practical is by no means complete. Be it said, however, that the work of this Society has measurably accelerated the adoption of scientific methods in casualty ratemaking, in the development of an orderly and standard system of merit rating and in the determination of compensation reserve values.

In the field of life insurance the regulation of rates *per se* is unknown. There is, however, an indirect control of rates through the legal reserve requirements which make it unprofitable for a company to "cut the rates." Add to this the fact that companies operating under the New York Law are bound by certain expense limitations and the inducements for a rate war are exceedingly limited.

In fire insurance, on the other hand, it was early discovered that rate cutting was a source of real danger, capable of destroying the security underlying the policy contracts and the invested capital of shareholders. If one is not mistaken in interpreting fire insurance history, the major cause of the inability of that huge business to achieve standardization and centralization has been the failure to adopt scientific methods of rate determination. In consequence, the several states, distrusting attempts at centralized control unaccompanied by a scientific mathematical basis for rates, have one by one adopted legislation of the anti-compact type and this in turn has brought about decentralization with attending evils of inexpert local ratemaking and rate control. About the year 1911 a different type of rate regulation appeared. In that year the state of New York undertook to investigate the ratemaking activities of the fire insurance business. Legislation resulted from this inquiry which gave to the state supervising official the right to hear specific complaints brought on the ground of unfair discrimination and for cause duly shown to order the discrimination removed. Of all the Augean tasks ever thrown upon an unsuspecting insurance department, this one probably takes the first rank, for as every supervising official knows a case of unfair discrimination exists in the mind of every assured and of every agent or broker who professes to believe himself or his client entitled to a lower rate.

Shortly after the adoption by New York of "unfair discrimination" as the test of fire insurance rates the same principle was applied through legislation to the business of casualty insurance. But in 1912 a quite different aspect was given to this question. In that year the Commonwealth of Massachusetts enacted a Workmen's Compensation Law. It provided among other things for a mutual association composed of employers which should grant insurance under the law and which was to be the exclusive carrier for that purpose. The rates of premium were made subject to the approval of the insurance commissioner. Before this law came into force it was amended so as to provide for the competition of other companies, all of whose rates then became subject to approval by the insurance commissioner with *respect to adequacy*. Here was a legal enactment designed to protect the public against the ultimate effects of a rate war. Now Massachusetts is a leading industrial state. The temporary imminence of a state mutual

monopoly in so important a commonwealth was not without significant bearing upon the legislative possibilities in New York, Pennsylvania and the other large industrial communities. It is not to be marveled at that the private companies were willing to accept this new principle of rate regulation, as a choice of evils, perhaps, but still as offering the opportunity to compete for business in the compensation field.

At about this same time the New York Insurance Department undertook to investigate the activities of a bureau supported by certain stock companies for the purpose of making and maintaining uniform rates for liability and compensation insurance. Such activities were then in their crude beginnings and the Department found various matters to criticize. In particular it was discovered that rates lacked statistical foundation and that when the company members of the bureau were faced with the competition of other companies the rules were often suspended and the members became free to war upon their competitors by cutting the rates. It was apparently realized by the official investigator that these tendencies were inherent in any general competitive situation and that the companies were more or less powerless to protect themselves against piratical competition without the weapon which rate cutting afforded. However, with a workmen's compensation law about to be enacted in New York, the State Insurance Department assumed the position that the security of the insurance protection should not be placed in jeopardy by the constant menace of a rate war. Moreover, it was soon to be the policy of the state to admit to the field stock companies, mutual associations and the State Fund so that with competition thus stimulated, it would become more than ever necessary to prevent the occurrence of rate wars. Accordingly, when the New York Workmen's Compensation Law took effect it was simultaneously provided that the premium rates should be subject to approval as to adequacy—substantially the Massachusetts provision.

Other states have followed these earlier precedents but as it is not intended to present here the complete history of rate regulation but rather to trace points of general significance it will be sufficient to state that this background has served to establish ratemaking activities upon a statistical foundation under the joint auspices of all classes of carriers and under supervision by the states. We are chiefly concerned here, however, with the

attitude of state supervision in relation to rates and shall therefore inquire somewhat into the reasons underlying that attitude. We have seen that the first reaction of the states was inimical to centralized ratemaking and that the earlier laws were of the anti-trust or anti-compact variety. But these laws were directed against a branch of the insurance business which has been traditionally opposed to the determination of rates from classified statistics. Such opposition undoubtedly gave rise to the series of anti-discrimination laws all of which are hopeless from the regulatory standpoint and in the hands of incompetent or hostile supervising officials are deadly to the business. Next came the laws designed to prevent rate wars in connection with which I should mention that regulation as to adequacy soon evolved into a virtual ratemaking by the state for many of the laws now provide that rates shall be "reasonable" or "not excessive" or "fair," etc., all in the discretion of the supervising official. Regulation of rates has now extended beyond the specialized field of workmen's compensation and in New York embraces practically all casualty lines.

From what has been said it may fairly be asserted that for something more than ten years state supervision has been groping for an effective means of regulating rates in fire and casualty insurance and that the solution of the problem still awaits development. I state a fact borne of experience when I say that rate regulation is a most irksome function of insurance supervision. Most of the insurance departments of the country are ill equipped to deal singly with so big a technical problem. Either they must rubberstamp the work of the companies or else assume a political attitude on all rate questions and decide them according to the exigencies of the moment. Theoretically, rate regulation is wholly desirable—that is, if we may ignore the human equation. But this we may not do if we would view the problem as it really is. What then is to be the future of the business under such unpromising conditions? It appeals to me that the actuaries must furnish answer to this question by devoting themselves to the development of the science of casualty insurance with the end in view of placing it upon as firm a technical foundation as that of life insurance. This, however, looks a long way into the future. In the meantime, how are the private carriers to demonstrate their desire to conduct the business along sound lines? A movement

that has already taken place in the compensation field appears to furnish the most logical basis for meeting the present situation. There it is proposed to recognize that state supervision by the several states each acting independently is ineffective and unsatisfactory and extremely difficult for the carriers and their regulators alike. In lieu of several brands of regulation with variable standards the plan is to appoint a national supervisor who shall act for all departments in the dual capacity of technical expert and interpreter as between the supervisors and the supervised. It is contemplated that he shall deal with the several insurance departments both individually and also through the National Convention of Insurance Commissioners as the central body of the supervising authorities. On the other side he is to have active resident supervision over the central organization for rates maintained by the carriers. In this way, assuming the carriers and the supervising officials can come to a common understanding on important principles, it is possible that the chief objects of both parties, the one representing the vendors and the other the purchasers of insurance, may be accomplished. Rate-making technique is now far enough advanced to render possible an agreement on the fundamentals and there would seem to be no good reason against centralizing the actuarial and ratemaking work of the carriers if it is to be so completely carried on under close public inspection.

But why, it may be asked, is there need for all this regulation,—for any regulation so far as rates are concerned? On this opinions may differ, but I believe it is chiefly due to the great vitality of the competitive system. We are a nation of pioneers, progressive, aggressive and prosperous. Our institutions have flourished amazingly and they are forging ahead at an accelerating pace. Much of this good fortune may be credited to the energy of private initiative, that is, to competition. We have all observed the interesting phenomenon of growth of vehicular traffic on our city streets. Some years ago—not so many years ago—we saw the slow moving horse-drawn trucks and drays, the cabs and the hacks, all striving in their own way to reach their certain respective destinations. But the general movement of the traffic was impeded by the lack of any control over the actions of the individual vehicles. In time it became necessary to introduce such a control and the police authorities assigned officers for the regulation of

traffic. It has become possible under this form of regulation for the fast moving, mechanically drawn vehicle largely to replace the slower horse-drawn variety and for traffic as a whole to increase enormously its average speed and operative efficiency.

Business competition is like this. The traffic grows quite imperceptibly at first, but eventually gets into a jam for want of regulation. Each manager of an insurance office, let us say, wishes to play a lone hand and to carry on his business at his own pace without much regard for his competitor. Very soon accidents begin to happen. The speed has become too fast for the general good and a police control has to be applied. But as in the case of vehicular traffic, the police department does not undertake to operate the vehicles. Its services are introduced for the purpose of moderating the natural competitive tendency which being based upon self-interest would, if left to itself, result in excesses that would disadvantage all concerned. Regulation of business carried to this point must obviously be for the general good. How much further it can safely be extended is one of the weightiest problems of the moment. Particularly is this true of insurance, a business of national scope and under potential regulation by every state jurisdiction for the form which such regulation assumes is not identical in the several states. The insurance company, unlike the motor vehicle, is subject not to continuous and successive regulations from state to state, but to the concurrent application of the laws of all states in which it operates. Moreover, many of these laws contain retaliatory provisions so that any excessive regulation of a company's affairs by a state is potent to bring about unfortunate consequences for all of its domestic insurance companies operating in other jurisdictions. Uniformity of law and of the administration of law can be brought about only through knowledge and by intelligent action based upon that knowledge. We should at all times exert our influence as actuaries for the promulgation of sound insurance knowledge and for such a standardization of casualty actuarial principles as may properly be reflected in our state laws, especially those laws which are designed for the regulation of insurance traffic. Our attitude toward reasonable regulation should be positive and friendly. At the same time, we should learn to resist any tendency of government to extend regulation to the point of actual managerial control. While the competitive traffic problem in insurance is a difficult

one, the roads are wide and there is room for all the vehicles. Under reasonable regulation, the system will continue to function satisfactorily. The state will not have to operate the motive power.

On the other hand, insurance companies are bound to recognize that insurance itself is a branch of economics and that it is under peculiar scrutiny by the public, by students of economic subjects and by supervising officials. In the long run, the business of insurance must be able to show a fair economic return for the price paid for its protection. Present methods of conducting the business are not meeting this requirement in all respects. The most important phase of the question is that relating to scientific distribution of the cost-load and in this I include as an essential factor the allocation of expenses. This matter is particularly acute in compensation insurance, due in part to prevailing methods of remunerating agents and brokers and in part to the approximate methods of cost accounting that have been followed in these pioneer years of the casualty business. I am frankly an advocate of so allocating expenses that, so far as may be possible, risks which vary greatly in premium magnitude shall be assessed for expenses in accordance with some appropriate formula that will reasonably recognize the actual incidence of the expense. If in addition there can be applied a system of suitably graduated commissions, the resulting premiums for risks both large and small will approach more closely the true economic value of the service rendered to both groups. It is not to be overlooked, of course, that the anti-discrimination laws might be at first construed against this procedure. In the course of time and with suitable amendment where found necessary it would undoubtedly become the accepted method. This subject, by the way, is of considerable interest to the two main classes of carriers engaged in underwriting compensation risks and bears not only upon the prospective determination of non-participating rates, but has an equally important application to methods of distributing surplus in the case of mutual and other types of participating insurance. The Society should give more than passing thought to this suggestive topic and I hope that papers on the subject will be submitted at an early meeting.

I suppose everybody who holds this office, in casting about for a suitable subject for the half yearly address, is constrained to

impress upon the membership the importance of the organization's mission. There is a certain temptation to do this on general principles and without much reflection on the ground that such messages tend to be inspirational. As a charter member of the Society, however, I am perhaps permitted to state my own belief that the Society—still in its first decade of existence—is not yet beyond the experimental stage, that it remains for the future work of the membership to determine the course which the Society shall ultimately follow and whether that course shall lead to failure or to success. But I am also able to state with conviction that the educational foundations of the Society have been soundly laid. This is a matter of the highest importance and one which is fully recognized by the Educational Committee. I have been much impressed from attendance at a recent meeting of that Committee with the thoroughness and zeal that are motivating its members, all of whom are already planning for the ultimate field of usefulness to be occupied by the casualty actuary. It is through application of the specialized training afforded by the pursuit of actuarial studies that the future success of private insurance depends. The fact that the casualty actuary has not yet "arrived" need not be a cause for discouragement. The problems of the future will be even more complicated than those of today due to the increasing degree of the public interest in insurance matters. It is not merely a question of whether the business of insurance is to come under a greater degree of regulation by government. That question, of course, is involved in the general trend of affairs. But I am thinking more of the various contingencies of human experience which as yet are either inadequately covered by insurance or are not covered at all. In developing the future usefulness of insurance we must recognize the tendencies of American laws and of state supervision. Whatever our own beliefs or desires, the present fact is that fire insurance and life insurance are things apart, differing in their fundamental application and in their administration. We can hardly conceive of any development in insurance that would greatly extend the sphere of usefulness of either of those great branches of insurance which would not be merely a modification of the technique of administration.

But in the wide field that appears to be open for development to casualty insurance there is no such limitation. It should logically fall to the casualty actuary to prepare the business

in which he is engaged for these larger opportunities. In recent years our national government has devoted considerable study to questions relating to the possible application of insurance principles to the solution of important economic problems. Private insurance should be even more alert and more ready to recognize such possibilities and be prepared with foreknowledge to accept the responsibilities which the discovery of new needs may create. Vital questions in such situations are necessarily those having to do with relative cost under public and private management and with their relative efficiency. If it be true as I have implied that the casualty actuary has not altogether "arrived," it is nevertheless also true that in such essential matters his aid and advice are eagerly sought. I greatly regret the lack of recognition in many offices of the actuarial point of view, not only for professional reasons but because I am certain that actuarial analysis and advice if followed in the earlier years of casualty insurance history, would have produced a healthier economic situation throughout the entire casualty field. It is not greatly to the credit of our business that state supervision rather than private initiative has been the chief means of bringing order out of chaos. But even so, it has remained for the basic principles of actuarial science to direct and mould regulatory legislation and administration.

If the casualty actuary has indeed failed to arrive, it is because there are not enough of us properly equipped with knowledge and with strength of character to impress ourselves upon the minds of company managers. The work that the Society is carrying on will eventually bear fruit, but we shall need to have patience. I look forward to the time when every casualty office will have its trained actuary who will be looked upon as being quite as indispensable as the managing head. For the time being, many of the smaller companies are content to rely upon the actuarial skill of the larger offices or upon that of the central bureaus which make the rates. Many of them also depend in large measure upon the disinterested and inexpensive actuarial advice that can be obtained from some of the more highly organized insurance departments. All this is bound to undergo a change that will benefit the casualty actuarial profession. The Society by means of its educational program and publications will be an important instrumentality for developing the men who will be sought for advice, not only on technical problems, but also those involving executive and administrative responsibility.

A PROCEDURE FOR MAKING RATES FOR WORKMEN'S
COMPENSATION INSURANCE BASED ON A CON-
SISTENT APPLICATION OF THE THEORY OF
PROBABILITIES

BY

A. H. MOWBRAY

During the course of working with the method of ratemaking outlined in the papers by Mr. Michelbacher and the writer in PROCEEDINGS Vol. VI. Pages 201 to 284, the National Council on Workmen's Compensation Insurance encountered certain difficulties which led to the whole subject matter of ratemaking procedure being referred by the General Rating Committee to the Actuarial Committee of the Council for intensive study and for its recommendations with respect to revision of existing methods. In consequence of that reference I have given extensive consideration to the theory of workmen's compensation ratemaking and particularly the application of past experience to the development of future rates. In the course of this study I have not, as have apparently those who have written heretofore on the subject, started out with the presumption that past experience must in some way be used in order to determine future rates but have endeavored to make a fundamental analysis of the problem and determine how far and under what circumstances the use of such experience is justified. As a result of my investigation there has developed a procedure for the use of past experience that has commended itself to others as well as myself, as sound in theory and workable in practice and it would therefore seem appropriate to bring the method and the underlying reasoning to the attention of the Society.

An insurance rate, particularly the pure premium portion of it, may be looked upon as a mathematical expectation, that is, the product of a probability and the sum at stake on the trial of the event.¹ The pure premium which is loaded to make the rate is certainly the company's estimate of the future loss cost

¹It may not be necessary to exclude the expense element in this connection but I think the conception will be simpler if we deal with pure premiums, and pure premiums for a particular benefit, for, after all, the total pure premium is but the sum of several partial pure premiums for individual benefits.

for the benefit under consideration per unit of exposure. The gross loss cost is the sum of the amounts payable when the event has occurred and in turn the pure premium is the quotient of these sums by the exposure out of which the accidents arose which occasioned these payments. If, then, we separate the losses into the product of the number of cases by the average cost per case and consider the denominator to be associated with the first factor we have the two elements of a mathematical expectation, *i. e.* the probability (which is the quotient of the number of cases of occurrence by the exposure covered) and the sum at stake on the issue of the event.

It is not necessary to this conception that the probability be calculated in the traditional way or even that it be correctly estimated.² This conception is possible under all conditions and is particularly fit if the fixing of correct rates is under consideration.

The amount at stake under an insurance contract is fixed within reasonable limits by the contract of insurance. This is so as respects life, fire, personal accident and many other forms and when the compensation law is read in conjunction with the policy it is also true of workmen's compensation insurance. Objection may here be raised that the amount of loss may vary considerably according to circumstances but it should be noted that we are considering a partial premium for a particular type of benefit and therefore the range of variation in the amount of indemnity is so relatively slight that the average may properly be substituted for the individual values.

Approaching the matter from this point of view it must become apparent that pure premium ratemaking is primarily the estimate of the underlying probabilities of occurrence of the events insured against. There may be involved a certain element of estimate of the amount of loss per case because of changes in wage levels and like conditions but even this extra element does not alter the underlying fact that a part at least, and a large part of pure premium determination really lies in estimating, consciously or unconsciously, the underlying probabilities of occurrence of the events insured against.

²It is of course necessary that it be correctly estimated if correct rates are to result unless perchance, there is a compensating error in the estimate of probability and of the amount at stake. Compensating errors of this kind, however, are relatively infrequent of occurrence.

In general, the experience of the past is a guide to the future if and so long as there is reason to believe the same forces which have been at work in the past will continue to work in the same way in the future or in that part of the future which it is attempted to forecast. Sometimes the period of the future is so indefinite that we can practically consider it perpetual. An example of a case of this kind is our knowledge from the experience of the past that an unsupported object will fall toward the center of the earth, the knowledge which we describe as the natural law of gravitation. Experience of this kind leads us to the belief that natural forces always act in the same way and that where, for example, successive throws of a die bring up different faces, it is not because the natural forces which have governed the way the die falls fail to act in their normal and usual way but that the actual forces operating are not precisely the same even though we are not able fully to appreciate their differences. Where all the forces acting are known both in power and trend and it is known that the forces and direction of their action cannot be changed, then we are dealing not with probability but with certainty. When, however, this is not known but it is known that so far as outward appearances go conditions remain unaltered, we are dealing with a case of probabilities and our tests in this field prove to us that in a great mass of cases we may accept the indications of the past as indications of probabilities for the future.³

This does not hold, however, if actual known changes have occurred in the forces at work unless the extent of these changes is known. Of course, in that case where the extent and trend can be measured, their influence may be taken into account and the indicated results may be modified in recognition of them. We then reach the conclusion that the justification for the use of past experience as regards the future must lie in the either known or assumed fact that all the important changes in the underlying forces at work can be measured both as to extent and trend.

The same limitations apply whether the experience of the past has been derived from the same jurisdiction whose future rates are under consideration or from a different jurisdiction. The

³For discussion of the criteria on this point see J. M. Keynes' "A Treatise on Probability" Part V "The Foundation of Statistical Inference" and Fisher "The Mathematical Theory of Probabilities" Chap. XII.

experience of the past is a guide to the future so far, but only so far, as the forces operating in the future may be expected to remain the same as those operating in the past.

It seems to me that these considerations are fundamental and that the faults and defects we have encountered in ratemaking procedure in the past have been due to the efforts to use past experience without analytic study of the changes in conditions which have taken place and the nature and extent of the modifications in the indications of that past experience which may be necessary in order to make it truly indicative for the purposes for which we wish to use it. At the outset the attempt was made to use the experience of the past and of other jurisdictions modified for changes in statutory benefits only. Such a procedure is equivalent to the assumption of a constant probability of accident per unit of wages. This system did not prove satisfactory because it fails to recognize that when the probabilities are taken to the base we are accustomed to use, namely, payroll, then they are subject to modification by reason of other changes such as for example, changes in wage levels.

On the other hand, where experience differentials and projection factors are resorted to we have known that mechanically we have made the aggregate of a bulk of experience reproduce another bulk but whether in so doing we have actually added to our data and gotten a better basis of indication for making classification rates or whether we have simply made the volume of data appear larger and perhaps in the process brought in a characteristic peculiarity or an eccentric variation of the latest year's data on which the experience modification factor or projection factor is based, we have not known.

Starting from the new point of view I have outlined, the questions which naturally first arise are "What are the forces at work producing the probability of loss of a particular type and amount with reference to our basic unit (in the case of workmen's compensation insurance, payroll)? Which of these are constant, which are variable and how do they vary?"

When the question is put in this form I think we are all prepared to agree that an exhaustive answer cannot be furnished from our present knowledge nor do I think we can devise any form of investigation which will correctly answer these questions.

We can, however, pick out certain elements we know or suspect

to be variables, find their measure in certain past periods and in the light of this investigation eliminate their apparent influence over particular periods of the past. We can then test the residue for constancy or trend. If the variation in the residue lies within reasonably narrow limits and there appears no pronounced trend then, I think, we may for practical purposes consider this residue of forces as constant for the period and after modifying the experience data for the influence of the variable forces we may put the data for several years and for several states together with confidence that in so doing we are in effect getting a larger volume of records of trials, under similar conditions, of the event we are considering and therefore coming closer to a correct estimate of the underlying probability.

In the field of workmen's compensation the statutory benefit provisions of the several compensation laws and the level of wages are notably variable factors. We can, however, measure with a considerable degree of accuracy the effect of changes in these statutory benefits and the same is true as respects wage levels. It therefore is a natural suggestion in the light of the above reasoning that we first eliminate from our experience data the effect of variation in the statutory benefit provision and in the wage levels and test the residue to determine the probable presence of a constant underlying probability. The residue when these items have been eliminated, is of course, the rate of accident by type of disability per 1000 hour-worker (or some other standard time exposure unit). It is not necessary at the outset to assume that this is constant but eliminating the other variable elements we may resort to an actual test and determine whether or not this is a constant or variable factor and if the latter we may determine whether the variation is wide or narrow and of regular or periodic type.

I have attempted to check up this theory and test out whether or not the accident frequency rate by type of injury per unit of time exposure was reasonably constant. As will appear, my tests were not entirely conclusive but seem to indicate a reasonable probability of this theory. For the purpose of the test I used Schedule Z experience for policy years 1916, 1917 and 1918 from the State of New York, for policy years 1917 and 1918 from Massachusetts and for policy years 1916 and 1917 from New Jersey, selecting a number of classifications more or less common

to the three states although some of the classifications were found in only two. I found difficulty in reducing the payrolls to number of employes but roughly approximated the conversion in the following way:—

For Massachusetts from the analysis of wages in the report of the Industrial Accident Board for the fiscal years from July 1, 1916, to June 30, 1917, and from July 1, 1917 to June 30, 1918, I worked out the average wage for each fiscal year and assumed that this corresponded to the average wage for the policy years '16 and '17 respectively. For the State of New York I took the average for the same period on the basis of monthly averages deriving the basic figures from the Labor Market Bulletin issued by the Labor Department; and for New Jersey I obtained calendar year figures from the Labor Department interpolating these figures roughly to get at the figures on a policy year basis.

Having approximated the weekly earnings I took 50 weeks as the annual earnings and divided the Schedule Z payroll by these average earnings to derive the number of full time workers in each of these exposures. I then tabulated these numbers with the number of accidents by the several types set up in Schedule Z and added together the data for all seven policy years involved. From these aggregate figures I determined the frequency of each type of accident and applied this frequency back against the exposure in each policy year and state, thus deriving an expected number of cases which might be compared with the actual number. The relation between the actual and expected was generally found to be reasonable considering the limited volume of exposure in each of the policy years. Taking any one classification in a state it was generally found that the ratio of actual to expected was not constant from year to year nor was there apparently any regular development. For one classification and one type of injury the first year might show an excess of actual over expected and the third year the reverse and so on, the changes being apparently purely accidental and due to limited exposure. I did not attempt to test out this question by the use of the criteria of Lexis or Charlier as outlined by Mr. Fisher in his *Mathematical Theory of Probabilities* as I do not believe the data sufficient in volume to give valid results with these tests. At least the test applied did not indicate that the hypothesis above set forth was untenable.

The application of this theory for ratemaking is relatively simple and the indicated procedure would be to obtain approximately accurate average wages for the exposure period, divide the payroll by these wages and thus reduce the exposure to terms of fulltime workers; ignoring the monetary loss, to tabulate the number of accidents by type, get the total of all the data, divide the number of cases by the exposure in fulltime workers and thus obtain an indicated probability or frequency of occurrence of the type of accidents in question, smoothing out irregularities in the results by whatever process may be available. When the probability of occurrence per employee has been ascertained it is a simple matter of arithmetic to apply the average wage to the denominator of this fraction and the cost per case to the numerator in order to obtain a pure premium in form for application to payroll exposure. Of course, the average wage and cost per case would have to be keyed to expected conditions for the period during which the rates are to be used.

This procedure is almost exactly analogous to the procedure in determining life insurance premium rates but is impracticable in workmen's compensation insurance for a number of important reasons. In the construction of mortality tables after the crude probabilities have been worked out from the basic data it is necessary to resort to a smoothing process to eliminate the errors due to limited data. The natural relationship between the classifications used to determine these probabilities (years of age) is such that these difficulties may be met by comparison of the probabilities from classification to classification in the process known as *graduating*. There is no such relation between the classifications used in workmen's compensation insurance and therefore some other process must be substituted for the process of *graduation*. This has usually been examination of the data and comparison of results between classifications by skilled underwriters. But these underwriters are not accustomed to think in terms of basic probabilities but rather in terms of premium and of pure premium. It is therefore necessary to express the results in these terms if effective work is to be done.

Of course, if this were the only objection, this could be met fairly readily by converting the probabilities into pure premiums on some standard basis which is familiar to the carriers. There would still remain, however, the objection of a very voluminous detail of calculation.

But an even greater difficulty stands in the way. If we are to get the correct number of fulltime workers to derive these probabilities it is a first essential that we have a correct average wage for the experience period by classification and it is also essential if correct pure premiums are to be determined that we have a very approximately correct estimate of the probable average wage by classification for the period for which the rates are to be applied. The figures, at least under present methods, are unobtainable and the suggested method therefore requires modification to meet the exigencies of practical conditions.

Just as in life insurance work it is sometimes found desirable to construct a mortality table on the basis of "amount insured" rather than "lives exposed" and the table when so constructed is found to be equally satisfactory for many uses so we may substitute for the number of fulltime workers a volume of payroll on some standard wage level. There is a general tendency for wage levels to change in about the same way and at about the same time for groups of industries if not for all industries in a given locality. This being so, instead of finding it necessary to have an exact average wage by which to convert a payroll exposure to terms of fulltime workers we may take an average relationship between wage levels and convert a payroll at a given wage level to the corresponding payroll at a new wage level. While it is difficult to obtain precise average wages for industrial classifications at two given periods it is much less difficult to obtain general average factors expressing relations between wage levels.

A probability fraction expressed in terms of payroll, however, would be no more intelligible to the underwriters reviewing the data than one in terms of fulltime workers and it is necessary to substitute monetary losses for numbers of accidents in order to derive a pure premium fraction for these purposes. One method of doing this would be to revalue the individual losses case by case and set up the cost on the new level of wages and the new law if there have been changes. This method, however, would be extremely laborious, in fact prohibitively so. The second method would be to work out the average cost per case and apply to the number of cases in each classification but this average will vary from classification to classification and as it is mainly caused by the limits of the compensation law would require a knowledge of the average wage for the future by classi-

fications almost as much as though we were proceeding from the pure probability fraction. Applying, however, the same principle as that on which payrolls were converted we may determine differential factors in the manner heretofore used and modify these for the difference in wage levels.

The soundness of this procedure will be seen from the following:—

Let π = pure premium L = losses P = payroll
and designate the data from the experience period by the subscript a and data for the future period by the subscript b . We then have

$$\pi_b = \pi_a \left(\text{differential } \frac{b}{a} \right)$$

Where $\left(\text{differential } \frac{b}{a} \right)$ means the differential computed in the usual way comparing the cost under the new law and conditions to that under the old law and conditions, the limit factors being calculated with respect to the general level of wages for both periods. Substituting for π the equivalent fraction $\left(\frac{L}{P} \right)$ we get

$$\frac{L_b}{P_b} = \frac{L_a}{P_a} \times \left(\text{diff. } \frac{b}{a} \right)$$

But payroll is the product of the time worked (or the number of fulltime workers covered) by the average wage and if we so analyze the payroll we may read:

$$\frac{L_b}{\text{Time} \times W_b} = \frac{L_a}{\text{Time} \times W_a} \times \left(\text{diff. } \frac{b}{a} \right)$$

But if we assume that our accident rate is constant per unit of time exposure then since our losses are presumed to be the same except for the difference in law and wage level, the time must be the same and therefore cancels out from both sides of the equation. Multiplying through by W_b we get the final result:

$$L_b = L_a \times \left(\text{diff. } \frac{b}{a} \right) \times \frac{W_b}{W_a}$$

In the industrial development of the country there has been a tendency for certain industries to concentrate in particular localities and for these industries the local experience, particularly over a number of years, is usually broad enough to be indicative of appropriate rates for workmen's compensation insurance and the

local authorities having jurisdiction over workmen's compensation insurance rates in such cases usually insist that the rate be made primarily from such local experience. Even when this is done it is necessary, however, to bring the experience of two or three policy years to a common level for the purpose of ratemaking and it will be apparent that by the above procedure when the terms of the law and the approximate future wage level are known, it is about as easy to make the combination of experience in such terms as to produce pure premiums for the future conditions as to do so in other terms.

There will, however, be many classifications for which local data are not sufficient in any case and it will be necessary to combine the experience of the entire country for determining these rates. This experience will have to be brought together upon some standard basis.

Any practical method of ratemaking must recognize and make suitable provision for these two conditions. These conditions will be recognized if the Schedule Z data is brought together for each state upon a basis suitable for application to its rate requirements for the future and then the experience of the several states converted to a basic experience for the second type of work.

In the above discussion nothing has been said about what analysis of the total pure premium should be made. In order that the partial pure premiums may rest upon the most homogeneous (from point of view of cost) possible data I suggest the analysis in the present Schedule Z as appropriate. But there is need of further discussion as to the medical cost. The medical cost is created by the requirements of the injured man which follow from the nature of the accident and injury and it would therefore seem a reasonable conclusion that the medical cost is closely associated with the type of injury, *i. e.* that it is a part of the sum at stake and not an element having a separate probability. It is true that the requirements with respect to medical aid in the provisions of the several compensation laws differ from state to state but in the development of the practice of workmen's compensation insurance the companies have come to disregard the limitation upon the requirements in respect to medical aid and to furnish the medical aid without respect to the statutory limitations. Of course, the cost will differ from state to state in accordance with the general level of fees paid in that jurisdiction.

It would therefore seem that the correct procedure in ratemaking would be to consider the medical cost part of the compensation for the type of injury and associate it with the indemnity in determining the pure premium. This, however, would greatly complicate the comparison of benefits under the several different laws. Moreover, Schedule Z until very recently has not provided for this analysis and it will be necessary in any problem of ratemaking in the near future to use data in which the medical losses have not been analyzed.⁴ The problem of conversion of such data, however, to the basis of state future requirements or to a basic level is apparently not susceptible to theoretical solution. A suggestion which has been made and which appears reasonable is that the entire medical for a given year of issue in a particular state be compared with the total number of compensable accidents, after modifying this number for the difference between the waiting period in the actual experience and the conditions to which the experience is converted. In this way, we will get a figure which might be referred to as the cost per compensable case.⁵ A comparison of this value as found for the data to be converted with the same value for the latest policy year or basic level will give a ratio which might be applied to the actual medical in the experience to convert it to the basic level.

In appendix A to this paper is given an exhibit sheet which has been worked out to present the combined experience of a classification converted by the method outlined above and a detailed statement of each step involved in the process.⁶

It will be noted that this exhibit sheet shows the actual experience by states as well as the converted experience both on state level and on a basic level. The number of accidents of each type are also shown and if such a sheet is prepared for each classification and each year of issue entering into the experience and then summary sheets in the same form are prepared for

⁴Even when the medical is treated as a separate pure premium unit it is desirable to have the cost analyzed by nature of injury to facilitate judging the dependability of the medical indication.

⁵It will not actually be the cost per case since it will include the cost of medical in noncompensable cases spread over the number of compensable cases.

⁶This process stated in such detail seems very long and involved but is not more so in fact than those used in previous revisions of workmen's compensation rates.

groups of classifications and schedules the underwriters reviewing the data before them can reach their own conclusions as respects the principle of the underlying assumption of a uniform accident frequency per unit of time exposure since wages at the basic level will be approximately equivalent to a time exposure. If examination of the data in this way reveals a trend or drift in the accident frequency it will be possible to take cognizance of this and give it due weight. In the exhibit the columns "State Latest" refers to the conditions at which it is anticipated the rates may be required but in practice a law may be amended subsequent to the time when the revision work begins and it may be necessary therefore to take cognizance of this in a later step. With the pure premiums on the same basis for several policy years available it will be possible to review the stability of these pure premiums and determine whether or not the local data is sufficient for the determination of rates solely on local experience and where this is determined upon the indicated pure premium is then shown. Where, however, the combined data is necessary for the determination of pure premiums the indication may be worked out and inserted in the pure premium column for each type of benefit on the grand total line. These will be the pure premiums reviewed by the underwriters' committee and from these selections will be made. They can, of course, be converted to the state latest basis by applying the reciprocals of the factors by means of which the state latest material were brought to basic level. To the pure premiums as so developed it would be necessary to apply suitable differentials for any amendment to the law subsequent to the time as of which the data was put together and the necessary loading for expenses.

This theory of ratemaking and this plan of procedure have been presented to the committees of the National Council on Workmen's Compensation Insurance and have been approved for use in the next general revision of rates undertaken by the Council. Since the procedure was developed there has come to the attention of the companies the apparently adverse experience of policy years 1921 and 1922 and it has been suggested that it may be necessary to introduce a further factor for changes in the accident frequency rate.

There are several possible theories upon which such a factor might be based. We know from various studies that have been

made that when industry begins to revive after a period of depression the introduction of new employes requires a certain amount of training to develop safe efficiency and accident rates tend to rise. Generally, however, the studies have indicated that they go down again as industry again becomes settled. If it is the desire that the rate for workmen's compensation insurance be responsive to these temporary changes then the assumption of a constant rate per time unit will probably not give a rate sufficiently flexible. I doubt, however, whether the other facts required can be ascertained with sufficient exactness to give such a rate. An alternative theory upon which the introduction of such a factor might be based might be that the experience period is not broad enough to give a true frequency and thus a factor of safety becomes necessary. A further alternative would be the assumption that a fall in wages in the future is probable⁷ and should be provided for and a fourth, that some new forces have intervened making the past experience not truly representative of the future. This assumption might call for a factor of less than unity as much as a factor greater than unity. The introduction of any of these factors, however, involves passing beyond the statistical basis for ratemaking and the introduction of judgment which finds its basis in something other than the statistical record. As a matter of business judgment this procedure may be not only defensible but highly desirable. In these days, however, of governmental supervision and the desire to make the processes as clearly scientific and statistical as possible, the need for the introduction of such a factor should be demonstrated as clearly as it is possible to do so.

Certain tests of the above procedure have been made to determine whether or not distortion results by the use of factors for wage level changes and law benefits derived from a combination of all classifications as against the determination of these factors from groups of classifications. These tests were made by converting the data for policy years 1918, 1919 and 1920 on a number of classifications in Massachusetts to the basis of 1923 conditions. The test showed that conversion by groups is apparently not necessary as no serious distortion results from the use of a single wage and law factor derived from total experience. A similar

⁷Present indications seem to be for the reverse in the immediate future in the United States.

test was made as respects converting from the Massachusetts level to the New York level and here again the indications were apparently that the conversion by groups was not necessary.

Subsequent to the development of this method, the New Jersey authorities began an examination of data on file with the New Jersey Bureau for the purpose of determining the basis for revising New Jersey rates in view of contemplated changes in the New Jersey Law. In Appendix B attached hereto is produced the summary of results of this study. In converting the pure premiums from the actual basis to the present basis the differentials heretofore calculated were used. These differentials were calculated on the basis of their level of wages corresponding to policy year 1919. Inasmuch as the New Jersey Act then provided for a 50 per cent. rate of compensation with a maximum limit of \$10 per week⁸, the difference in wage level would not have a material effect on the calculated differentials. An examination of the New Jersey exhibit appears to confirm at least as respects policy years 1918, 1919 and 1920 the general fundamental theory of approximately stable accident frequency per unit of time exposure. It also indicates that pure premiums converted on this basis approach very closely the aggregate indications for the latest policy year. Taken on the whole, these studies appear to indicate that the procedure herein outlined will prove satisfactory for effective ratemaking.

Due to an amendment to the New Jersey Law it has become necessary to revise the New Jersey rates before it will be possible to carry through the proposed scheme of ratemaking to completion and arrangements have been made to conduct this revision by combining the experience on the level of policy year 1920 and applying suitable factors to cover the amendment to the law and the change in wage level at the present time. The experience is to be brought to the 1920 level by modifying the payrolls of the several policy years in the ratio of the average wage at the level of policy year 1920 to the average level of wages for each policy year (the wage levels to be determined by the individual reports on Schedule Z), and by modifying the losses of the policy years by differential factors to cover the law amendment as heretofore calculated. It has been found by test that these factors are substantially the same as those which would

⁸Changed July 4, 1919, to 66 $\frac{2}{3}$ % and \$12.

have been calculated in accordance with the above outlined procedure and the only essential difference will be that instead of separately considering the pure premiums for all types of benefits the pure premiums will be reviewed in three groups as during the 1920 national revision. This preliminary work on the rates for the State of New Jersey should give a very satisfactory test of the procedure and it is anticipated that it will be completed in time for comments thereon to be made as an amendment to the paper at the time it is actually presented to the Society.

APPENDIX A PART II—DETAILED STEPS IN PROPOSED RATE-
MAKING PROCEDURE

The full procedure is as follows:

(1) Schedule *Z* in the usual form is received at the central office from the several carriers and the staff at once proceeds to audit this material.

After the Schedule has been audited in this way, Hollerith cards are cut covering the information in Part I (the classification summary sheet) for each company and by means of Hollerith machines the schedules of the several companies are combined into a single total schedule.

For the official Schedule *Z* states this audit is performed in some instances by the local authorities, in other instances the National Council is the authorized agent for receiving and compiling the Schedule on behalf of the state authorities.

This is the raw material in the nature of experience data upon which ratemaking on a statistical foundation is based.

(2) The next step in the procedure is to transcribe this raw material to work sheets which are substantially the same as the final exhibit sheets.

(3) Concurrently with this work the wages of the injured employes are taken from the individual reports of Parts II, III, IV and V of the Schedule for each state and year of issue for the purpose of determining the wage level underlying the experience.

(4) From such sources as are deemed reliable by those in charge of the work (including the committees) the average wage levels to which rates are to be keyed for each state are estimated. The ratio of this average wage for each state to the average wage for the same state for each of the experience policy years is the factor for converting the payroll exposure of the several policy years to the current level.

(5) When the payroll conversion factors as determined above have been worked out, the actual payrolls for each policy year and each state will be converted to the present level in that state by multiplying the original payroll as entered on the work sheet by this factor.

(6) The Standard of basic pure premiums having been determined, the conversion factors for converting the payroll for the several states at their latest level to the basic level are determined in the same way as described for converting the several policy years' experience to the present conditions in each state.

(7) So far in the above work the technical section of the staff will have had only the comparatively easy task of determining the conversion factors but while this work is going on it will be necessary to compute for each state the cost of compensating a standard distribution of accidents (for this we use the "American Accident" distribution) under the terms of each law in effect over any part of the experience period and the cost of compensating the same distribution under the current law, these costs to be estimated in terms of weeks' wages for each element.

NOTE: This work was done during the 1920 revision and I think much of it can be used over although it is likely some new calculations must be made.

(8) Using the wage data as referred to in (3), limit factors, the need for which and the calculation of which are described more fully in the separate paper presented at this meeting, must be calculated and applied to the costs in terms of week's wages without limits as determined in (7) and to these values must be applied the average wages in order to put this calculated cost in monetary terms.

(9) The proportionate exposure of each policy year under the several laws must be determined (usually we assume a uniform distribution of business of the year for this purpose) and an appropriate weighted average of the costs found under (8) must be found.

(10) The corresponding costs on the basis of the present law and wages are then to be found.

(11) The ratio of the cost found in (10) to that found in (9) represents the conversion factor to bring the actual losses of each state to the present level.

NOTE: It is not feasible to determine factors in this way for bringing the medical cost to the latest level. The method of converting medical is dealt with in the body of the paper.

(12) Application of these factors to the losses as entered gives the losses at the state current level.

(13) In like manner the cost of compensating the standard distribution of losses of the basic law and wage must be calculated for each separate kind of benefit.

(14) The ratio of this cost to the costs of compensating the same distribution on the several states' current levels determined in (10) must then be taken to get the conversion factors for bringing these state experiences to the basic level.

(15) Application of these to the losses for each state at its own current level brings the losses to the basic level.

(16) The next step is the addition of the appropriate items across the exhibit page and such vertical additions as should be made. These will be evident from an examination of the exhibit sheet.

(17) The next step will be the assembly of the three years' experience on a cumulative exhibit sheet.

(18) Division of the losses on the state current basis by the payrolls on that basis and entry of the indicated pure premiums is the next step, followed by the determination and entry of the indicated pure premiums on the basic level.

(19) Following this, the data on the classification sheets must be assembled into group and schedule total sheets.

(20) The work sheets must then be type-copied in order to furnish clear copy from which the exhibit sheets are prepared.

(21) I assume the exhibit sheets for committee work will be prepared by a similar process to that used during the 1920 revision. When the printer's job has been completed the data will be ready for consideration of the committee.

(22) The next step will be consideration of the experience data by the Committee and the selection of pure premiums. In this work it may be necessary to consolidate the data for certain of the sub-divisions upon which the analyzed data is not broad enough to furnish indications. This will probably be done in the Committee room during the session.

(23) When the selected pure premiums have been determined, it will next be necessary to apply the reciprocals of the conversion

factors by which state losses were brought to the basic level in order to re-convert the selected pure premiums to the state basis. This reconversion would be to the latest level in each state and the test would be made on this basis. In the test recognition would, of course, be given to state exceptions that had been made during the review of the experience and would presumably have been made on the state level.

(24) As 1923 is a busy legislative year, it is likely there will be amendments to several of the laws subsequent to the date at which each state's experience has been brought to current level and law differentials by parts along the lines indicated in the above steps will have to be calculated to determine the effect of these amendments.

(25) The next step is the application of the expense loading to the pure premiums as developed at the state latest level and modified for subsequent amendment of the law in order to convert them into gross rates. As noted in the text it may be decided to bring a further factor beside amendment and loading into the multiplier. At any rate this step is the assembly of factors into multipliers to convert pure premiums into rates.

(26) With the determination of the multipliers out of the way, the next step (the calculation of rates) will consist in applying the multipliers to the selected partial pure premiums and adding the partial gross rates together bringing in the catastrophe pure premium if the past practice of adding \$.01 per \$100 is to be continued.

(27) The final step will be the calculation of ex-medical factors for states where this is permitted, experience rating split factors and other supplementary tables necessary to carry through the rates and the Rating Plan.

APPENDIX B
EXPERIMENTAL CALCULATIONS MADE BY THE COMPENSATION RATING AND INSPECTION BUREAU OF NEW JERSEY
PRELIMINARY TO REVISION OF RATES AND IN PARTIAL TEST OF PROPOSED THEORY
Statistics taken from Schedule "Z". Grand Summaries.
All Industries excluding Per Capita.

Policy Year	Audited Payroll (in hds.)	Earned Premium	Incurred Losses	Loss Ratio %	Avg. Earned Rate	Est'd Man. Rate	Pure Premiums actual				Pure Premiums Present Benefit				% of All Cost Present Benefit		
							D.&P.T.	A. O.	Med.	Total	D.&P.T.	A. O.	Med.	Total			
1916	3102069	2303366	1552013	67.38	.743	.85	.113	.274	.113	.500	.124	.359	.170	.653	19.0	55.0	26.0
1917	5171564	5309899	2258539	42.53	1.027	1.05	.111	.234	.092	.437	.122	.307	.138	.567	21.5	54.2	24.3
1918	6115538	6677966	2320659	34.75	1.092	1.10	.072	.228	.080	.380	.078	.288	.113	.479	16.3	60.1	23.6
1st rept																	
1919	6966702	6456549	2917240	45.18	.927	1.027	.062	.254	.102	.418	.063	.262	.106	.431	14.6	60.8	24.6
1919	7295437	6705411	2986826	44.54	.919	1.027	.063	.247	.100	.410	.064	.255	.104	.423	15.1	60.3	24.6
1st rept																	
1920	6759097	6094617	2692037	44.17	.902	.978	.060	.224	.114	.398	.060	.224	.114	.398	15.1	56.3	28.6

Policy Year	Average Wage	Wage Ratios 1920 to resp. yrs.	Payroll Modified to 1920 Wage	For Comparison							
				Pure Premium Basis 1920 Wage and Present Benefit				Pure Premium 1920 Basis. Using Exp. Conv. Factor			
1916	18.11 (209)	1.712	5310742	.072	.210	.099	.381	.062	.257	.110	.429
				(.079)	(.212)	(.098)	(.389)	(.061)	(.233)	(.098)	(.392)
1917	21.62 (573)	1.434	7416023	.085	.214	.096	.395	.061	.219	.090	.370
1918	25.82 (537)	1.201	7344761	.065	.240	.094	.399	.059	.257	.096	.412
1919	29.02 (565)	1.068	7791527	.060	.239	.097	.396	.057	.225	.091	.373
1920	31.00 (453)	1.000	6759097	.060	.224	.114	.398	.060	.224	.114	.398
Average				.067	.229	.100	.397				

APPENDIX B (Cont.)

Accident Frequency per \$1,000,000 Payroll on 1920 Wage Basis

Policy Year	Death	Permanent Total	Major	Minor	Temporary	†(Temp. Corrected)	Total (Corrected)
1916	.378	.017	..	*2.395	14.250	18.083	20.873
1917	.356	.018	.391	2.168	11.676	14.817	17.750
1918	.300	.012	.442	2.206	10.737	13.260	16.220
1919	.236	.022	.475	2.466	12.396	12.817	16.016
1920	.254	.009	.395	2.845	12.139	12.139	15.708

*Includes Major.

†Adjusted for waiting period amendment in present Compensation Law.

Compensable Accidents

Policy Year	Death	Permanent Total	Major	Minor	Temporary	Indeterminate	Total
1916	201	9	..	1272	7568	0	9050
1917	264	13	290	1608	8659	1	10835
1918	220	8	325	1620	7886	9	10068
1919	184	17	370	1921	9658	16	12166
1920	172	6	267	1923	8205	44	10617

LEGAL LIMITS OF WEEKLY COMPENSATION
IN THEIR BEARING ON RATEMAKING FOR
WORKMEN'S COMPENSATION INSURANCE

BY

A. H. MOWBRAY

In nearly all of the workmen's compensation laws it is provided that the weekly indemnity for disability and the weekly rate of indemnity in the case of specific provisions for permanent disability is a percentage of the earnings of the injured employe, subject to certain arbitrary maximum and minimum limits. The effect of these limits on the rate of compensation paid the injured workers has been discussed from the social and economic point of view by a number of writers in different places and I shall not give consideration to these aspects of the matter in this paper. My purpose is to present the subject from the standpoint of the maker of rates for workmen's compensation insurance.

It must be obvious that were the compensation a fixed percentage of the wages without the introduction of these arbitrary limits, fluctuations in the earnings of injured employes (assuming other conditions remained unchanged) would have no effect upon the rate for compensation insurance if that rate is applicable to the total payroll of the employer.* Where, however, these arbitrary limits intervene, fluctuations in wage levels have an important bearing on the cost of compensation in relation to payroll. That this is so, is rather generally understood among underwriters and those engaged in the business, but my personal contact with many company representatives has led me to the view that the precise reason for this effect and the proper way of measuring it is not generally understood or appreciated.

A simple illustration, at the outset, of the way these statutory limits work will probably help to clear the ground and make further discussion more readily understood. Let us take, for example, the compensation law of the State of New York in which it is provided that the rate of weekly indemnity for total

*As the medical benefit is independent of wages, important changes in wage scales, if doctors' fees and hospital charges did not parallel them, might call for some slight variation in rates on account of wage changes.

disability is to be $66\frac{2}{3}\%$ of the average weekly earnings of the injured worker, subject to a maximum limit of \$20.00 per week and a minimum limit of \$8.00 per week. Under this provision, if the injured worker's weekly earnings lie between \$12.00 and \$30.00, compensation will be precisely $66\frac{2}{3}\%$ of his actual earnings; but if his earnings are less than \$12.00 per week, the indemnity provided will be more than $66\frac{2}{3}\%$ of the earnings, and if his earnings are more than \$30.00 per week, the compensation will be less than $66\frac{2}{3}\%$ of his earnings. In any given industry or establishment there are, of course, employes earning different rates of wages and the average rate of compensation which will be payable to such employes in the case of injury will depend upon the proportion of the employes in the various wage grades. If there is a considerable proportion earning more than \$30.00 per week, the average rate of compensation will drop considerably below $66\frac{2}{3}\%$, and where the industry is such that there is a considerable proportion of workers earning less than \$12.00 per week that is not offset by an equal or greater proportion earning more than \$30.00 per week, then the average rate of compensation in the event of injury would be something more than $66\frac{2}{3}\%$.

Let us now consider a particular establishment and assume that the general level of wages is such that the average rate of compensation is slightly under $66\frac{2}{3}\%$ and that an abrupt rise has taken place in the general level of wages. This will throw a larger proportion of employes into the class earning more than \$30.00 per week upon which the upper limit of \$20.00 is operative. It will also tend to throw employes from the group below \$12.00 per week into the group above and diminish the number of those whose rate of compensation is more than $66\frac{2}{3}\%$. Both these changes tend to lower the average rate of compensation as a percentage of wages. The actual amount of money payable will, of course, be greater, but its increase will be less than the increase in average wages. On the contrary, a drop in the level of wages has directly the opposite effect and tends to raise the average percentage rate of weekly compensation.

As long as premiums are based on the total payroll of the assured, it is not possible to make compensation insurance rates precisely reflect rapid changes of this kind because to attempt to do so would require continuous, almost daily, recision of outstanding contracts to the great confusion and annoyance of

insurer and assured alike. It is, however, both necessary and desirable to recognize changes of this kind when they are of the "long swing" character, and it becomes a matter of importance in the making of compensation rates to give proper consideration to the wage levels under which the experience used in making the rates has been accumulated and that at which it is probable the rates to be made will be used. The rates must be properly keyed to the latter.

It is obvious that the exposure to losses arising out of industrial accidents is a function of, if not directly proportional to, the number of persons employed by the assured and the length of time they work. These two quantities are fluctuating quantities and not easily ascertainable and it was therefore a custom of employers' liability insurance prior to the introduction of the workmen's compensation principle to base the premium upon the employers' payroll as an approximate measure of the exposure covered by the insurance. Under employers' liability insurance there was not the direct relation between the wages of the employe and the amount he received in the event of injury that obtains under workmen's compensation laws and as the rates for employers' liability insurance were not fixed by the precise methods used for workmen's compensation insurance, the question of nice adjustments such as are here considered did not come up.

When the Massachusetts Workmen's Compensation Act came into effect, however, Mr. S. H. Wolfe, Consulting Actuary of the Massachusetts Employes Insurance Association noted this effect of the statutory limits of weekly compensation and recognized the further fact that in the same industrial classification there might be employers paying different scales of wages and upon whose risk cost the statutory limits would have different effects. He therefore devised a system of premium determination for that company which was based upon the principle of adjusting the payroll to reflect the effect of these limits and then applying a uniform rate to such adjusted payroll.* Theoretically this proposal followed sound lines, but at the time it was put forward, it provoked a sharp controversy with those who had

*In actual practice there were other features such as the basing of that part of the premium required for medical on the number of employes. The student desiring further details will find them in the "The Standard" and other insurance journals in 1912.

had extensive experience in employers' liability insurance. The scheme was tried for about six months by the Association but found unworkable in practice for a company seeking business in competition with other carriers who quoted a flat rate on the total payroll in each classification. The company was not able to quote a prospective assured a definite rate which he could apply to his total payroll, and in order to estimate his premium, it was necessary to obtain a considerable amount of information not readily revealed by his general account books. Similar information in the same detail had to be obtained before adjusting the premium on audit after the close of the policy year. After the data were obtained from the assured there were extensive calculations necessary before he could be billed. The Association, therefore, abandoned this scheme, after such trial, in favor of a flat rate applicable to the assured's total payroll by manual classification.

Under the early compensation laws the statutory limits were such, in relation to the percentage of wages provided as compensation and the average wage then earned, that they had no marked effect upon the average rate of wages payable as compensation and for practical purposes in most cases might have been ignored. With the increase of wages, however, which resulted from the industrial boom following the outbreak of the war, the limits had an increasing effect in depressing the effective percentage of wages paid as compensation. This led to a volume of legislation amending the compensation acts to bring the limits more nearly into line with the average wages and statutory percentage allowed as compensation. Even as yet, however, they have not generally been brought to the point where the effective percentage of wages payable as compensation substantially equals the statutory limits, nor have the efforts to amend the laws and increase the benefits noticeably diminished.

In some cases the limits have been changed for some of the benefits and the old limits have been allowed to remain for certain of the other benefits, or if they have been changed have not been brought to the same level. Under such circumstances the intricacy of detail involved in an attempted adjustment of payroll to be used as the basis of premium so as to allow for the effect of limits becomes even greater. I think it may be taken as demonstrated that it is practically impossible to make provision in this way for the effect of limits. It, therefore, becomes necessary to make provision through the manual rate.

Where the manual rate is made from past experience, it may possibly happen that, through the relationship found to exist between the wage level and limits in effect at the time the experience was accumulated and those in effect at the time the rates are to be used, it is possible to use the past experience without adjustment on this point, but rarely will this be so. I cannot recall a case. But, of course, the recent past has been one of rapidly changing wage levels. Generally there will have been a change in the wage level, or a change in the statutory limits, or both, between the time the experience has been accumulated and the time the rates will probably be used.

In this case, an adjustment must be made. This adjustment may be made directly upon the pure premium or by operating separately upon the two parts of the pure premium fraction—the payrolls and the losses. If the former method of procedure is followed, then the modifying factor will be the ratio of the effective percentage rate of compensation payable at the time the rates are to be used to the effective rate of compensation payable during the period whose experience is used. If the experience of more than one policy year is used, it will usually be necessary to use different factors for each of the several policy years. If the latter method is to be followed, then the modification factor for losses will be the ratio of the average effective monetary rate of compensation payable at the time the rates are to be used, to the average effective monetary rate of compensation payable on the accidents of the policy year whose experience is used, and the corresponding modification factor for the denominator (payroll) is the ratio of the anticipated average wage for the time when the rates become effective to the actual average wage of the experience data.

Whether the modification factor is determined for application to pure premiums or to losses, it is necessary for its determination to have two* tables showing the distribution of wages in each period around the average wage for that period. Heretofore it has been the practice to collect such a distribution from the records of wages received by injured employes during the experience period and from a like record of wages received by injured employes during a period thought to be representative of

*It is shown later in this paper how a single standard distribution may be used, but this has to be used twice corresponding to different averages.

the period when the rates are to become effective. The most convenient distribution table of this kind proceeds by regular intervals (usually of \$1.00) and records the number of employes out of a given total receiving wages lying within each particular interval.

In Table I following is given a distribution covering 3,092 cases with an average wage of \$22.46, collected during the 1920 national revision of rates and based upon accidents occurring in Massachusetts during the latter half of calendar year 1919.

TABLE I.
TYPICAL WAGE DISTRIBUTION

Actual Wages (1)	Assumed Average Wages (2)	Number of Cases (3)	Total Wages (2) x (3)
\$4.01 to 5.00	\$4.50	11	\$49.50
5.01 " 6.00	5.50	3	16.50
6.01 " 7.00	6.50	9	58.50
7.01 " 8.00	7.50	15	112.50
8.01 " 9.00	8.50	30	255.00
9.01 " 10.00	9.50	58	551.00
10.01 " 11.00	10.50	24	252.00
11.01 " 12.00	11.50	71	816.50
12.01 " 13.00	12.50	67	837.50
13.01 " 14.00	13.50	67	904.50
14.01 " 15.00	14.50	113	1638.50
15.01 " 16.00	15.50	71	1100.50
16.01 " 17.00	16.50	107	1765.50
17.01 " 18.00	17.50	216	3780.00
18.01 " 19.00	18.50	114	2109.00
19.01 " 20.00	19.50	217	4231.50
20.01 " 21.00	20.50	212	4346.00
21.01 " 22.00	21.50	155	3332.50
22.01 " 23.00	22.50	131	2947.50
23.01 " 24.00	23.50	191	4488.50
24.01 " 25.00	24.50	249	6100.50
25.01 " 26.00	25.50	99	2524.50
26.01 " 27.00	26.50	98	2597.00
27.01 " 28.00	27.50	110	3025.00
28.01 " 29.00	28.50	74	2109.00
29.01 " 30.00	29.50	169	4985.50
30.01 " 31.00	30.50	93	2836.50
31.01 " 32.00	31.50	39	1228.50
32.01 " 33.00	32.50	51	1657.50
33.01 " 34.00	33.50	21	703.50

TABLE I. (Continued)

Actual Wages (1)	Assumed Average Wages (2)	Number of Cases (3)	Total Wages (2) x (3)
\$34.01 to 35.00	\$34.50	59	\$2035.50
35.01 " 36.00	35.50	31	1100.50
36.01 " 37.00	36.50	11	401.50
37.01 " 38.00	37.50	15	562.50
38.01 " 39.00	38.50	4	154.00
39.01 " 40.00	39.50	39	1540.50
40.01 " 41.00	40.50	3	121.50
41.01 " 42.00	41.50	6	249.00
42.01 " 43.00	42.50	1	42.50
43.01 " 44.00	43.50	3	130.50
44.01 " 45.00	44.50	9	400.50
45.01 " 46.00	45.50	5	227.50
46.01 " 47.00	46.50	..	..
47.01 " 48.00	47.50	2	95.00
48.01 " 49.00	48.50	..	..
49.01 " 50.00	49.50	9	445.50
50.01 " 51.00	50.50	1	50.50
51.01 " 52.00	51.50	1	51.50
52.01 " 53.00	52.50	..	..
53.01 " 54.00	53.50	1	53.50
54.01 " 55.00	54.50	1	54.50
59.01 " 60.00	59.50	2	119.00
62.01 " 63.00	62.50	2	125.00
69.01 " 70.00	69.50	1	69.50
70.01 " 71.00	70.50	1	70.50
Average Wage	22.46	3092	69461.00

The use of this table may be illustrated by determining the effect of the Massachusetts statutory limits of \$4.00 and \$10.00 on fatal and dismemberment cases under the 1919 law, the nominal percentage of wage payable in such cases being $66\frac{2}{3}\%$. To get at the effect of these limits, we first find from the table the number of cases where the wages were less than \$6.00 (the lower limit of \$4.00 being $\frac{2}{3}$ of \$6.00). In this tabulation there are 14 such cases which compensated at \$4.00 per week would require \$56.00 of compensation. Next we consider the cases where the limits do not apply. There are 454 such cases where the wages lie between \$6.00 and \$15.00. On these cases the statutory rate of $66\frac{2}{3}\%$ is payable. Summing the figures in column (4) for this section of the table, the total weekly wage of this group is found to be \$5,426, $66\frac{2}{3}\%$ of which is \$3,617.

We next consider the cases to which the upper limit applies. There are 2,624 such cases with wages over \$15.00 which would be compensated at \$10.00 per week and which would call for \$26,240 weekly compensation. The total weekly cost of compensation on all the 3,092 cases in this distribution would be \$29,913 = (\$56 + \$3,617 + \$26,240). The total wages in this distribution are \$69,461, two-thirds of which would be \$46,307. The ratio of the compensation above, \$29,913, to this figure is .646 which is the limit factor applicable to the valuation of this law at this wage level in terms of weeks' wages without limits. This factor shows that the rate of weekly compensation under this wage distribution and these limits, instead of being 66 $\frac{2}{3}$ % of wages, would be actually 43.09%. The latter figure might have been derived independently by directly comparing \$29,913 of weekly compensation with the total corresponding wage of \$69,461.

If we were deriving rates for this benefit and wage level from experience data, and the laws under which the data were accumulated were the same in other respects than the limits, or if it were the same law in all respects but under different wage conditions, the estimated value of compensation for a given number of cases in weeks' wages without limits* would be the same for both cases and the pure premium modification factor would be the ratio of two limit factors each calculated as in our illustration. The loss modification factor (if payrolls and losses are to be modified separately) would be found by applying the effective rate of compensation in each period to the average wage of that period, thereby determining the effective monetary rate of weekly compensation and comparing these two values. In this case the corresponding payroll factor would be the ratio of the average wages.

In working up any set of data for use in making rates for different conditions it is necessary (if there is no difference in law to be considered) to work out such a modification factor for each set of limits in the law and apply it to the pure premiums (or losses)† for each benefit subject to those limits.

In some statutes there is a maximum limit of total compensa-

*i. e., time lost multiplied by the statutory percentage rate.

†The factor applicable to payroll is independent of the limits and does not change when they do.

tion which becomes operative on long term benefits such as are given for total permanent disability and to dependents in fatal cases. If this is less than the total payable at the maximum weekly rate for the maximum term of benefit (if limited) then there must be a more complicated calculation to make allowance for this limitation in determining the factors. In such cases it has usually been more convenient to calculate the total amount payable for the entire number of cases in the distribution and reduce to terms of weekly wages for comparison by dividing by the average wage.

The method of procedure for determining the effect of limits of weekly indemnity outlined above is very laborious and requires the collection of a typical wage distribution for each of the periods between which comparison is to be made. This it is not always possible to do—at least, not satisfactorily.* For this reason, I recently set out to see if it were not possible to find a typical distribution which may be applied to any average wage and represent the most probable actual distribution within a reasonable margin of error.

In seeking this typical distribution, I first had a number of actual distributions transformed into terms of percentage departure from the average wage. I then had histograms of these distributions plotted in superposition on the same chart with their means at the same point. After roughly smoothing out irregularities in individual distributions there was apparently sufficient similarity in the form of the several distributions to indicate that a composite distribution might be substituted for each of them without introducing serious error. I therefore had a new chart of the same form prepared including several more distributions and a freehand curve drawn through it so as to represent as nearly as could be determined the composite indications of each of the histograms. Using this curve, I then had the number of squares falling between $2\frac{1}{2}\%$ above and $2\frac{1}{2}\%$ below the mean value counted and the number of squares for 5% intervals, determined in the same way, for the remainder of

*For example, it may be entirely possible to estimate from mass data with considerable precision what the average weekly wage will be at a certain future time, although it would be quite impossible to secure a wage distribution which would be recognized as corresponding to this average wage.

the curve. Dividing these by the total indicated area, we got a new standard percentage distribution.

This distribution I had applied to the determination of the effective limits under a number of different compensation laws and at different wage levels and compared the result with the factor produced by calculating direct from the wage distribution used in getting the average wage in question. Some of these tests placed a very severe strain on the use of the standard distribution, since among other factors calculated was the factor corresponding to limits of \$4.00 and \$10.00 on a two-thirds rate with average wages of \$39.10. Even in this case the error was less than 2%, and, in general, the average error of 13 tests was $1\frac{1}{4}\%$. These tests indicated that a standard distribution could be used satisfactorily in lieu of an actual distribution for practically any limit factor calculation required. In the test used, the average wages ranged from \$19.00 to \$39.00 and the limits from \$4.00 and \$10.00 on a $66\frac{2}{3}\%$ rate in one case or \$5.00 and \$11.00 on a 50% rate in another to \$3.00 and \$18.00 on a 60% rate.

I found, however, that the labor of passing from a percentage distribution to a distribution in dollars for the purpose of calculating the limit factor was much greater than the calculation from an actual distribution already collected in dollars and almost offset the advantage gained by not having to call for such a distribution. I have since found a way of overcoming this difficulty. I did not apply it to this first distribution, but as will be apparent when the method is described, it could equally well be used with this one as with the distribution finally adopted.

Satisfactory as these results appeared to be, it seemed to me that a distribution determined by graphic methods must always contain a large element of the personal equation and be open to attack on that ground. It seemed that it would be better, if possible, to find some way of constructing the standard distribution by a mechanical method which would not involve so large an element of personal judgment.*

I therefore set out anew and selected ten wage distributions all of which were based upon a large number of cases and which represented a wide variety of conditions both as respects average

*The personal element, however, is not entirely eliminated since a number of distributions must be selected from which to derive the standard.

wage and the extent of dispersion around the average. Most of these distributions were obtained either from material collected by the National Council for use in the 1920 rate revision or from Schedule Z. I had, however, learned from Mr. S. B. Perkins, Actuary of the Compensation and Liability Department of the Travelers Insurance Company, that he had recently made a number of distributions from accidents reported to his company by New York risks and I obtained copies of these distributions from him and selected, for use in constructing this composite, four wage distributions, three of which came from the latter part of 1920 and one from the early part of 1919. In this way I increased the range of average wages represented in my basic data and the variation in the distribution of the several distributions around their means.

I then had each of these distributions transformed into the form of percentage departures from the mean and had their moments calculated by the summation method. Next I had the weighted averages of these moments determined, using as the weights for each distribution the number of cases involved and, after applying Sheppard's corrections, adopted these as the moments for the new curve.

I am not aware that this method of amalgamating material has heretofore been used. The method of moments has, of course, been frequently used for determining the constants of curves for graduating mortality and other statistical data to produce smooth and regular curves and there is nothing new in applying it to this problem unless it be in this use of it to amalgamate and get a composite of a large amount of basic data. I see no reason why the method should not be available for such a purpose. The distributions used both in monetary and percentage form and their actual moments as calculated are shown in Appendix A.

The weighted averages of these moments were:

ν_1	1.000
ν_2	48.504
ν_3	271.876
ν_4	10,450.566

After applying Sheppard's adjustment, the final values are:

μ_1	1.000
μ_2	48.421
μ_3	271.876
μ_4	10,426.343

(I doubt whether application of Sheppard's adjustment was really necessary and, as will be noted, it had little effect on the value of the moments.) From these values I determined:

$$\begin{array}{r} \beta_1 \\ \beta_2 \end{array} \begin{array}{r} .651 \\ 4.447 \end{array}$$

I first tried out the construction of a Pierson frequency curve from these moments but found that the values indicated the transcendental (Type IV) curve which could only be integrated to get the distribution by some mechanical process and was therefore unsatisfactory. I then turned to the method described by Mr. Carver in his paper in *Proceedings VI*, page 52, and attempted the construction of the distribution by this method which proved highly satisfactory. The values of the several constants in his formula worked out as:

$$\begin{array}{r} C_1 \\ C_2 \\ C_3 \\ C_4 \end{array} \begin{array}{r} 34.542 \\ 794.365 \\ 53.948 \\ 847.313 \end{array}$$

This gave as the finite difference equation for determining the curve:

$$\frac{y_x + 1}{y_x} = \frac{x^2 + 34.542x + 794.365}{x^2 + 53.948x + 847.313}$$

The following column heads indicate the work sheet for constructing the distribution:

$$\begin{array}{cccccc} (1) & (2) & (3) & (4) & (5) & (6) \\ x & x^2 & C_1 x & (2) + (3) & (4) + C_2 & C_3 x \\ & (7) & (8) & & (9) & \\ (2) + (6) & (7) + C_4 & & & \frac{(5)}{(8)} = \frac{y_x + 1}{y_x} & \end{array}$$

As Mr. Carver explains in his paper, this equation may be used for graduating any particular section of a general curve and starting with a particular value of x and an assumed corresponding value of y , the remaining values may be determined by successive multiplication, if the value of x is the lowest value in the section to be dealt with, or by division if it is the highest, or it is possible to begin with the mean value and work in both directions.

In working out this distribution we considered the value of x to be zero for the mean and y to be 1000, carrying the calculation of the successive values of y to the point where they became less

than one on either side. We then reduced the numbers so that the total distribution summed to 100.00. The basic data were grouped in 5 point intervals of percentages and therefore a unit difference in the value of x corresponds to a difference in the wage equal to 5% of the average.† As will appear from the table in the Appendix B, tests of this distribution proved quite as satisfactory as the earlier one I had obtained and indeed slightly more so.

The next problem undertaken was to find some means of reducing the mechanical work of calculating limit factors from such a standard distribution in percentage form. For that purpose certain auxiliary columns were calculated. The following table shows, in column (2), the distribution obtained as above described and in columns (3), (4) and (5), the auxiliary figures.

TABLE II.
STANDARD WAGE DISTRIBUTION
LESS THAN AVERAGE
Limit has a Positive (+) Effect on Average.*

(1) % Deviation from Average	(2) Distribution	(3) (1) x (2)	(4) Σ (2)	(5) Σ (3)
— 90	.02	1.80	.02	1.80
85	.04	3.40	.06	5.20
80	.08	6.40	.14	11.60
75	.18	13.50	.32	25.10
70	.33	23.10	.65	48.20
65	.59	38.36	1.24	86.55
60	.96	57.60	2.20	144.15
55	1.46	80.30	3.66	224.45
50	2.09	104.50	5.75	328.95
45	2.81	126.45	8.56	455.40
40	3.58	143.20	12.14	598.60
35	4.34	151.90	16.48	750.50
30	5.04	151.20	21.52	901.70
25	5.61	140.25	27.13	1,041.95
20	6.02	120.40	33.15	1,162.35
15	6.24	93.60	39.39	1,255.95
10	6.29	62.90	45.68	1,318.85
5	6.17	30.85	51.85	1,349.70

*Meaning of this note will appear in the following work.

†Theoretically, Mr. Carver's formula graduates unit values and where an area is used as in this case as though it were an ordinate, the use of a quadrature formula as he has indicated in his paper might be necessary. The rate of change in the distribution we had was not so rapid that in my judgment such further adjustment was necessary.

GREATER THAN AVERAGE
Limit has a Negative (-) Effect on Average*

(1) % Deviation from Average	(2) Distribution	(3) (1) x (2)	(4) Σ (2)	(5) Σ (3)
170	.04	6.80	.04	6.80
160	.02	3.20	.08	10.00
155	.02	3.10	.08	13.10
150	.03	4.50	.11	17.60
145	.03	4.35	.14	21.95
140	.04	5.60	.18	27.55
135	.05	6.75	.23	34.30
130	.06	7.80	.29	42.10
125	.08	10.00	.37	52.10
120	.10	12.00	.47	64.10
115	.12	13.80	.59	77.90
110	.15	16.50	.74	94.40
105	.18	18.90	.92	113.30
100	.22	22.00	1.14	135.30
95	.28	26.60	1.42	161.90
90	.34	30.60	1.76	192.50
85	.42	35.70	2.18	228.20
80	.51	40.80	2.69	269.00
75	.63	47.25	3.32	316.25
70	.77	53.90	4.09	370.15
65	.93	60.45	5.02	430.60
60	1.13	67.80	6.15	498.40
55	1.36	74.80	7.51	573.20
50	1.63	81.50	9.14	654.70
45	1.95	87.75	11.09	742.45
40	2.30	92.00	13.39	834.45
35	2.70	94.50	16.09	928.95
30	3.14	94.20	19.23	1,023.15
25	3.62	90.50	22.85	1,113.65
20	4.12	82.40	26.97	1,196.05
15	4.62	69.30	31.59	1,265.35
10	5.10	51.00	36.69	1,316.35
5	5.55	27.75	42.24	1,344.10

*Meaning of this note will appear in the following work.

The use of these columns will perhaps be best understood, if we briefly review the remarks earlier in this paper as to the effect of limits and the nature of the limit factor. The limit factor, from one point of view, is the ratio of the effective rate of compensation to the statutory rate of compensation. If, however, we look at the matter from the earlier point of view presented and assume that notwithstanding the practical difficulties pointed out, instead of applying the effective rate to the entire payroll, we so adjust the payroll that the effective rate will be equal to the nominal rate, it can easily be proven that the ratio of the adjusted payroll to the actual total payroll

will be the same as the ratio of the effective compensation rate to the nominal statutory rate. We may, therefore, calculate the limit factor by ascertaining what adjustment would be required in a total payroll distributed around its average wage in accordance with this standard distribution.

Let us now assume for illustration that our average wage in a particular problem is \$24.00. The statutory rate of compensation is $66\frac{2}{3}\%$ and the minimum limit is \$8.00. \$8.00 being $66\frac{2}{3}\%$ of \$12.00, it would become necessary in the adjustment of the payroll to treat all employes receiving \$12.00 or less as though receiving \$12.00. Since \$12.00 is 50% of \$24.00, this limit is therefore a departure of 50% from the average, and we find in column (4) of the above table (in upper half) that 5.75% of the employes are affected by this lower limit. Column (3) gives the product of the departure by the frequency of cases having that departure and the items in column (5) are the sum of the items in column (3). Therefore, we may find the average percentage deviation of actual wages for those in this class from the average of all wages by dividing the figure in column (5) corresponding to 50% (328.95) by the figure in column (4)—5.75. This gives an average departure of 57% for which we must substitute the departure of 50%. The product of the difference between these average departures by the percentage of the cases affected (5.75) gives the correction for the lower limit. As a matter of mechanics, however, it is probably simpler to multiply the figure in column (4)—5.75—by the substitute departure corresponding to the limit, in this case 50% giving \$287.50. Subtraction of this figure from the figure corresponding to 50% in column (5) will also give the correction and the result, if the calculations are both carried to the same decimal place, will be identical. The difference between these two figures taken positively gives the correction on the average wage corresponding to this substitution of limit value. In this connection, it should be borne in mind that the total distribution is 100 and that the results in all cases are divisible by 100.

In actual practice it will be necessary to interpolate between the tabulated values of the deviation and I have tested out to determine whether or not second differences need be considered. I have found that for all practical purposes an interpolation by first differences will be sufficient and since columns (2) and (3)

respectively are from the nature of the construction of columns (4) and (5) the first differences of the later columns, we have all the required material in this table.

The calculation of the modification for the upper limit follows precisely the same lines.

Where the lower limit is a fixed amount "or wages" this calculation does not give the exact results but slightly over-estimates the effect of the lower limit. I first worked out a modification of the process to take account of the "or wages" clause but it greatly complicates the work even when certain approximations are used. I have, therefore, had tests made of the effect of this "or wages" clause in about its most important case, that is when the minimum limit is as high as \$8.00, and find the effect is practically negligible so that I have issued instructions for my office that in the calculation of limit factors, this clause may be ignored.

In one or two cases we have found the wage corresponding to the upper limit falls below the average wage indications for the jurisdictions whose law we were valuing. This case somewhat complicates the formula but the principle above outlined can be followed through and we have actually tested out the results and found them correct.

In order to facilitate calculations in this office, of limit factors from this distribution, we have had work sheets multigraphed in which the data may be inserted from the wage facts, the terms of the law, and these standard tables and on actual tests with the use of these sheets we find our calculations reduced to a minimum of time and effort.

In Appendix C is a calculation on the basis of this distribution and using this calculation form, of the limit calculated earlier in this paper (\$4.00 and \$10.00 on a $66\frac{2}{3}\%$ rate) from an actual wage distribution whose average is the same as that used in the first illustration. You will note that in this case the upper limit lies below the average wage and the use of the columns is somewhat complicated but the form has been drawn to facilitate this use. The principle is the same as heretofore explained.

By these methods I have had made a set of test calculations of limit factors for comparison with calculations made on actual wage distribution. The results of these test calculations are shown in the table in Appendix B.

A review of this table will indicate that the largest error in the limit factor was only a trifle more than 2% and that in only one other case was the error so large as 1½%. These errors are within the limit of accuracy of the basic assumption in such work and the method, therefore, may, I think, be accepted as practically sufficient. It will enable us to go ahead with the determination of the effect of statutory limits when we are able only to obtain an average wage from mass figures without having the detail figures necessary for an actual distribution. If it is desired to obtain the average effective compensation in the monetary terms rather than as a percentage of the wages, this may easily be found by applying the statutory provision to the average wage and then applying the limit factor calculated in this way to that amount. The result will be the effective rate of compensation in monetary terms.

In a few states there is a maximum limit on the total compensation payable in fatal and permanent total disability cases which is less than the product of the maximum limit of weekly indemnity and the maximum term fixed by the act. To estimate the effect of the various limits in these cases with accuracy would require an actual wage distribution, the determination of the present value of the compensation corresponding to each wage level and the comparison of the weighted average of these present values with the present value for the statutory percentage rate and term. This is a very laborious calculation.

Fatal and permanent total disability benefits rarely represent more than 15% to 25% of the total pure premiums and an error of 3% or 4% in this factor would be less than 1% of the total. The approximation method described below has been found by test not to show greater error than this and often to lie within 1% or 2% of a direct estimate, an admissible error since we must assume averages to measure the mortality and cannot hope for higher accuracy. The method is based on the fact that the only difference in the value of the benefit after the maximum amount is reached is due to the greater or less effect of discount.

In calculating the effect of these limits I first find the lowest rate of weekly compensation which gives the maximum aggregate compensation prescribed for the benefit and calculate the limit factor by the method described above using this as the upper limit. I next find the present value in terms of weeks' com-

pensation and note the effect of discount. Then I find by use of my standard distribution the correction in the average wage resulting from excluding all cases below the upper limit above set and the corresponding rate of compensation substituting the statutory weekly maximum if this is less. Next I find the term required to pay out the maximum at this rate, the present value and the effect of discount. The difference between the effect of discount at this rate and at the lower rate above found, I multiply by the proportion of the distribution lying above the first limit, thus in effect distributing it over the whole. The resulting figure I apply as a correction of the limit first calculated.

This description of the method sounds laborious, but the following example shows that it is fairly simple:

Under the Massachusetts law in effect in 1918, the benefit is two-thirds wages with limits of \$5.00 and \$14.00 and a maximum period prescribed for permanent total disability of 500 weeks. The maximum absolute amount payable, however, is \$4,000. It is desired to find the limit factor when the average wage is \$22.46. It will first be noted that 500 weeks at \$8.00 equals the maximum of \$4,000, and therefore, this absolute limit except for the effect of discount, is equivalent to an \$8.00 weekly limit. The limit factor on that basis is 51.55%. The commuted value of 500 weeks' wages is 404.53, and the effect of discount and mortality is, therefore, 19.9%; 7.68% of the total cases in our standard distribution would at this average wage have less than \$12.00 wages. The effect of eliminating these cases from the standard distribution is to raise the average wage on the remainder of the distribution 4.1% or to \$23.38 of which two-thirds is \$15.59. This exceeds the statutory maximum of \$14.00. Using, therefore, \$14.00 we find \$4,000 consumed in 286 weeks, of which the commuted value is 253.14. The effect of discount is, therefore, 11.49%. The present value, therefore, of compensation on these cases is 7.61% greater than on cases running the full term. Spreading this over the entire distribution, that is multiplying by .9232* leaves 7.03% as the correction. The product of the basic limit factor, 51.55 times 1.073, gives 55.17% as the final limit factor.

Acknowledgment is made of the assistance rendered by Mr. C. W. Graham and Mr. Kendrick Stoke of the staff of the National Council on Workmen's Compensation Insurance in carrying through the details of this investigation.

*.9232 = 1 - .0768.

APPENDIX A—PART I

BASIC DISTRIBUTIONS USED IN CONSTRUCTING
STANDARD WAGE DISTRIBUTIONS

(a) LIST OF SOURCES OF DISTRIBUTIONS.

1. New York 1919 (from 1920 Revision). Average wage \$25.77. Number of cases 10,771. All groups combined.
2. California 1919 (from 1920 Revision). Average wage \$27.88. Number of cases 13,853. All groups combined.
3. Massachusetts 1918 (from Schedule Z). Average wage \$22.15. Number of cases 801. All groups combined.
4. Massachusetts 1919 (from Schedule Z). Average wage \$26.11. Number of cases 938. All groups combined.
5. Massachusetts 1920 (from Schedule Z). Average wage \$28.75. Number of cases 975. All groups combined.
6. New York 1920 (calendar year 1921, July-December). From Traveler's data. Average wage \$26.14. Number of cases 3,741. Group I—Manufacturing.
7. New York 1921 (calendar year 1921, July-December). From Traveler's data. Average wage \$33.05. Number of cases 1,570. Group II—Contracting.
8. New York 1921 (calendar year 1921, July-December). From Traveler's data. Average wage \$26.34. Number of cases 2,680. Group V—All other.
9. New York 1919 (calendar year 1919, January-June). From Traveler's data. Average wage \$21.44. Number of cases 669. Group V—All other.
10. Tennessee 1919 (from 1920 Revision). Average wage \$19.06. Number of cases 495. All groups combined.

(b) ACTUAL DISTRIBUTIONS BY KEY NUMBERS

DISTRIBUTION No. 1.

In Dollars as Reported.

In Percentage Form as Grouped

(1)	(2)	(1)	(2)	(3)	(4)
Wages in Dollars	Number of Cases	Wages in Dollars	Number of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases
4.01- 5.00	6	44.01-45.00	31	- 85	.0
5.01- 6.00	14	45.01-46.00	11	- 80	.1
6.01- 7.00	4	46.01-47.00	59	- 75	.1
7.01- 8.00	41	47.01-48.00	44	- 70	.5
8.01- 9.00	53	48.01-49.00	10	- 65	.8
9.01-10.00	71	49.01-50.00	29	- 60	.9
10.01-11.00	75	50.01-51.00	8	- 55	1.8
11.01-12.00	181	51.01-52.00	4	- 50	1.2
12.01-13.00	77	52.01-53.00	..	- 45	2.5
13.01-14.00	122	53.01-54.00	6	- 40	2.0
14.01-15.00	254	54.01-55.00	2	- 35	3.8
15.01-16.00	146	55.01-56.00	2	- 30	5.5
16.01-17.00	192	56.01-57.00	3	- 25	4.4
17.01-18.00	616	57.01-58.00	4	- 20	6.4
18.01-19.00	323	58.01-59.00	..	- 15	4.6
19.01-20.00	374	59.01-60.00	9	- 10	8.3
20.01-21.00	575	60.01-61.00	..	- 5	5.7
21.01-22.00	446	61.01-62.00	1	0	4.9
22.01-23.00	294	62.01-63.00	1	+ 5	3.0
23.01-24.00	911	63.01-64.00	..	10	6.5
24.01-25.00	411	64.01-65.00	..	15	14.7
25.01-26.00	470	65.01-66.00	4	20	4.1
26.01-27.00	278	66.01-67.00	..	25	3.3
27.01-28.00	224	67.01-68.00	..	30	1.9
28.01-29.00	630	68.01-69.00	2	35	2.4
29.01-30.00	1494	69.01-70.00	2	40	2.2
30.01-31.00	316	70.01-71.00	1	45	1.4
31.01-32.00	373	71.01-72.00	1	50	1.7
32.01-33.00	226	72.01-73.00	..	55	1.2
33.01-34.00	142	73.01-74.00	1	60	1.0
34.01-35.00	211	74.01-75.00	..	65	.4
35.01-36.00	184	75.01-76.00	1	70	.5
36.01-37.00	184	76.01-77.00	..	75	.2
37.01-38.00	101	77.01-78.00	..	80	.6
38.01-39.00	152	78.01-79.00	..	85	.4
39.01-40.00	101	79.01-80.00	1	90	.2
40.01-41.00	99			95	.2
41.01-42.00	79			100	.1
42.01-43.00	30			Over	
43.01-44.00	54			100	.4
Average Wages 25.77		Total No. of Cases 10,771		Total 99.9	

LEGAL LIMITS OF WEEKLY COMPENSATION

DISTRIBUTION No. 2.

In Dollars as Reported

In Percentage Form as Grouped

(1)	(2)	(1)	(2)	(3)	(4)	(3)	(4)
Wages in Dollars	Number of Cases	Wages in Dollars	Number of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases
4.01- 5.00	17	39.01-40.00	135	-85	.1	90	.3
5.01- 6.00	10	40.01-41.00	67	-80	.1	95	.2
6.01- 7.00	10	41.01-42.00	322	-75	.2	100	.3
7.01- 8.00	28	42.01-43.00	76	-70	.4	105	.1
8.01- 9.00	48	43.01-44.00	184	-65	1.0	110	.1
9.01-10.00	97	44.01-45.00	96	-60	1.4	115	.2
10.01-11.00	75	45.01-46.00	77	-55	1.3	120	.1
11.01-12.00	196	46.01-47.00	25	-50	2.4	125	.3
12.01-13.00	90	47.01-48.00	190	-45	1.6	130	.0
13.01-14.00	206	48.01-49.00	48	-40	2.7	135	.1
14.01-15.00	291	49.01-50.00	87	-35	3.5	140	.1
15.01-16.00	103	50.01-51.00	30	-30	4.2	145	.0
16.01-17.00	182	51.01-52.00	13	-25	6.1	150	.3
17.01-18.00	471	52.01-53.00	12	-20	5.2	over	
18.01-19.00	259	53.01-54.00	44	-15	10.9	150	.2
19.01-20.00	391	54.01-55.00	16	-10	5.6		
20.01-21.00	690	55.01-56.00	44	- 5	7.2		
21.01-22.00	484	56.01-57.00	5	0	5.1		
22.01-23.00	533	57.01-58.00	7	+ 5	9.2		
23.01-24.00	1229	58.01-59.00	3	10	3.1		
24.01-25.00	688	59.01-60.00	22	15	3.6		
25.01-26.00	449	60.01-61.00	13	20	2.3		
26.01-27.00	797	61.01-62.00	7	25	4.5		
27.01-28.00	658	62.01-63.00	39	30	2.8		
28.01-29.00	308	Over 63.00	97	35	2.2		
29.01-30.00	1146			40	2.0		
30.01-31.00	296			45	1.0		
31.01-32.00	340			50	2.4		
32.01-33.00	401			55	1.5		
33.01-34.00	135			60	1.0		
34.01-35.00	449			65	.5		
35.01-36.00	508			70	1.5		
36.01-37.00	136			75	.6		
37.01-38.00	220			80	.5		
38.01-39.00	253			85	.1		
Average Wages	27.88	Total No. of Cases	13,853	Total	100.1		

DISTRIBUTION, No. 3.

In Dollars as Reported

In Percentage Form as Grouped.

(1)	(2)	(1)	(2)	(3)	(4)	(3)	(4)
Wages in Dollars	Number of Cases	Wages in Dollars	Number of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases
5.01- 6.00	3	40.01-41.00	..	-75	.5	100	.6
6.01- 7.00	6	41.01-42.00	2	-70	.8	105	.1
7.01- 8.00	3	42.01-43.00	..	-65	.6	110	..
8.01- 9.00	9	43.01-44.00	3	-60	1.6	115	..
9.01-10.00	16	44.01-45.00	5	-55	1.6	120	.4
10.01-11.00	8	45.01-46.00	..	-50	1.8	125	.1
11.01-12.00	16	46.01-47.00	..	-45	1.9	130	.1
12.01-13.00	12	47.01-48.00	..	-40	2.6	135	..
13.01-14.00	22	48.01-49.00	2	-35	4.5	140	..
14.01-15.00	34	49.01-50.00	2	-30	3.5	145	.1
15.01-16.00	24	50.01-51.00	..	-25	4.5		
16.01-17.00	28	51.01-52.00	1	-20	7.2		
17.01-18.00	61	52.01-53.00	..	-15	5.2		
18.01-19.00	26	53.01-54.00	..	-10	9.5		
19.01-20.00	61	54.01-55.00	1	- 5	7.6		
20.01-21.00	77			0	4.0		
21.01-22.00	37			+ 5	6.4		
22.01-23.00	24			10	7.7		
23.01-24.00	54			15	2.4		
24.01-25.00	56			20	2.9		
25.01-26.00	14			25	2.6		
26.01-27.00	22			30	3.9		
27.01-28.00	18			35	3.9		
28.01-29.00	21			40	1.4		
29.01-30.00	42			45	1.8		
30.01-31.00	9			50	1.3		
31.01-32.00	11			55	2.4		
32.01-33.00	14			60	2.1		
33.01-34.00	7			65	.4		
34.01-35.00	19			70	.3		
35.01-36.00	15			75	.5		
36.01-37.00	3			80	.9		
37.01-38.00	2			85	.1		
38.01-39.00	1			90	.1		
39.01-40.00	10			95	.3		
Average Wages	22.15	Total No. of Cases	801	Total	100.2		

DISTRIBUTION No. 4.

In Dollars as Reported

In Percentage Form as Grouped

(1)	(2)	(1)	(2)	(3)	(4)	(3)	(4)
Wages in Dollars	Number of Cases	Wages in Dollars	Number of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases
7.01- 8.00	3	42.01-43.00	3	-75	.1	100 Over 100	.1 .6
8.01- 9.00	1	43.01-44.00	9	-70	.2		
9.01-10.00	3	44.01-45.00	4	-65	.3		
10.01-11.00	4	45.01-46.00	4	-60	.6		
11.01-12.00	8	46.01-47.00	1	-55	1.0		
12.01-13.00	6	47.01-48.00	1	-50	1.4		
13.01-14.00	13	48.01-49.00	1	-45	2.9		
14.01-15.00	23	49.01-50.00	6	-40	2.4		
15.01-16.00	18	50.01-51.00	1	-35	3.9		
16.01-17.00	14	51.01-52.00	1	-30	3.3		
17.01-18.00	44	52.01-53.00	1	-25	9.0		
18.01-19.00	15	55.01-56.00	1	-20	6.8		
19.01-20.00	68	56.01-57.00	1	-15	4.3		
20.01-21.00	62	57.01-58.00	1	-10	9.7		
21.01-22.00	31	59.01-60.00	1	- 5	8.9		
22.01-23.00	31	74.01-75.00	2	0	5.7		
23.01-24.00	74			+ 5	5.7		
24.01-25.00	79			10	5.1		
25.01-26.00	34			15	4.6		
26.01-27.00	46			20	3.4		
27.01-28.00	40			25	3.3		
28.01-29.00	25			30	3.1		
29.01-30.00	67			35	3.8		
30.01-31.00	16			40	1.6		
31.01-32.00	17			45	1.5		
32.01-33.00	26	50	2.0				
33.01-34.00	18	55	1.1				
34.01-35.00	26	60	.5				
35.01-36.00	29	65	1.0				
36.01-37.00	10	70	.6				
37.01-38.00	10	75	.4				
38.01-39.00	11	80	.2				
39.01-40.00	17	85	.1				
40.01-41.00	6	90	.6				
41.01-42.00	5	95	.2				
Average Wages	26.11	Total No. of Cases	938	Total	100.0		

DISTRIBUTION, No 5.

In Dollars as Reported

In Percentage Form as Grouped

(1)	(2)	(1)	(2)	(3)	(4)	(3)	(4)
Wages in Dollars	Number of Cases	Wages in Dollars	Number of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases
4.01- 5.00	1	44.01-45.00	55	-85	.1	115	..
5.01- 6.00	2	45.01-46.00	5	-80	.2	120	.1
6.01- 7.00	..	49.01-50.00	11	-75	.1	125	.1
7.01- 8.00	1	52.01-53.00	8	-70	.1	130	..
8.01- 9.00	1	53.01-54.00	1	-65	.3	135	..
9.01-10.00	1	54.01-55.00	1	-60	1.0	140	.1
10.01-11.00	3	55.01-56.00	1	-55	1.2	Over	
11.01-12.00	8	56.01-57.00	2	-50	2.0	140	.5
12.01-13.00	6	59.01-60.00	4	-45	2.4		
13.01-14.00	11	63.01-64.00	1	-40	2.9		
14.01-15.00	13	64.01-65.00	1	-35	3.5		
15.01-16.00	18	69.01-70.00	1	-30	4.7		
16.01-17.00	13	79.01-80.00	2	-25	5.0		
17.01-18.00	23	82.01-83.00	1	-20	7.6		
18.01-19.00	15	89.01-90.00	1	-15	10.9		
19.01-20.00	44	99.01-100.00	1	-10	6.4		
20.01-21.00	24			- 5	6.5		
21.01-22.00	37			0	6.3		
22.01-23.00	28			+ 5	5.9		
23.01-24.00	75			10	4.1		
24.01-25.00	78			15	3.0		
25.01-26.00	43			20	5.3		
26.01-27.00	44			25	2.8		
27.01-28.00	44			30	1.7		
28.01-29.00	29			35	3.1		
29.01-30.00	70			40	2.6		
30.01-31.00	22			45	.5		
31.01-32.00	25			50	.2		
32.01-33.00	38			55	5.7		
33.01-34.00	5			60	.4		
34.01-35.00	45			65	..		
35.01-36.00	27			70	.6		
36.01-37.00	9			75	.5		
37.01-38.00	13			80	.4		
38.01-39.00	7			85	.5		
39.01-40.00	46			90	.1		
40.01-41.00	3			95	.3		
41.01-42.00	3			100	..		
42.01-43.00	4			105	.3		
43.01-44.00	..			110	.1		
Average Wages	28.75	Total No. of Cases	975	Total	100.1		

DISTRIBUTION No. 6.

In Dollars as Reported

In Percentage Form as Grouped

(1)	(2)	(1)	(2)	(3)	(4)	(3)	(4)
Wages in Dollars	Number of Cases	Wages in Dollars	Number of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases
2.01-3.00	1	42.01-43.00	24	-90	.1	110	.5
3.01-4.00	2	43.01-44.00	20	-85	.0	115	.1
4.01-5.00	1	44.01-45.00	40	-80	.1	120	.1
5.01-6.00	1	45.01-46.00	35	-75	.2	125	.0
6.01-7.00	6	46.01-47.00	7	-70	.7	130	.5
7.01-8.00	16	47.01-48.00	12	-65	.8	Over	
8.01-9.00	20	48.01-49.00	12	-60	1.3	130	.5
9.01-10.00	31	49.01-50.00	34	-55	2.3		
10.01-11.00	35	50.01-51.00	32	-50	2.2		
11.01-12.00	56	51.01-52.00	4	-45	4.0		
12.01-13.00	67	52.01-53.00	4	-40	3.4		
13.01-14.00	82	53.01-54.00	7	-35	4.4		
14.01-15.00	112	54.01-55.00	10	-30	6.4		
15.01-16.00	100	55.01-56.00	8	-25	3.3		
16.01-17.00	104	56.01-57.00	2	-20	7.4		
17.01-18.00	162	57.01-58.00	2	-15	5.2		
18.01-19.00	176	58.01-59.00	1	-10	6.4		
19.01-20.00	164	59.01-60.00	10	-5	7.5		
20.01-21.00	156	60.01-61.00	10	0	4.0		
21.01-22.00	141	61.01-62.00	2	+5	4.2		
22.01-23.00	132	62.01-63.00	1	10	4.2		
23.01-24.00	179	63.01-64.00	..	15	6.0		
24.01-25.00	226	64.01-65.00	..	20	2.8		
25.01-26.00	161	65.01-66.00	1	25	3.2		
26.01-27.00	112	66.01-67.00	2	30	2.1		
27.01-28.00	122	68.01-69.00	1	35	3.6		
28.01-29.00	126	69.01-70.00	1	40	2.1		
29.01-30.00	156	70.01-71.00	1	45	.9		
30.01-31.00	138	71.01-72.00	1	50	1.6		
31.01-32.00	79	74.01-75.00	2	55	1.5		
32.01-33.00	88	75.01-76.00	2	60	.9		
33.01-34.00	72	77.01-78.00	1	65	.7		
34.01-35.00	79	80.01-81.00	1	70	1.3		
35.01-36.00	99	90.01-91.00	1	75	.9		
36.01-37.00	62	98.01-99.00	1	80	.3		
37.01-38.00	32	99.01-100.00	1	85	.5		
38.01-39.00	32			90	1.4		
39.01-40.00	50			95	.4		
40.01-41.00	44			100	.2		
41.01-42.00	26			105	.2		
Average Wages	26.14	Total No. of Cases	3,741	Total	100.4		

DISTRIBUTION No. 7.

In Dollars as Reported

In Percentage Form as Grouped

(1)	(2)	(1)	(2)	(3)	(4)	(3)	(4)
Wages in Dollars	Number of Cases	Wages in Dollars	Number of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases
5.01- 6.00	1	40.01-41.00	27	-80	.2	95 Over 95	1.2 .6
6.01- 7.00	1	41.01-42.00	22	-75	.1		
7.01- 8.00	1	42.01-43.00	15	-70	.1		
8.01- 9.00	2	43.01-44.00	38	-65	.4		
9.01-10.00	1	44.01-45.00	40	-60	.7		
10.01-11.00	2	45.01-46.00	14	-55	1.9		
11.01-12.00	3	46.01-47.00	7	-50	2.4		
12.01-13.00	4	47.01-48.00	13	-45	7.3		
13.01-14.00	8	48.01-49.00	16	-40	4.7		
14.01-15.00	16	49.01-50.00	67	-35	8.7		
15.01-16.00	16	50.01-51.00	64	-30	4.8		
16.01-17.00	23	51.01-52.00	4	-25	5.4		
17.01-18.00	60	52.01-53.00	2	-20	4.1		
18.01-19.00	68	53.01-54.00	8	-15	4.2		
19.01-20.00	44	54.01-55.00	24	-10	6.4		
20.01-21.00	54	55.01-56.00	26	- 5	1.5		
21.01-22.00	82	56.01-57.00	7	0	3.3		
22.01-23.00	56	57.01-58.00	2	+ 5	2.4		
23.01-24.00	54	58.01-59.00	3	10	4.1		
24.01-25.00	60	59.01-60.00	4	15	4.7		
25.01-26.00	32	60.01-61.00	3	20	5.4		
26.01-27.00	40	61.01-62.00	1	25	2.4		
27.01-28.00	45	62.01-63.00	2	30	2.4		
28.01-29.00	35	63.01-64.00	11	35	3.9		
29.01-30.00	55	64.01-65.00	10	40	.8		
30.01-31.00	50	65.01-66.00	1	45	1.7		
31.01-32.00	14	67.01-68.00	2	50	7.6		
32.01-33.00	26	68.01-69.00	3	55	1.2		
33.01-34.00	30	69.01-70.00	1	60	.4		
34.01-35.00	22	70.01-72.00	1	65	2.6		
35.01-36.00	42	74.01-75.00	1	70	1.3		
36.01-37.00	35	75.01-76.00	2	75	.3		
37.01-38.00	26			80	.5		
38.01-39.00	64			85	.1		
39.01-40.00	57			90	.4		
Average Wages	33.05	Total No. of Cases	1,570	Total	100.2		

DISTRIBUTION No. 8.

In Dollars as Reported

In Percentage Form as Grouped

(1)	(2)	(1)	(2)	(3)	(4)	(3)	(4)
Wages in Dollars	Number of Cases	Wages in Dollars	Number of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases
3.01- 4.00	2	38.01-39.00	38	-85	.1	90	.8
4.01- 5.00	2	39.01-40.00	34	-80	.3	95	.1
5.01- 6.00	8	40.01-41.00	30	-75	.6	100	..
6.01- 7.00	13	41.01-42.00	13	-70	.9	105	.4
7.01- 8.00	16	42.01-43.00	8	-65	1.3	110	.3
8.01- 9.00	20	43.01-44.00	10	-60	1.5	115	..
9.01-10.00	28	44.01-45.00	19	-55	2.6	120	..
10.01-11.00	30	45.01-46.00	12	-50	1.8	125	.1
11.01-12.00	43	46.01-47.00	2	-45	3.5	130	.3
12.01-13.00	46	47.01-48.00	10	-40	2.3	135	.1
13.01-14.00	42	48.01-49.00	10	-35	3.2	140	..
14.01-15.00	70	49.01-50.00	12	-30	5.5	145	.1
15.01-16.00	60	50.01-51.00	12	-25	6.0	150	..
16.01-17.00	36	51.01-52.00	2	-20	4.9	Over	
17.01-18.00	102	52.01-53.00	2	-15	4.3	150	.7
18.01-19.00	107	53.01-54.00	4	-10	5.4		
19.01-20.00	102	54.01-55.00	8	- 5	7.3		
20.01-21.00	123	55.01-56.00	5	0	2.8		
21.01-22.00	100	56.01-57.00	1	+ 5	4.6		
22.01-23.00	82	59.01-60.00	5	10	9.9		
23.01-24.00	98	60.01-61.00	6	15	7.4		
24.01-25.00	154	61.01-62.00	2	20	2.0		
25.01-26.00	106	62.01-63.00	1	25	2.0		
26.01-27.00	62	64.01-65.00	2	30	3.1		
27.01-28.00	91	65.01-66.00	2	35	4.8		
28.01-29.00	161	68.01-69.00	2	40	.9		
29.01-30.00	210	69.01-70.00	2	45	2.4		
30.01-31.00	130	71.01-72.00	1	50	1.7		
31.01-32.00	43	74.01-75.00	4	55	1.1		
32.01-33.00	36	75.01-76.00	4	60	.5		
33.01-34.00	32	79.01-80.00	1	65	.5		
34.01-35.00	92	81.01-82.00	1	70	.9		
35.01-36.00	102	89.01-90.00	1	75	.2		
36.01-37.00	26	98.01-99.00	2	80	.4		
37.01-38.00	36	99.01-100.00	1	85	.4		
Average Wages	26.34	Total No. of Cases	2,680	Total	100.0		

DISTRIBUTION No. 9.

In Dollars as Reported

In Percentage Form as Grouped

(1)	(2)	(1)	(2)	(3)	(4)	(3)	(4)
Wages in Dollars	Number of Cases	Wages in Dollars	Number of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases	Per cent. Variation from Ave. Wage	Per cent. of Cases
3.01- 4.00	1	38.01-39.00	4	-85	.1	90	.3
4.01- 5.00	1	39.01-40.00	3	-80	..	95	.3
5.01- 6.00	4	40.01-41.00	2	-75	.6	100	.2
6.01- 7.00	5	41.01-42.00	2	-70	.9	105	.2
7.01- 8.00	5	42.01-43.00	2	-65	.7	110	.2
8.01- 9.00	6	43.01-44.00	1	-60	.9	115	..
9.01-10.00	10	44.01-45.00	1	-55	2.1	120	.2
10.01-11.00	13	47.01-48.00	1	-50	1.6	125	..
11.01-12.00	23	49.01-50.00	2	-45	5.1	130	.2
12.01-13.00	25	50.01-51.00	1	-40	2.5	135	.3
13.01-14.00	14	60.01-61.00	1	-35	2.4	Over	
14.01-15.00	24	70.01-71.00	1	-30	5.2	135	.5
15.01-16.00	26	75.01-76.00	1	-25	3.0		
16.01-17.00	22			-20	4.9		
17.01-18.00	39			-15	7.3		
18.01-19.00	40			-10	5.4		
19.01-20.00	36			- 5	6.4		
20.01-21.00	40			0	7.2		
21.01-22.00	45			+ 5	5.5		
22.01-23.00	36			10	4.8		
23.01-24.00	27			15	6.6		
24.01-25.00	41			20	4.2		
25.01-26.00	31			25	2.1		
26.01-27.00	15			30	3.9		
27.01-28.00	19			35	3.9		
28.01-29.00	25			40	3.4		
29.01-30.00	24			45	1.3		
30.01-31.00	16			50	.6		
31.01-32.00	6			55	.7		
32.01-33.00	4			60	.7		
33.01-34.00	4			65	1.3		
34.01-35.00	6			70	.7		
35.01-36.00	8			75	.3		
36.01-37.00	4			80	.6		
37.01-38.00	2			85	.6		
Average Wages	21.44	Total No. of Cases	669	Total	99.9		

DISTRIBUTION No. 10.

In Dollars as Reported

In Percentage Form as Grouped

(1) Wages in Dollars	(2) Number of Cases	(3) Per cent. Variation from Ave. Wage	(4) Per cent. of Cases	(3) Per cent. Variation from Ave. Wage	(4) Per cent. of Cases
5.01- 6.00	3	-75	.2	125	.2
6.01- 7.00	1	-70	.4	130	..
7.01- 8.00	4	-65	.4	135	.2
8.01- 9.00	4	-60	.8	Over	
9.01- 10.00	5	-55	.8	135	.8
10.01- 11.00	6	-50	1.0		
11.01- 12.00	23	-45	1.4		
12.01- 13.00	10	-40	4.2		
13.01- 14.00	13	-35	2.0		
14.01- 15.00	65	-30	2.4		
15.01- 16.00	19	-25	12.3		
16.01- 17.00	45	-20	4.4		
17.01- 18.00	91	-15	8.1		
18.01- 19.00	19	-10	16.6		
19.01- 20.00	28	- 5	6.3		
20.01- 21.00	20	0	5.1		
21.01- 22.00	12	+ 5	4.2		
22.01- 23.00	10	10	2.8		
23.01- 24.00	15	15	2.0		
24.01- 25.00	34	20	2.6		
25.01- 26.00	12	25	5.1		
26.01- 27.00	6	30	4.2		
27.01- 28.00	7	35	1.8		
28.01- 29.00	2	40	1.2		
29.01- 30.00	13	45	1.0		
30.01- 31.00	1	50	1.2		
31.01- 32.00	2	55	1.6		
32.01- 33.00	5	60	.4		
33.01- 34.00	1	65	.4		
34.01- 35.00	6	70	.8		
35.01- 36.00	2	75	.4		
37.01- 38.00	2	80	1.0		
39.01- 40.00	2	85	.4		
42.01- 43.00	1	90	..		
43.01- 44.00	1	95	.4		
45.01- 46.00	1	100	..		
49.01- 50.00	1	105	.4		
59.01- 60.00	1	110	..		
64.01- 65.00	1	115	..		
100.01-101.00	1	120	.2		
Average Wages 19.06	Total No. of Cases 495		Total 99.7		

APPENDIX A. PART II-A

WEIGHTED AVERAGE OF MOMENTS OF ALL DISTRIBUTIONS

Weighting of ν_2

(Column 1) Dist. of Wage Serial No.	(Column 2) ν_2	(Column 3) Number of Cases	(Column 4) (2) x (3)
1	38.0186	10,771	409,498.3406
2	51.3220	13,853	710,963.6660
3	47.8390	801	38,319.0390
4	39.0044	938	36,586.1272
5	46.0310	975	44,880.2250
6	59.5380	3,741	222,731.6580
7	58.1040	1,570	91,223.2800
8	59.0250	2,680	158,187.0000
9	52.0720	669	34,836.1680
10	46.1080	495	22,823.4600
Grand Total . . .	..	36,493	1,770,048.9638
			Ave. $\nu_2 = \frac{1,770,048.9638}{36,493}$
			= 48.504

APPENDIX A. PART II-B

WEIGHTED AVERAGE OF MOMENTS OF ALL DISTRIBUTION

Weighting of ν_3

(Column 1) Dist. of Wage Serial No.	(Column 2) ν_3	(Column 3) Number of Cases	(Column 4) (2) x (3)
1	86.1575	10,771	928,002.4325
2	364.8115	13,853	5,053,733.7095
3	223.9770	801	179,405.5770
4	147.5683	938	138,419.0654
5	302.3160	975	294,758.1000
6	401.3390	3,741	1,501,409.1990
7	216.4130	1,570	339,768.4100
8	408.9470	2,680	1,095,977.9600
9	270.5410	669	180,991.9290
10	422.4620	495	209,118.6900
Grand Total . . .	..	36,493	9,921,585.0724
			Ave. $\nu_3 = \frac{9,921,585.0724}{36,493}$
			= 271.8764

APPENDIX A. PART II-C

WEIGHTED AVERAGE OF MOMENTS OF ALL DISTRIBUTIONS

Weighting of ν_4

(Column 1) Dist. of Wage Serial No.	(Column 2) ν_4	(Column 3) Number of Cases	(Column 4) (2) x (3)
1	4,988.7795	10,771	53,734,143.9945
2	13,151.0647	13,853	182,181,699.2891
3	8,986.7840	801	7,198,413.9840
4	5,839.8423	938	5,477,772.0774
5	10,235.4420	975	9,979,555.9500
6	13,232.1390	3,741	49,501,431.9990
7	8,038.4450	1,570	12,620,358.6500
8	17,377.2270	2,680	46,570,968.3600
9	11,764.9120	669	7,870,726.1280
10	12,600.8480	495	6,237,419.7600
Grand Total . . .	..	36,493	381,372,490.1920
	Ave. $\nu_4 =$	$\frac{381,372,490.1920}{36,493}$	
		= 10,450.566	

APPENDIX B
RESULTS OF TESTS ON COMPOSITE WAGE DISTRIBUTION CONSTRUCTED BY FORMULA

No. of Tests	State	Policy Year	Industrial Group	Was Data Used in Curve	Average Wage	Legal Per cent. of Comp.	Compensation Limits	Limit Fact. on Actual Dist.	Limit Fact. on Stand. Dist.	Differential	Per cent. Variation from Actual
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	Wisc.	1919	All	No	22.47	65	6.83-16.90	.938	.926	-.012	-1.28
2	Tenn.	1919	All	Yes	19.06	50	5.00-11.00	.916	.927	+.011	+1.20
3	(a) N. Y.	1920 (July-Dec.)	Cont.	No	39.10	66 $\frac{2}{3}$	8.00-20.00	.744	.728	-.016	-2.15
3	(b) "	" " "	"	"	"	"	4.00-10.00	.383	.383	.000	.00
3	(c) "	" " "	"	"	"	60	3.00-18.00	.740	.728	-.012	-1.62
4	(a) "	1919 (Jan.-June)	A. O.	Yes	21.44	66 $\frac{2}{3}$	8.00-20.00	.976	.978	+.002	+.20
4	(b) "	" " "	"	"	"	"	4.00-10.00	.668	.675	+.007	+1.05
4	(c) "	" " "	"	"	"	60	3.00-18.00	.965	.970	+.005	+.52
5	(a) "	1919 (July-Dec.)	Mfg.	No	30.03	66 $\frac{2}{3}$	8.00-20.00	.876	.867	-.010	-1.14
5	(b) "	" " "	"	"	"	"	4.00-10.00	.496	.499	+.003	+.61
5	(c) "	" " "	"	"	"	60	3.00-18.00	.876	.866	-.010	-1.14
6	(a) "	1921 (Jan.-June)	A. O.	No	25.88	66 $\frac{2}{3}$	8.00-20.00	.939	.926	-.013	-1.38
6	(b) "	" " "	"	"	"	"	4.00-10.00	.573	.571	-.002	-.35
6	(c) "	" " "	"	"	"	60	3.00-18.00	.934	.924	-.011	-1.18

LEGAL LIMITS OF WEEKLY COMPENSATION

APPENDIX C

LIMIT FACTORS FOR THE STATE OF MASSACHUSETTS

OLD FATAL—PRESENT SPECIFIC DISMEMBERMENT

Average Wage \$22.46 No. of cases
 Compensation rate 66 $\frac{2}{3}$ % Limits \$4 and \$ 10
 Wages at which limits become effective are \$6 and \$15
 (a) \$6 represents a—73.29 % deviation from average wage.
 (b) \$15 “ “—33.21 % “ “ “ “
 Interpolation formula $f(x') = f(x) - s/t \Delta f(x)$

A. FOR THE LOWER LIMIT

1. s	= 3.29	2. s/t	= .658
3. From (Col. 4) $f(x)$	= .65	4. From (Col. 5)	
(Col. 2) (2)		$f(x)$	= 48.20
		(Col. 3) (2)	
5. $s/t \Delta f(x)$	= .33	6. $s/t \Delta f(x)$	= 23.10
$\times .658$	= .22	$\times .658$	= 15.20
7. $f(x')$	= .43	8. $f(x')$	= 33.00
9. (a) \times (7)	= 73.29 \times .43 =		= 31.51
	Effect of lower limit =		+ 1.49

B. FOR THE UPPER LIMIT WHEN THE WAGE AT WHICH IT BECOMES EFFECTIVE IS GREATER THAN THE AVERAGE WAGE.

1. s	=	2. s/t	=
3. From (Col. 4)		4. From (Col. 5)	
$f(x)$	=	$f(x)$	=
(Col. 2) (2)		(Col. 3) (2)	
5. $s/t \Delta f(x) = x$	=	6. $s/t \Delta f(x) x$	=
<hr/>		<hr/>	
7. $f(x')$	=	8. $f(x')$	=
9. (b) \times (7)	=	.....	=
		<hr/>	

FOR THE UPPER LIMIT WHEN THE WAGE AT WHICH IT BECOMES
EFFECTIVE FALLS BELOW THE AVERAGE WAGE

1.	s	=	3.21	2.	s/t	=	.642
3.	From (Col. 4)						
	$f(x)$	=	21.52				
	(Col. 2) (2)						
4.	$s/t \Delta f(x)$	=					
	$5.04 \times .642$	=	3.24				
5.	$f(x')$	=	18.28 from 51.85	=	33.57		
6.	= (5) + 5.91*	=					
	+ 42.24*	=	81.72				
7.	= (6) \times (b)	=		$81.72 \times (-33.21)$	=	- 2,713.92	
3.	Total above						
	average	=		1,344.10*			
4.	Total below						
	average	=	1,349.70*				
5.	From (Col. 5)						
	$f(x)$	=	901.70				
	(Col. 3) (2)						
6.	$s/t \Delta f(x)$	=					
	$151.20 \times .642$	=	97.07				
7.	$f(x')$	=	804.63				
8.	(4) - (7)	=	545.07				
9.	(3) - (8)	=	799.03				
10.	Net effect of upper limit.....	=	3,512.95				
A	Effect of lower limit.....	=	+ 1.49				
	Net effect of limits.....	=	- 3,511.46				
	Limit factor = $100 - 3511.46/100$	=	64.89%				

*Fixed value printed in form.

THE NEW RULES REGARDING ACQUISITION AND
FIELD SUPERVISION COST FOR CASUALTY
INSURANCE

BY

G. F. MICHELbacher

THE PROBLEM

Practically every stock casualty company maintains an extensive sales force through which business is acquired and by means of which a valuable service to policyholders is maintained. As in other commercial enterprises, the development of the sales force and the methods employed in securing business vary among the companies, depending upon their requirements and upon the policies favored by their chief executives. In general, there are three systems of field organization which occasionally may be found singly but which more often are found in combination. These are:

1. The general agency system;
2. The branch office system;
3. The direct reporting system.

General Agency System.

Under the general agency system as it is usually organized in this country, the territory in which a company transacts business is sub-divided; the sub-divisions, which may be groups of contiguous states, individual states or smaller geographical units, being placed under the supervision of representatives known as general agents. These representatives serve under contracts which fix their remuneration in terms of certain percentages of the premiums in the various casualty lines which they produce.

Under his contract the general agent is assigned a definite territory which he is required to cultivate for the company.

It is incumbent upon him to develop an agency system of his own among the sub-producers in his field. The general agent secures business direct from policyholders by his personal efforts and by means of salaried salesmen attached to his office. He also develops business from brokers and various grades of agents, all of which passes through his hands and in connection with which he renders certain services which are essential to the transaction of the casualty insurance business.

Branch Office System.

The branch office system is essentially the same as the general agency system except that the representatives in this case are not agents under contract but are salaried employees of the company. The producing unit in each territory is a branch office and the representative in charge is a branch office manager, a resident manager or a resident officer of the company. This individual is just as much an integral part of the company's organization as is an official at the home office. In fact, the branch office is merely a section of the home office which is placed in a certain territory in order that it may be more readily available to the producers in that territory for the rendering of service.

The branch office manager may or may not secure business direct from policyholders through his own efforts and through the efforts of his salaried staff. Inasmuch as he is an employee of the company, he does not usually solicit business personally, his function being to cooperate with the producers in his territory in the development and production of their business. Most of the business of the branch office, therefore, comes through brokers and through an agency system of sub-producers which is developed in the territory under the jurisdiction of the office.

Direct Reporting System.

Under the general agency or branch office system the company partitions the field and arranges to assemble the business in certain territories, diverting it through general agencies and branch offices where field service is performed. This has the effect of reducing the number of channels through which business flows to the home office. It also enables the company to transfer some of its functions, such as accounting, policy writing, inspec-

tion, rating and claim adjustments to its principal representatives in the field.

Under the direct reporting system the producers representing the company in the field report direct to the home office without the intervention of territorial offices. This has the effect of largely increasing the contacts which the home office must maintain with the field and also of bringing into the home office some of the field service functions performed by general agents and branch office managers under the other systems. The direct reporting agent may perform all of the functions of a general agent but this is not usual. His territory is more restricted and the volume of his business is smaller. He reports to the home office of the company his direct business and also such business as he is able to secure through brokers and sub-producers in his territory.

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It is unusual to find a company operating exclusively under one of these systems. The usual organization contains elements of two and sometimes of all three of the systems. A company may maintain both general agencies and branch offices or it may maintain branch offices and direct reporting agencies or it may work out some other combination of the three methods to suit its requirements and to meet the demands of the various situations which it encounters in developing its business.

The problem of establishing agency rules is complicated because the rules must be elastic enough to recognize the demands of each type of organization while providing for an absolute limitation upon total production cost. It is no simple task to devise rules under which each producer will be remunerated in accordance with the actual service which he performs and each company, irrespective of the nature of its field organization, will be placed upon an equal footing with its competitors.

REASONS DICTATING NECESSITY FOR RULES

Before undertaking a discussion of the rules themselves, it is pertinent to inquire why there should be rules on this subject. Why should not each company go its own way in arranging for the production of its business? The answer is simple: unrestricted competition tends to develop a situation which is

generally conceded to be inimical to the best interests of the carriers and of the insuring public. It is agreed that unrestricted competition in insurance rates is disadvantageous; that its tendency is to produce discrimination and to drive the rates below the level of adequacy, thus affecting the solvency of the carriers and the security which they offer to their policyholders. It is undesirable, therefore, to permit the carriers to compete for business by rate cutting and some measure of control over competition of this kind is now recognized as essential.

This leaves open the possibility of acquiring business by competing for the services of producers through offers of attractive inducements in the way of remuneration. Here unrestricted competition also affects the cost of insurance but instead of driving the cost below the level of adequacy, the tendency is to increase the cost beyond the point of reasonableness. If the rates of insurance are adjusted properly to reflect the actual facts, policyholders may be required to pay rates that are excessive when considered in the light of the service rendered. If rates remain fixed, the cost of production will exceed the allowance in the premium and the carriers may be driven into insolvency.

This situation dictates the necessity of imposing some reasonable limitation upon that element of the rate which is intended to cover the cost of production. This will protect the policyholder. For the protection of the carriers, and in order that the limitation upon production cost may actually be observed, it is necessary that all carriers in the production of their business shall be required to conform to certain definite rules covering not only the total cost of acquisition and field service, but also such matters as the geographical distribution of producers and recognition of the relative value of the services performed by each class of producers.

HISTORICAL DEVELOPMENT

Stock companies, since the inception of casualty insurance in this country, have recognized the necessity for some measure of regulation of the cost of production. In the beginning this took the form of cooperative agreements by means of which the companies, associated in rate making bureaus and associations, sought to control the situation. These agreements were not uniformly successful largely because some of the companies

transacting casualty insurance did not subscribe to the rate making bureaus and were therefore free from restraint; also because under the stress of competition voluntary agreements were difficult to enforce.

The difficulties of the companies in their attempts to control the situation led to the intervention of the Department of Insurance of New York in 1913, in which year Superintendent Emmet issued his famous series of rulings. The first letter of the Superintendent was addressed to the companies under date of June 20, 1913. It referred to the serious situation then existing in the liability insurance business; rates were apparently inadequate, loss reserves in many cases were insufficient, administration expenses were excessive and commissions were increasing under the stimulus of strenuous competition. The Superintendent suggested that the aim of the companies "should be to remedy this condition by securing adequate premiums and by reducing expenses to a minimum." He then laid down the following three rules for the conduct of the liability insurance business and stated that the Department would insist upon adherence to these rules as a condition of continued transaction of business in New York state:

1. Underwriting to be based entirely upon statistical experience and upon the physical and moral hazards of each individual risk and to be free from the influences of competition.
2. Administration expenses to be minimized.
3. Commissions not to exceed 15% to brokers and 20% to agents.

Additional communications were issued by the Superintendent in August and September, 1913, amplifying his original rulings, particularly the ruling on acquisition cost. Finally, a conference of all parties interested, including Insurance Department officials, company executives and agents, was held in Chicago on December 1st and 2nd, following which the definite announcement, since referred to as the "Emmet Ruling," was promulgated under date of December 8, 1913.

This ruling, which became effective December 1, 1913, was worded as follows:

"The acquisition expense on Workmen's Compensation and Employers' Liability business in Workmen's Compensation states not to exceed $17\frac{1}{2}\%$ of the premiums; in other states the acquisition expense on Employers' Liability business not to exceed 20% of the premiums; in all states the acquisition expense on all Liability business, other than Workmen's Compensation and Employers' Liability, not to exceed 25% of the premiums; except that on Employers' Liability business in the Rocky Mountain Zone embracing the states of Montana, Wyoming, Colorado, New Mexico, Arizona, Utah and Idaho an acquisition expense of not more than 25% of the premiums may be permitted."

Acquisition expense was defined as including the following items:

1. Commissions to brokers and local agents.
2. Commissions to general agents.
3. Amount of salaries of resident or branch office managers.
4. Contingent commissions to resident or branch office managers.
5. Payments to agents under profit-sharing contracts.
6. Salaries and commissions of special agents.
7. Clerical and supervising cost of policies written in agencies.
8. Cost of collection of premiums in agencies.
9. Rent of agency or branch office.
10. Compensation of clerical office force in agency or branch office.
11. Cost of furniture and equipment.
12. Telephone, telegraph, postage, etc., at agency or branch office.
13. Traveling expenses of managers, agents and solicitors.

It was provided, however, that the limitation upon acquisition expense did not include—

1. Expenses incidental to the adjustment of losses.
2. Cost of inspections.
3. Cost of payroll audits.
4. Taxes and governmental impositions.
5. Cost of stationery, blanks and supplies.
6. Expenses which properly belong to home office expenses.

This ruling did not attempt to do more than fix a maximum limitation upon the production expense in a few lines of casualty insurance. It did not classify producers and provide for different rates of remuneration for the services performed by each class. Nor did it specify how the producers of a given company should be distributed geographically. The task of arranging rules which would permit the companies to observe, without undue competitive difficulty, the limitations which had been established was left to the companies themselves.

The organization upon which this function devolved was the Workmen's Compensation Service Bureau which at that time was the official rate making organization for workmen's compensation, employers' liability, automobile and other forms of liability insurance. The Bureau proceeded to develop a complete set of agency rules for its companies which classified producers, fixed the rate of remuneration for each class, and, finally, established a definite geographical distribution of producers of the first rank (those receiving the highest rate of remuneration) by providing limitations upon the number of such producers which each company might maintain in each city and state in the country. These rules with some modifications, continued in effect for many years.

In the meantime other lines of casualty insurance attained importance. None of these was brought within the jurisdiction of the Workmen's Compensation Service Bureau. Separate organizations were established for rate making and for the regulation of the business in these lines and these organizations sought, without the intervention of the Insurance Department, to control the cost of production. Thus, by 1922, there were at least five separate national organizations, each with rules governing production cost for one or more branches of the casualty insurance business. More or less difficulty was experienced by all of these organizations in controlling the situation.

In 1922 legislation was enacted in New York conferring upon the Superintendent of Insurance a greater degree of authority to regulate rates and rate making bodies than he had previously enjoyed. This legislation had been effective but a short time when a competitive situation in the burglary insurance business developed to such proportions as to attract the attention of the Department. The Superintendent of Insurance, taking advan-

tage of this opportunity, called the stock companies authorized to transact casualty insurance in New York into conference. He pointed to the fact that the production cost was excessive throughout the casualty insurance field and that various abuses had crept into the business which required immediate correction. He invited the companies to undertake a solution of the problem without dictation from the Department; intimating that, if the companies failed to agree, he would then consider himself obliged to regulate the situation under the authority conferred upon him by law.

It was as a result of this request by the Superintendent of Insurance of New York that the so-called Conference on Acquisition and Field Supervision Cost for Casualty Insurance was organized on October 24, 1922. The Conference faced a difficult task. For the first time in history the agency problem for the entire field of casualty insurance was brought up for consideration with the purpose of attempting to discover a plan of general scope which might be uniformly applied to the many varieties of agency organizations maintained by the companies. The executives of the companies were sincerely desirous of solving the problem and, after many days of discussion, in which not only representatives of the companies but also representatives of the various classes of producers participated, a set of rules was finally adopted and reported to the Superintendent of Insurance of New York.

These rules were nationwide in their scope and embraced all of the casualty lines except accident and health insurance, which was deliberately omitted because the New York law did not cover it and because of the peculiar problems involved. Hearings were held before the Superintendent following which the rules were referred by him to the National Convention of Insurance Commissioners, which approved them, with the exception of certain special New York items, on December 7, 1922.

It is the purpose of this paper to present an analysis of these rules which became effective on February 1, 1923,* and under which the stock casualty companies are now operating. Because of the peculiarity of the situation in Greater New York,

*The rules for Greater New York were delayed in promulgation and, therefore, became effective March 1, 1923 for new business and April 1, 1923 for renewal business.

there is a separate set of rules for this territory. In discussing the subject the general rules for the United States will be considered first and a supplementary statement will then be made concerning the particular rules which apply to Greater New York.

CLASSES OF FIELD REPRESENTATIVES

Field representatives are divided into five classes, as follows:

1. General agents and branch office managers.
2. Regional agents.
3. Office agents.
4. Local agents.
5. Brokers.

General Agents and Branch Office Managers.

This class of representative, as before stated, supervises a certain territory in which business is developed for the company. This business is assembled in the office of the representative where it is carefully checked and where certain functions, such as accounting, policy writing, inspection, rating and claim adjustment may be performed. Representatives of this class have the greatest expense requirements for they must not only pay commissions to the producers reporting to them but they must also cultivate the territory, instruct producers and assist them in acquiring business and maintain a service organization adequate to care for the interests of the company and of its policyholders in the territory.

The branch office manager always represents a single company, or a single group of companies, exclusively. Usually, but not always, the general agent will do likewise, at least so far as casualty insurance is concerned.

Regional Agents.

The regional agent is essentially a direct reporting representative, although regional agents are utilized also by companies operating on the branch office or general agency system. He has under his supervision a small geographical unit, such as a city, county or part of a state, and on a restricted scale he is required to do for his territory what the general agent does for the field under his jurisdiction. As a general rule his volume of business

is limited and will consist of direct business of his own and of such business as he is able to attract from brokers and local agents in his territory.

This class ranks second in the scale so far as expenses are concerned because of the fact that they must be placed in a position where they can offer commissions for the business of brokers and local agents and receive enough in addition to defray the cost of the limited field supervision service which they must perform for their clients.

Office Agents.

The office agent is always attached to the home office of a company or to the office of one of its branches or general agencies. He is a salesman under a contract which requires him to solicit exclusively for a given company and to place all of his casualty business with that company unless he receives specific written permission to do otherwise. He is in effect an employee of the company but, instead of receiving a definite remuneration, he is paid for the business he produces on a percentage basis, his remuneration varying with the volume of business which he develops and controls.

Local Agents.

The local agent is a representative of a given company by virtue of a specific written contract. He is usually located in one of the smaller cities. As a general rule the local agent represents one company exclusively for casualty insurance but of late, with the organization of casualty running mates by the fire companies, this rule is subject to some exceptions. In many cases the local agent, who normally represents several fire companies in addition to a casualty company, has maintained an affiliation with the parent fire company for years. The casualty running mate of his fire connection is then offered to him and because the fire connection has been in his office for many years, or because of the fact that it has given him unusually good service, or for some other good reason, he takes on a new casualty company, at the same time continuing his affiliation with the casualty company already in his office. In this manner some local agents come to represent more than one company for casualty insurance.

Local agents are compensated by commissions. They render no field supervision service in addition to the acquisition of the business. When the risk has been secured, it is reported to a regional agency, a general agency, a branch office or, in some cases, to the home office of the company, where the insurance service is rendered.

Brokers.

The classes of representatives so far mentioned are agents or direct employees of the company. With some exceptions they are bound to an individual company for which they have exclusive representation either by virtue of direct employment or under written contract. The broker is not so restricted. He is a free lance in the sense that he retains his freedom to place his business in any company. Theoretically, the agent represents the company while the broker represents the assured. It is the broker's task to secure the best and most complete coverage for his client at the lowest possible cost consistent with the selection of a solvent company. For this reason he must be free to deal with all of the companies and to "shop around" for that particular insurance arrangement which he considers best for the policyholder he represents.

The broker is not required to render any service beyond the placing of the business. Some brokers do, however, give special service which is performed for the advantage of the assured and which may be a duplication of service performed by the company. Thus, a broker may maintain an inspection and rating service. This parallels similar service offered by the company and the functions are performed for the purpose of checking the company's work and making certain that the policyholder is accorded every advantage which the rating procedure entitles him to receive.

REMUNERATION

The remuneration payable to field representatives is divided into two parts. That part which is paid solely for acquisition service, such as is rendered by the local agent and broker, is termed "*acquisition cost.*" That part which is paid for service expenses, such as are incurred by regional agents, branch office managers and general agents, is termed "*field supervision cost.*" The total of both classes is termed "*production cost.*"

It should be noted that the terminology in the new rules differs from that employed in the Emmet ruling. Heretofore acquisition cost has had the same meaning as production cost. This has resulted in a popular belief that the production cost has been paid solely for acquiring the business. From this point of view the item has been criticized as being unreasonably excessive. The Conference has attempted to correct this misconception by limiting the use of the term "acquisition cost" to that portion of production cost which may fairly be said to represent the expenses of acquisition. Those field expenses which are involved in handling the business once it has been acquired are classified under the new term "field supervision cost."

Acquisition cost is always quoted in terms of a percentage of gross paid premiums. The application of this percentage to the premiums actually paid to the company by the producer develops his commission on the business.

Under the rules of the Conference the following percentages of gross paid premiums represent the acquisition cost for the several lines of insurance in territory outside of Greater New York:

- | | |
|---|------|
| a. Workmen's Compensation and Employers' Liability Insurance in Workmen's Compensation states . . . | 10% |
| b. Workmen's Compensation and Employers' Liability Insurance upon Underground Coal Mining Risks. | 5% |
| c. Employers' Liability Insurance in states where there are no Workmen's Compensation laws | 10% |
| d. Automobile Property Damage and Collision, Sprinkler Leakage and Water Damage Insurance. | 20% |
| e. Automobile Liability and Property Damage Insurance upon Public Passenger Carrying Risks | 10% |
| NOTE: The foregoing acquisition cost upon public passenger carrying risks is subject to a limit of \$30 per car in cities of the first class in New York State. | |
| f. All other forms of Liability (including Automobile Public Liability) Property Damage and Collision Insurance | 17½% |
| g. Burglary Insurance | 20% |

- h. Plate Glass Insurance 22½%

NOTE: In addition to the foregoing acquisition cost for Plate Glass Insurance, an allowance of 2½% of paid premiums may be granted producers for the adjustment of claims and the making of inspections, provided these services are actually performed in good faith by such producers. This additional allowance shall not be paid to producers who do not perform these services.

- i. Steam Boiler, Engine, Flywheel, Machinery and
Electrical Equipment Insurance 17½%

Field supervision cost is similarly quoted in percentages. It covers the entire cost of conducting a general agency or branch office, including the following items:

1. Remuneration to general agents, branch office managers, assistant managers and salaried special agents.
2. Traveling expenses of general agents, branch office managers, assistant managers and salaried special agents.
3. The cost of policy-writing in agencies and branch offices.
4. The cost of collection of premiums in agencies and branch offices.
5. Rent, heat, light and maintenance of agencies and branch offices.
6. Remuneration of clerical office force in agencies and branch offices.
7. Exchange, advertising, postage, telephone, telegraph and express in agencies and branch offices.

It does not include:

1. Expenditures for taxes and governmental impositions.
2. Expenditures actually made in good faith for the adjustment of claims, the making of inspections and payroll audits.

The entire remuneration of a broker or of a local agent is obtained by applying the acquisition cost percentages to the gross paid premiums of the lines of casualty insurance which he produces.

The regional agent, in addition to acquisition cost as previously defined, receives 2½% for field supervision expenses except on workmen's compensation and employers' liability premiums upon underground coal mining risks, on automobile property

damage and collision premiums upon all risks and on automobile public liability premiums upon public passenger carrying risks.

The general agent and branch office manager, in addition to acquisition cost, receive varying allowances for field supervision expenses as follows:

- a. Workmen's Compensation and Employers' Liability Insurance in Workmen's Compensation states. 7½%
 - b. Workmen's Compensation and Employers' Liability Insurance upon Underground Coal Mining Risks:
 1. When the premium for the individual risk is less than \$15,000. 5%
 2. For the excess premium above \$15,000 for the individual risk. 2½%
 - c. Employers' Liability Insurance in states where there are no Workmen's Compensation Laws. 10%
 - d. Automobile Property Damage and Collision, Sprinkler Leakage and Water Damage Insurance. 5%
 - e. Automobile Liability and Property Damage Insurance upon Public Passenger Carrying Risks. 5%
- Note: The foregoing field supervision cost upon public passenger carrying risks is subject to a limit of \$20 per car in cities of the first class in New York State.
- f. All other forms of Liability (including Automobile Public Liability) Property Damage and Collision Insurance. 7½%
 - g. Burglary Insurance. 10 %
 - h. Plate Glass Insurance. 10 %
 - i. Steam Boiler, Engine, Flywheel, Machinery and Electrical Equipment Insurance. 7½%

The office agent does not receive a special allowance for field supervision expenses but, in addition to acquisition cost, he may be provided with office quarters without charge for rent in any home office, general agency or branch office of his company and he may be furnished, also, with clerical assistance, the use of telephone and the actual postage necessary for the transaction of the company's business. An office agent, however, may be designated a regional agent for his company, in which case he will receive, in addition to acquisition cost and the other items just enumerated, the same 2½% allowance for field supervision expenses that is granted to regional agents.

These definite rates of remuneration to the different classes of field representatives are maximum limits. The company, if it

chooses to do so, may remunerate a general agent at a rate intermediate between the allowance specified by the rules and that granted to regional agents. Similarly, regional agents are not necessarily entitled in all cases and for all classes of insurance to receive the $2\frac{1}{2}\%$ allowance for field supervision expenses.

The remuneration granted to the different grades of producers is summarized in the following table which gives the total production cost granted to each class of representatives:

REMUNERATION OF FIELD REPRESENTATIVES

Line of Insurance	Local Agent and Broker	Office Agent	Regional Agent	Genl. Agent and Branch Office Mgr.
W. C. & E. L. in W. C. states...	10.0%	10.0% (a) (b)	12.5%	17.5%
W. C. & E. L. on Underground Coal Mining (all states).				
1. When less than \$15,000 for individual risk,	5.0	5.0 (a)	5.0	10.0
2. For excess above \$15,000	5.0	5.0 (a)	5.0	7.5
E. L. in non-comp. states.	10.0	10.0 (a) (b)	12.5	20.0
Automobile P. D & Collision...	20.0	20.0 (a)	20.0	25.0
Automobile Liability.	17.5	17.5 (a) (b)	20.0	25.0
Automobile Liab. & P. D. on Pub. Pass. carrying vehicles	10.0 (c)	10.0 (a) (c)	10.0 (c)	15.0 (d)
Sprinkler Leak. & Water Dam	20.0	20.0 (a)	20.0	25.0
All other forms of Liab. P. D. and Collision.	17.5	17.5 (a) (b)	20.0	25.0
Burglary.	20.0	20.0 (a) (b)	22.5	30.0
Plate Glass*	22.5 (e)	22.5 (a) (b) (e)	25.0	35.0
Steam Boiler, Engine, Fly-wheel, Mach. & Electrical Equipment.	17.5	17.5 (a) (b)	20.0	25.0 (f)

a. In addition, the office agent may receive office quarters without charge, clerical assistance, the free use of telephone and postage.

b. If an office agent is designated as a regional agent, he receives the allowances for rent, clerical assistance, etc., and in addition the same remuneration as regional agents in the adjacent column.

c. Limitation in cities of the first class in New York state—\$30.

d. Limitation in cities of the first class in New York state—\$50.

e. An additional $2\frac{1}{2}\%$ allowance is available to producers who actually contract to adjust claims and to make inspections.

f. In addition, because of the technical nature of the business, the home office of the company may expend not to exceed 5% for salaried soliciting assistance.

*There are special Plate Glass insurance rules for Chicago, Illinois, as follows:

a. The basic Acquisition Cost is $22\frac{1}{2}\%$ with no extra allowance of $2\frac{1}{2}\%$ for the adjustment of claims and the making of inspections.

GEOGRAPHICAL DISTRIBUTION OF FIELD REPRESENTATIVES

Limitations are imposed upon the number and location of general agents, branch offices and regional agents. These limitations are essential because without them, under the stress of competition, there would be a tendency to increase the remuneration of all representatives to the maximum limit, thus defeating the purpose of the rules by requiring the companies to expend more than the permissible cost for production.

The rules provide the allotments of general agencies, branch offices and regional agencies for each state which appear in the table on page 258.

Each company is free to locate general agencies, branch offices and regional agencies wherever it may choose with the following exceptions:

1. Not more than one general agency or branch office may be located in any one city. This rule is subject to exception in Boston, in which the number may be three; in Los Angeles, in which the number may be three for Burglary Insurance only; and in Baltimore, Buffalo, Chicago, Cleveland, Detroit, Philadelphia, Washington, D. C., and St. Louis, in which the number may be two. These exceptions recognize certain definite situations of long standing which cannot be disturbed at this time.

2. Only one regional agency may be located in the same city in which one or more general agencies or branch offices are maintained. This limitation does not apply to office agents who may be designated as regional agents. In such cases as many representatives of this class as the company wishes to appoint may be located in the same city with a general agency or branch office but each such appointment reduces by one the permissible regional agency appointments for the state. The company which appoints a large percentage of office regional agents, there-

- b. In addition to the basic Acquisition Cost a class of representatives known as Registered Class 1 Agents are permitted a Field Supervision allowance of 5%, thus bringing their total remuneration on Plate Glass business to 27½%. Registered Class 1 Agents are Class 1 members of the Chicago Board of Fire Underwriters who have been approved and registered by the Executive Committee of the Casualty Underwriters Association of Illinois.

- c. Finally Regional Agents are allowed the same remuneration on Plate Glass business as Registered Class 1 Agents in order that there may be a fair basis of competition between these two classes of representatives.

SCHEDULE SPECIFYING THE NUMBER OF GENERAL AGENTS OR BRANCH OFFICES AND THE NUMBER OF REGIONAL AGENTS WHICH AN INDIVIDUAL COMPANY MAY MAINTAIN IN EACH STATE

State	General Agents or Branch Offices	Regional Agents
Alabama.....	3	4
Arizona.....	2	2
Arkansas.....	2	2
California.....	5	5
Colorado.....	2	2
Connecticut.....	5	10
Delaware.....	2	0
District of Columbia.....	2	0
Florida.....	3	3
Georgia.....	5	3
Idaho.....	2	2
Illinois.....	6	22
Indiana.....	7	15
Iowa.....	4	11
Kansas.....	4	5
Kentucky.....	3	4
Louisiana.....	2	3
Maine.....	2	4
Maryland.....	3	5
Massachusetts (outside of Boston)	9	34
		(includ. Boston)
Michigan.....	6	11
Minnesota.....	4	7
Mississippi.....	2	3
Missouri.....	4	4
Montana.....	2	3
Nebraska.....	3	0
Nevada.....	2	0
New Hampshire.....	2	3
New Jersey.....	8	18
New Mexico.....	2	1
New York (outside of Greater New York).....	11	28
North Carolina.....	2	7
North Dakota.....	2	1
Ohio.....	8	27
Oklahoma.....	3	4
Oregon.....	2	1
Pennsylvania (outside of Philadelphia).....	9	33
		(includ. Phila.)
Rhode Island.....	3	6
South Carolina.....	2	3
South Dakota.....	2	1
Tennessee.....	5	1
Texas.....	6	12
Utah.....	2	1
Vermont.....	2	1
Virginia.....	5	5
Washington.....	4	5
West Virginia.....	3	5
Wisconsin.....	3	14
Wyoming.....	2	0

fore, will restrict its field organization outside of the large cities in which general agencies or branch offices are located. There is no limitation upon the number of regional agencies which an individual company may appoint in a city or town in which it does not have a general agency or branch office.

RULES FOR GREATER NEW YORK

The situation in Greater New York is peculiar principally because practically all of the business in this territory is developed through brokers. This peculiarity is recognized by the establishment of a special set of rules covering the five boroughs of Manhattan, Bronx, Queens, Kings and Richmond.

In this territory the rules provide for the following classes of representatives:

1. Principal office.
2. Borough agents and borough branch offices.
3. District agents (for plate glass insurance only).
4. Supervising special agents.
5. Regional agents (for Queens county only).*
6. Office agents.
7. Brokers.

Principal Office.

The principal office may be the home office of the company, a branch office or the office of a general agent. It is the office through which the business of Greater New York is controlled and supervised. Its functions are similar to those performed by a general agency or branch office in the field.

Borough Agents and Borough Branch Offices.

A borough agent is a representative under contract to act exclusively for a given company in the lines of casualty insurance which it transacts. He has a definite territory under his jurisdiction in which he develops business from brokers but he may have in addition a large amount of direct business which he pro-

*This classification, which applies only to Queens County, was created by the New York City Agency Committee recently and is not available for use prior to June 1, 1923.

duces personally or through a staff of salaried solicitors attached to his office. The rules specify that a broker shall not be eligible for appointment as a borough agent.

A borough branch office performs functions similar to those performed by the office of a borough agent but in this case the person in charge is a salaried manager appointed by the company.

District Agents (for Plate Glass Insurance only).

This is a special kind of borough agent who is appointed for the purpose of producing plate glass business only.

Supervising Special Agents.

A supervising special agent is an individual who is employed as a solicitor and who has his sole office in the principal office of his company.

He is required to solicit exclusively for the given company which he represents and he may not place insurance elsewhere except by specific written permission. He is thus in practically every respect analogous to the office agent. The only difference is to be found in his remuneration, which will be explained later.

The supervising special agent is passing. There are a few left and the rules provide for their continuance in a number not to exceed five per company with the understanding that no new appointments of this class are to be made.

Regional Agents, Office Agents and Brokers.

These classes are identical with similar representatives previously described.

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The remuneration of these representatives is as follows:

Brokers receive the rates of acquisition cost specified for the country at large with the following exceptions:

1. The acquisition cost on burglary insurance is 22½% of paid premiums.
2. The acquisition cost on plate glass insurance is 25% of paid premiums with the provision that no additional allowance may be granted for the adjustment of claims and the making of inspections.

Office agents receive the same acquisition cost as brokers but in addition they may be furnished with office quarters without charge for rent and the use of telephone. It should be noted that they are not provided with all of the special allowances granted to office agents in the field.

Supervising special agents receive the same acquisition cost as brokers on business which they themselves produce. On business which comes to them through brokers, they may be granted an allowance of $2\frac{1}{2}\%$ for field supervision expenses. In addition, they are entitled to the same accommodations as office agents.

Regional Agents, in Queens county, may be granted an allowance of $2\frac{1}{2}\%$ for field supervision expenses in addition to the basic acquisition cost specified by the rules for Greater New York.

District agents (for plate glass insurance only) may receive 25% of paid premiums, which is the basic acquisition cost for plate glass business, and in addition a field supervision allowance of not to exceed 5% of paid premiums.

Borough agents receive the same basic acquisition cost as brokers and in addition they are entitled to receive a field supervision allowance of 5% except on workmen's compensation and employers' liability insurance on underground coal mining risks and automobile liability and property damage insurance on public passenger carrying risks. If, however, the borough agent incurs all of the field supervision expenses of a general agent, he may be granted the same allowance for field supervision cost as a general agent.

Similar limitations are imposed upon borough branch offices.

The principal office is subject to the same limitations as general agencies and branch offices in other sections of the country.

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As in the remainder of the country, there are limitations in Greater New York on both the number and location of the representatives receiving substantial remuneration. These may be enumerated as follows:

There may be but one principal office.

Each company may maintain not more than five borough agencies or branch offices, no more than two of which may be

located in any one borough except that in the borough of Manhattan not more than one such agency or office may be located below Fourteenth Street.

Each company may maintain not to exceed six district agencies for plate glass insurance only; not more than three of these may be located in any one borough.

Each company may maintain not to exceed three regional agencies in the County of Queens. However, if this option is exercised, the company cannot locate a borough agency in the county and in addition it must subtract one from the five borough agencies permitted for Greater New York, thus limiting itself to four possible borough agency appointments in the remaining boroughs. This rule recognizes the fact that Queens County is a widespread territory in which the borough agency plan does not permit proper cultivation of business.

PROCEDURE

The Conference has effected a simple organization for administering the rules. There are two agency committees. One of these has jurisdiction over Greater New York; the other over the remainder of the country. Each committee functions in close cooperation with the New York Insurance Department and is provided with an executive staff to handle the details of the work.

Each chief executive is required to file with the committee a pledge that he will, so far as the direct employees of his company are concerned, hold himself responsible for strict adherence to the rules of the Conference and that he will, in addition, by incorporating a clause in agency contracts or by other suitable means, secure a similar pledge in writing from the general agents, regional agents, supervising special agents, district agents and borough agents of his company. He must also register every appointment of his company which carries with it a rate of remuneration in excess of the basic acquisition cost. Finally, he is required to file copies of his contract forms together with all riders and endorsements which are used in connection therewith.

With these data on record the agency committees are in a position to control the uniform application of the rules, to deal with complaints and violations and, in general, to maintain proper

practices. They also observe the situation constantly for the purpose of suggesting modifications of the rules wherever conditions warrant such action.

CONCLUSION

In the Rules regarding Acquisition and Field Supervision Cost for Casualty Insurance a code of practice has been established which, while based upon compromise and therefore subject to the weaknesses of agreements reached under stress of conflicting views, is fairly in accord with sound business sense. The Rules may be expected to produce, when they have been made fully effective, the following extremely desirable results: Stabilization of the field situation in casualty insurance, equal competitive opportunities for all companies irrespective of the systems which they may adopt for their field organizations, abolition of abuses which have been prevalent and, finally, reduction of the production cost of the companies to a reasonable basis.

With this preliminary move in the direction of stabilization and good practice, the work of the Conference as it progresses will undoubtedly pave the way for additional improvements which will be to the ultimate advantage of the carriers, the producers and the insuring public.

INSURANCE AND PREVENTION

BY

ALBERT W. WHITNEY

Insurance and Prevention are two processes that have much in common and that influence each other in intimate and important ways. They both have to do with the same thing, misfortune, but their primary objects are quite distinct. Prevention undertakes to avoid misfortune itself while insurance undertakes to avoid or ameliorate the evil effects of misfortune.

Anything that avoids misfortune is prevention but anything that avoids the evil effects of misfortune is not necessarily insurance; that is, insurance is only one of a number of ways of accomplishing the same thing. Philanthropy and good neighborliness for instance are methods of alleviating misfortune that accomplish the same results as insurance.

The distinction between philanthropy on the one hand and insurance on the other is cleancut and significant. Philanthropy (and good neighborliness) comes into effect only after the misfortune is an accomplished fact. This obviously is not prevention, for the misfortune has already occurred. The Widow Maginty's cow has died and the neighbors get together and buy her another. Philanthropy and good neighborliness, since they come into operation after the misfortune has happened, require good-will and a social consciousness.

The distinguishing characteristic of insurance is that the relief of the misfortune is undertaken before the misfortune is an accomplished fact, and while its incidence is still uncertain. It does not, therefore, require good-will but only enlightened self-interest. The Widow Maginty's neighbors get together and say, "What's happened to Bridget may happen to any of us; let's now bind ourselves to come to the help of anyone of us that has a misfortune." Each one goes into the undertaking knowing that he may be the one to profit by the bargain. This simple understanding contains the essence of insurance; for insurance is fundamentally an agreement on the basis of self-interest before the misfortune occurs. Incidentally, it may be noticed that insurance, since it comes before the misfortune instead of after it as in the case of philanthropy, admits of the possibility of being used preventively.

It is evident that the insurance that is practiced by the Widow Maginty's neighbors is very primitive. In actual practice the agreement with each other is usually replaced by an agreement with a third party who either acts as agent for all or who for profit undertakes to handle the transaction, taking the chance of securing a sufficient number who will come into the undertaking to afford the average upon which insurance is based.

Obviously there must be important relations between two things that are so much alike, prevention of misfortune on the one hand and prevention of the effects of misfortune on the other. The principal purpose of this paper is to point out two of these relations.

Insurance is a process which in the nature of things produces an unstable equilibrium. Those who go into an insurance agreement will tend to exercise a selection which will be adverse to the others; that is, the insurance will be taken more readily by the poorer risks. This is avoided if the insurance is compulsory, or if by some other means a fair average is had. Otherwise it is necessary to grade the risks by some system of classification which will serve as a basis either for underwriting or for rating.

But often it is not possible to differentiate sufficiently to avoid adverse selection. In that case the result of such a selection will be an increased loss-cost; this will require the raising of the rates; this will in turn make the operation of an adverse selection still more potent and so on indefinitely in a vicious circle. This is the unstable equilibrium that I referred to.

This is to some extent the situation in the automobile field today in such a city as New York. The increasing congestion of the streets has resulted in an increased number of accidents; this increased cost when reflected in the rates has led to a selection against the companies. This in turn has been followed by still more accidents owing to the poorer quality of the risks insured and so on.

Such at least is the theory of the situation. It is well known, however, that adverse selection does not operate in practice to the extent which might be expected, due to the fact that carefulness in securing insurance protection and financial ability to secure insurance protection are correlated to a considerable extent with qualities that characterize a good risk.

However, this fundamental instability by which the poorer risks tend to come to the top, in much the same way that the large

stones in a pile work to the top, does undoubtedly operate to a greater or less extent throughout the whole field of insurance. That is, the system of insurance by itself seems to have an innate tendency to cause its own destruction and there is nothing within the system that is sufficiently strong to restore the equilibrium. In that case we must resort to force from the outside to break the vicious circle. In theory we may attack either the increased losses that are causing the adverse selection or the adverse selection that is causing the increased losses. Something can be done through underwriting to overcome the effect of adverse selection but in general the most hopeful point of attack and the one that brings the most far-reaching results is upon the loss side of the circle, that is, prevention.

I may sum up, therefore, by saying that there is intrinsic in insurance a fundamental instability. This may be overcome by restricting its scope through classification and it may be neutralized through the counteracting effect of other correlated forces and it may to some extent be overcome by underwriting but certainly in many cases it will be necessary or advisable to go to the real heart of the matter by undertaking direct action to prevent the misfortune itself.

There are, however, social as well as economic reasons for prevention in insurance. The purpose of insurance is relief from the effects of misfortune. There is in addition to this wholly good effect a secondary effect which is bad, namely, the loss of individual responsibility. If my house is insured I shall not be quite so squeamish about taking a lighted candle into the attic or about having a defect in the electric wiring go uncorrected; if my car is insured I shall not be quite so concerned at letting my son or nephews drive it. In the development of insurance this secondary bad effect must be taken into account as well as the primary good effect; the problem of insurance is evidently to maximize the good effect and at the same time to minimize the bad effect.

Now it is impossible to restore individual responsibility and the best therefore that the insurance company can do is to put something preventive in its place. The key to what this may be is found in the very nature of insurance. Insurance is a plan for bringing mass-action into play upon individual misfortune. The individual misfortune is shared by the mass and so is made bear-

able. Advantage should evidently be taken, in seeking for something to make up for the loss of individual responsibility, of this opportunity for mobilized action. The insurance company is able to carry on collectively for its members preventive work that will in the majority of cases more than make up for the lessened personal responsibility.

If this analysis is correct the insurance companies have a social obligation to the community to take part directly in preventive work, wherever insurance develops a lessened degree of responsibility in the individual.

An insurance company organized for the primary purpose of avoiding the evil effects of misfortune may, therefore, be forced for business reasons such as these to enter the field of prevention. There are many examples of this. Preventive work on a large scale is being carried on by the fire insurance companies, to some extent by the life insurance companies and more recently the stock casualty insurance companies have definitely come to the conclusion that they must attack the problem of the automobile hazard and have taken positive steps in that direction.

In what I have said I refer to direct preventive work. There is in addition the indirect preventive work that comes out of insurance through the operation of the merit-rating systems. When a classification system is used by which the rate is graded to fit the hazard of the individual risk a pecuniary incentive is immediately produced for raising the risk through preventive work to the level of a class that has a lower rate. The influence of this indirect preventive work is very great.

There is a test which can obviously be applied to preventive work, whatever the basis upon which it is undertaken, namely, that the savings in losses shall at least equal the cost of the preventive work. Insurance as an institution can hardly be asked to do preventive work that does not pay for itself; but if the work is rightly managed it will pay for itself.

There are, therefore, three reasons why insurance companies should carry on direct preventive work:

1. In order to overcome adverse selection and thus place the insurance system upon a stable basis.
2. To fulfill a social obligation to the community to offset the lessening of the responsibility of the individual.
3. On economic grounds because the saving in losses more than pays for the expense.

The question may be raised whether the insurance companies by doing preventive work will not put themselves out of business. Theoretically, perhaps yes; practically, no! It is exactly the same question that faces the doctors: Shall the doctors go into preventive work when by doing so they will lessen the need for their services! In a still larger sense it is a problem that runs through all of life. In a general way the answer is that institutions must accommodate themselves to that course of action which is best for society. Prevention of misfortune is desirable. Insurance companies and doctors and all the rest of us must make our plans accordingly!

In general, however, it is true that what works for the good of society as a whole works also for the good of its parts; both the doctors and the insurance companies are likely to find that the work of conservation will bring them into quite as large a field as the work of alleviation.

SOME OBSERVATIONS ON THE DEVELOPMENT OF
MANUAL RATES FOR WORKMEN'S COMPENSATION
INSURANCE

BY

S. B. PERKINS

With the passage of time and characteristically sudden changes in industrial conditions, facts continuously and insistently present themselves as replacements for conjectures made previously in the development of workmen's compensation rates. It seems also to be characteristic of workmen's compensation insurance that these facts more frequently than not belie their forerunning indications—at least the interpretation which has been placed upon them. Most peculiarly, so far as insurance carriers are concerned, there is no possibility of alleviating the inequities resulting from the dissimilarity between assumptions and realizations on the ground that the assumptions were on the safe side. There is no safe side. If compensation rates are pitched at a level which does not provide sufficient premium to satisfy the exigencies of the business, obviously an underwriting loss must result. If on the other hand rates prove to be redundant, there must inevitably follow unrest and discontent among the insureds with the resulting loss by the carriers of the better class of risks to become self-insurers and, as a consequence, if the conditions are allowed to continue, a selection against the companies will result occasioned frequently by the over-zealous efforts of the field to gain in volume at the expense of quality. It is safe to say, then, that complete satisfaction on the part of both the insuring public and the insurance carriers can only be realized when conditions permit of rates actually fitting existing industrial conditions.

The problem of fitting rates to conditions or, more properly, of establishing rate levels, should be considered as absolutely independent of the other phases of basic rate making. Classification relationship must always be established from a study of classification experience. The combination of the experience for various years must always be accomplished by the use of data accumulated from the experience developed during those years. Mature data is necessary for the accomplishment of such

operations and considerable time is required to make the necessary studies and analyses. Owing to the manner in which the basic material is accumulated and reported, however, the labor involved can be distributed over an extended period and accomplished in an orderly manner. Under the present system of reporting classification experience the most recent data that will ever be available for any general rate revision will be that developed under a policy which has expired over a year before the effective date of the new rates. This has been recognized and efforts were made at the last general rate revision to bridge the gap between the latest classification experience and the period over which rates were to be effective with partial success.

The theory underlying the method adopted by the National Council on Workmen's Compensation Insurance in the 1920 Revision of rates, as has been explained many times, was dependent upon the assumption that classification hazard relativity remains generally constant for periods of three or four years duration but that factors affecting all classifications similarly do operate to increase or decrease workmen's compensation pure premiums. With unchanging compensation rates and with all business written at standard rates loss ratios should vary directly with pure premiums. Accordingly, therefore, in the 1920 revision classification relationships were established on the experience for policy years 1916 and 1917 while the premium level was established on the basis of business conditions prevailing during the policy year 1919 including, of course, business in force throughout calendar years 1919 and 1920. It must be remembered that the revision was being carried on in 1920 and that the aforementioned effort of the National Council to bridge the gap between the experience period and the period of rate effect consisted in the establishment of a loss ratio for the then uncompleted policy year 1919.

This last general rate revision produced rates effective for the most part on January 1, 1921. Rates for New York and one or two other states were effective before that time. The policy year 1919 therefore was the last year for which twelve months' experience was available and it was for this year that the loss ratio was developed on the projection basis.

It has been interesting since that time to observe the development of the 1919 policy year experience and to note how closely

the actual experience has approached the anticipated. There are, to be sure, several individual states in which the actual loss ratio varies quite markedly from the projected but it is fair to state that in the majority of cases the results were satisfactorily close. In spite of this fact, however, the experience for the policy year 1921, which is the first policy year which would reflect to any great extent the effect of the new rates, has proved a disappointment to many. Generally the loss ratios for 1921 have been high and as a natural result the projection method has been subjected to rather more severe criticism than it actually deserves. It requires but a casual survey of claim records to discover one factor which has never been included in any procedure of rate making and which has been directly responsible for the unfavorable turn and that is accident rate. There has always been a distinct aversion in the minds of rate making bodies toward the use of conjectural factors so far as they relate to the future. However, there is, or should be, a middle course between the use of experience which is so old that it does not reflect conditions as they exist within a reasonable time prior to the period for which the rates are being determined and the use of pure conjecture as to what may happen during that period. It should be possible to obtain some actual experience which would at least carry the vision of rate makers approximately up to the effective date of rates. As has been intimated, this index or experience should reflect among other things the actual trend of accident rate so that, even though it might still be considered inadvisable to prognosticate as to the future, it would be possible to interpret correctly conditions that actually existed at the time and to incorporate in the rates some factor reflecting these conditions.

Another general rate revision is pending at this time and the procedure is once again to be modified—this time by adjusting the payrolls and losses actually experienced during the period under observation, which is to be policy years 1918, 1919 and 1920, to the latest possible level. Wage data has been accumulated by the National Council covering experience down to as recent a date as January 1, 1923. This will make it possible to adjust the experienced payroll so that it will be representative of the payroll which would have been earned under conditions prevailing at the beginning of 1923. This same data, together with a knowledge of amendments of the various compensation acts

which have been or will be passed prior to the effective date of new rates, will furnish the material necessary to modify to the present day level the losses actually experienced.

There can be no question but that the use of separate payroll and loss factors will be an improvement over the use of the combined projection factor heretofore employed. Considering the proposed treatment of the payroll and losses separately, there seems little to add as far as the payroll factors are concerned, unless it might be possible that a more efficient and economical method for measuring payroll changes might be devised, while the loss adjustment seems to be as susceptible to attack as it always has been. There persists the feeling that proper consideration is not to be given to changes in accident rate. What is proposed is to modify the actual cost of accidents that really occur so that modified losses will represent the amount of money which would actually have to be spent if those self-same accidents occurred today. Granted that this may be accomplished; but suppose that for every two accidents which occurred during the period 1918-1921 but one should be occurring today or, conversely, suppose that for every one accident that occurred in 1919 two should be occurring today, what would be the effect on the workmen's compensation experience? The answers are obvious. Under the method employed during the last general revision a loss ratio was used as the measure of the trend of experience. Loss ratios do reflect changes in accident rate as well as every other element effecting compensation cost, and at least to that extent does it seem to the writer that a loss ratio is a better criterion or, what should amount to the same thing, that a gross pure premium is a better criterion of a proper rate level than a consideration of only two of the several important factors which in combination, produce workmen's compensation experience. The most obvious improvement over the proposed system would therefore be to develop some mature experience—some block of business representative of the current period, the examination of which might reveal at least, the trend of accident rate, if it were still desirable to treat payroll and losses separately for wage levels and amendments.

If all policies were written on January 1 of a given year for a period of six months, then by October 30 of that year premiums would be audited and losses developed enough to produce a loss

ratio or a pure premium which would be clearly indicative of the quality of the business during the first six months of that same year. Allowing another three months for the compilation of data, rates could be established at the beginning of the following year with a gap between the actual experience and the effective date of the new rates of not more than six months. This of course is purely visionary, but how nearly can it be approached in reality? There seems to be at least one simple solution. Why not include in the Workmen's Compensation Statistical Plan some means of allocating experience to the year and month of issue of the policy? If every unit of exposure carried the effective month and year of the policy and every loss unit carried the same date then, allowing three months in which to obtain audits and to develop losses, on April 30 of each year the experience of the policies written in January of the preceding year could be segregated and a block of experience obtained, mature and complete, which would be a substantial index of the quality of the business and the result of business conditions during that entire year. As the months passed succeeding blocks of business could be obtained and trends observed. Current observations of this experience would undoubtedly disclose necessities for rate level modifications very promptly after conditions making such modifications necessary had developed.

There is another phase of manual rate making that has disclosed itself recently and which seems to demand as serious consideration as the question of rate level in the aggregate. It is generally recognized that the classification system of compensation rates is not adequate for properly differentiating between the hazards of different individual risks. Consideration of this problem, however, has always been limited to industrial groups. Manual rates have been established for groups of risks defined by manual classifications and all risks qualifying under one classification as to product or process have received one manual rate. It is characteristic of American industries that distinctly different methods are applicable in the manufacture of large quantities of goods than are practicable in the manufacture of comparatively small quantities. Plant organization and efficiency are given much more serious consideration in a large organization than in a small one. These things must have their effect. To be sure, the desired effect is the most economic production of goods, but

it is possible that one of the elements of the reduction in cost is the reduction in the number of accidents and a corresponding reduction in time lost because of the confusion that must accompany the replacement of experienced and skilled workers by inexperienced and unskilled ones. It is conceivable then that risks of certain sizes as measured by premiums may present by virtue of that size itself a hazard entirely different from that of risks in the same manual classification but of different size. If this can be demonstrated, then equitable treatment of policyholders demands a recognition of this particular difference in hazard in just as substantial a way as does the difference in industrial hazards by virtue of differing products and processes.

At the present time the Workmen's Compensation Statistical Plan does not provide for the segregation of experience along these lines. It has been suggested from time to time but has always met with objections which seem to preclude the possibility of its acceptance. The usual objection has been that the size of a risk is impossible of ascertainment until after the final audits are made. This has seemed to be valid because of the fact that during the life of the policy all of the losses would have occurred and would have been assigned to their proper classifications and those of them which had been closed would have been finally recorded and disposed. This, of course, does not imply that the records would be unavailable but, admittedly, the labor involved in reviewing every unit of exposure and every unit of loss after the final audit for the purpose of segregating experience by size of risk would be tremendous and far too costly to warrant its inclusion in the statistical plan. The first obstacle to be surmounted then is that of the establishment of some means of this segregation at a point in the statistical procedure which would permit of its application as soon as the policy is written and the first statistical records entered, that is, before any cards are punched either for exposure or losses. It seems obvious that if the suspected difference in hazards in certain groups of risks, measured by their size, exists this difference must be a progressive one and would not appear in a sharply defined manner at any specific point. This very fact seems to offer a cue as to the statistical method of obtaining the desired results. If, whenever a risk is accepted by the carrier, the best estimate possible is made of its expected size for the year, and if this risk throughout the

course of statistical records should carry some code indicative of its estimated size, then at the end of the year or after the experience has completely matured it would be possible to segregate the entire exposure for the policy year and the entire losses for the policy year into groups by estimated size of risk. Would it matter if a risk estimated at \$500 should develop to \$750? The losses for that risk would be included with the exposure and at least there would be available the experience on a group of risks of approximately the same size including every dollar of premium and every dollar of incurred loss. The range of risks within one group might, and undoubtedly would, overlap the range of the risks placed in the next higher group, but at least there would be a pure loss ratio available for a certain group of risks at a certain average size and, if there should be found to be a difference in the hazards of risks by various sizes, this method would show it clearly both quantitatively and qualitatively.

The two suggestions set forth in this very brief paper seem to possess such potential possibilities that the writer urges their most serious consideration by those upon whose judgment the future of workmen's compensation insurance depends.

LEGAL NOTES

BY

RICHARD FONDILLER

(MEMBER OF THE NEW YORK BAR)

ACCIDENT AND HEALTH

ACCIDENTAL MEANS:—(Kahn *vs.* Metropolitan Casualty Ins. Co., Supreme Court of Missouri, 240 S. W. Rep. 793.) This was a suit brought by the beneficiary of an accident policy. The insured was treasurer of an organization and there was contradictory evidence at the trial as to whether he had been short in his accounts. There was also controversy concerning the insured shooting himself, accidentally or with suicidal intent, a month before his death by drowning.

On the day of his death, the insured went out alone in a boat to fish. He was seen to fall over the side of the boat, whether accidentally or by reason of heart disease, could never be ascertained. There was much expert medical testimony to show that the insured was bruised at the spot where he struck the boat in falling out and that he had been drowned. Autopsies revealed serious diseases of the heart and the kidneys. He was doubtless in poor health and what with the effects of the gunshot wound and the wind blowing while he was in the boat, it was not unreasonable for the jury to find that the insured fell into the water and met death from shock and strangulation. There were visible marks of new injury, which brought the case within the requirements of the policy of "bodily injuries sustained directly, solely, exclusively and independently through accidental means." The defense was that there was no such evidence in this case. The jury found against the defendant company as to the sufficiency of the evidence, and the court declined to disturb the jury's verdict in the beneficiary's favor.

Even if the insured is suffering from disease, the beneficiary can recover if there is evidence that the accident would have occurred and the injuries would have been sustained if the disease had not existed. There was some evidence produced by the

defendant that the insured committed suicide, but the burden of proof must be borne by the insurer, who had failed in the instant case.

RIDER COVERAGE:—(Dunwoody *vs.* Royal Indemnity Co., Supreme Court of Michigan, 188 N. W. Rep. 498.) The defendant company issued to Dr. Dunwoody an accident policy, to which was attached the following rider, properly countersigned:

"SEPTIC POISONING RIDER
ROYAL INDEMNITY COMPANY

"In consideration of an additional premium of \$1.25 it is hereby understood and agreed that septic infection resulting from external inoculation through accidental contact with septic matter shall be regarded as an accidental bodily injury within the terms of the policy named below.

"This rider is valid only when attached to a policy issued to a physician, surgeon, dentist, undertaker or embalmer.

"Nothing herein contained shall be held to waive, alter, vary or extend any of the conditions, agreements or limitations of this policy, other than as above stated.

"This rider, issued by the Royal Indemnity Company, when countersigned by the company's duly authorized official or agent and attached to policy No. AR-1799, issued to John F. Dunwoody, M.D., of Detroit, Michigan, shall be valid and shall form part of the policy."

In October, 1918, at the height of the influenza epidemic, the insured was examining a patient who was suffering from influenza. The patient involuntarily coughed violently and the sputum flew into the doctor's mouth. He became suddenly ill and died several days thereafter. Defendant company having denied liability, suit was brought by the beneficiary.

The judgment for the amount claimed by the beneficiary was affirmed. The patient and several physicians testified as to the happening of the event terminating in the insured's death. The accidental coughing of the patient, who threw influenza germs, septic matter, into the doctor's mouth, brings this case within the terms of the septic poisoning rider. The medical testimony proved that the insured died of influenza and pneumonia which was septic in nature and had been contracted from his patient's sputum.

UNDERWRITING CLASSIFICATION:—(*Sefton vs. London Guarantee and Accident Co.*, Supreme Court of Pennsylvania, 117 Atl. Rep. 406.) The insured was general manager of an electric light and power company and also of a street railway company. He stated his occupation and the names of his employers in his written application for accident insurance for \$7,500. In the policy issued in 1919 the insured was described as "general manager preferred, the duties of which are consulting or office work only." The policy was renewed in 1920 for another year.

While temporarily acting as a motorman on his street railway company, the insured received mortal injuries. The insurance company denied liability for the full amount, because the insured was engaged in an occupation more hazardous than that stated above. The defendant claimed that the following clause in the policy governed:

"This policy includes . . . the entire contract . . . except as it may be modified by the company's classification of risks and premium rates in the event that the insured is injured . . . after having changed his occupation to one classified by the company as more hazardous than that stated in the policy, or while he is doing any act or thing pertaining to any occupation so classified. . . . If the law of the state in which the insured resides . . . requires . . . a statement of the premium rates and classification of risks, pertaining to it, shall be filed with the state official . . . then the premium rates and classification of risks mentioned in this policy shall mean only such as have been last filed by the company in accordance with the law."

The provisions were in compliance with the Insurance Law of the state. However, the defendant had neglected to file the manual of rates and risks for 1919 or 1920 with the insurance commissioner, hence defendant could not introduce these manuals in evidence as a further defense. The defendant was forced to submit a manual which had last been filed in 1913, and which it contended was a sufficient compliance with the insurance law. The 1913 manual did not include the kind of policy held by the insured, nor the classification nor rate. The defendant maintained that under the 1913 manual the deceased would be classified as "Manager of an electric light plant, consulting or office work B-2 Preferred, limit of risk \$5,000," and that he was injured under the classification "Motorman, D-4, limit of risk \$2,000."

Relative to this argument, the court held:

"Before this manual could be received in evidence, it must appear the policy sued on was affected by it, not only that the classification mentioned might be assimilated to one contained in the book (which, on examination, we find does not), but a premium rate to cover it must be on file. The insurance law (section 1) reads:

"The classification of risks and the premium rates pertaining thereto, shall have been filed with the insurance commissioner."

"Defendant admits no premium rate applicable to the present policy was filed or contained in the 1913 manual, but argues it was not necessary to file a premium rate. This is not the law; the act commands exactly the contrary; and, when defendant attempted to save itself for failure to file the 1919-20 manual by taking advantage of the 1913 manual, the 'premium rates and classification of risks last filed by the company according to law,' it must, in that manual, have complied with the law in all respects; but here we have a different policy, under a different classification and rating. The book filed in 1913 was not admissible as evidence; defendant could not take the benefit of that which might apply, without showing a substantial compliance with all the requirements of the act."

Where a manual is not filed the company is held to be not entitled to the benefits of its provisions, and under the insurance law a policy issued under said manual is deemed to have the standard provisions incorporated.

The plaintiff's judgment for the face of the policy was affirmed. The court below had rightfully rejected the receipt of the 1913 manual in evidence. That manual included neither the classification, the rate, nor the description of the policy in suit.

WORKMEN'S COMPENSATION

CONSTITUTIONALITY:—(Ward & Gow *vs.* Krinsky, United States Supreme Court, 42 S. C. 529.) Ward & Gow leased vending and advertising rights from the Interborough Rapid Transit Company, under which it sold merchandise and newspapers on the station platforms of the transit company's lines. It had over a hundred salesmen employed in the booths on the station platforms, and each man went directly from his home in the morning to his booth, and then back to his home in the evening. Krinsky was one of these salesmen. He kept water in a pail

furnished by his employer, for washing the booth and his hands. While emptying the pail upon the subway tracks, in accordance with his custom, he was struck by a train and received severe injuries.

An award of compensation was made and affirmed by the Court of Appeals of New York State. An appeal was then made to the United States Supreme Court.

In 1918, the New York Workmen's Compensation Law had been amended by the addition of group 45 (now numbered 18), reading as follows:

"All other employments not hereinbefore enumerated carried on by any person, firm or corporation in which there are engaged or employed four or more workmen or operatives regularly in the same business or in or about the same establishment, either upon the premises or at the plant or away from the plant of the employer, under any contract of hire, express or implied, oral or written, except farm laborers and domestic servants."

The New York State Industrial Commission held that this amendment brought under the coverage of the compensation law every employee of every employer who regularly had four or more workmen: in other words, if there were four or more workmen engaged in the hazardous employments elsewhere enumerated in the law, all the other employees engaged in non-hazardous employments were covered. It is necessary, however, to determine that there are four or more employees who are "workmen or operatives" within the statutory definition of these terms.

Ward & Gow admitted that in their other business departments, they had large numbers of employees who were insured under the compensation law. The employer maintained that since the salesmen were entirely unconnected with the other departments, they were without the coverage of the compensation law. The New York courts held that although salesmen were not "workmen or operatives," nevertheless they were within the protection of the law by reason of group 45.

The opinion of the Supreme Court, in affirmance of the award to the employee, is a very important one. The constitutionality of group 45 is upheld in sweeping fashion.

In a brief consideration of the evidence, it was held to sustain the findings of the state commission that the injury arose out of

and in the course of his employment. The court wrote during the course of its opinion:

"A sufficient vindication of compulsory Workmen's Compensation and Employers' Liability Acts, as it has seemed to this court, is found in the public interest of the state in the lives and personal security of those who are under the protection of its laws, from which it follows that, when men are employed in hazardous occupations for gain, it is within the power of the state to charge the pecuniary losses arising from disabling or fatal personal injury, to some extent, at least, against the industry after the manner of casualty insurance, instead of allowing them to rest where they may happen to fall, upon the particular injured employees or their dependents, and to this end to require that the employer . . . shall make or secure to be made such compensation as reasonably may be prescribed, to be paid in the event of the injury or death of one of those employed, instead of permitting the entire risk to be assumed by the individuals immediately affected. In general, as in the New York law, provisions for compulsory compensation are made to apply only to those employed in hazardous occupations, where it may be contemplated by both parties in advance that sooner or later some of those employed probably will sustain accidental injury in the course of the employment, but where nobody can know in advance which particular employees or how many will be the victims, or how serious will be the injuries."

The court held that the State Legislature did not go beyond its constitutional powers in enacting such an amendment.

"The New York Workmen's Compensation Law by its terms is based upon the existence of actual, not hypothetical, inherent hazards confronting employees in gainful occupations; was sustained as valid by this court upon that ground in *New York Central R. R. Co. vs. White*, 243 U. S. 188; has been administered by the state constantly on that basis; and group 45 shows no clear evidence of a purpose to depart from it. . . .

"Next, we agree that, in a test of constitutionality under the Fourteenth Amendment, the question whether there is inherent hazard in an occupation or a group of occupations is not to be settled conclusively by a legislative declaration or by an empty form of words. We add, it is not to be settled, hardly is affected, by an arbitrary a priori statement, unaided by the light of experience in which the Legislature acted, that there is absolutely no inherent hazard in an occupation, especially where it appears that even one employee has been seriously injured while acting in the line of his duties in a manner that easily might have been anticipated by the employer, or the inspector who supervised

his work, to say nothing of the employee himself, had either of these exercised the ordinary care of the reasonably prudent man to whom the common law so frequently resorts for a standard. The Legislature, in the New York system, is justified in extending the benefits of the Compensation Law as far as it reasonably may determine occupational hazard to extend—to the “vanishing point” as it were—and any lines of group definition it may adopt, if easily understood and applied, cannot reasonably be called “an empty form of words” merely because they do not carry on their face the reasons for adopting them.

“It was desired to extend the benefits of the law as far as practicable from the administrative standpoint, abandon the attempt to go further in grouping occupations as hazardous because of the names by which they are described, include all remaining businesses, above a fixed minimum, in a single group, treat them all as more or less hazardous, and leave questions as to the particular degree of hazard, and the proper grouping of businesses as between themselves, to be worked out by the commission in the light of experience, according to the methods of private casualty insurance companies, as already was done with the existing groups.

“Was actual inherent hazard ignored? Not at all; rather it was treated as virtually universal, but incapable of being precisely defined or classified by fixed statutory rules in advance, and more easily treated in the light of experience; the new group was to be a part of a law which operates, as nearly as experience may guide, not in vacuo, but only where there is actual inherent hazard, and to the extent that it extends.

“But why begin with ‘four workmen or operatives regularly employed’? Possible answer: It was necessary to begin somewhere; the Legislature must decide where; it is reasonable to believe there is some actual inherent hazard, where even as few as four workmen or operatives are employed steadily, though it be no more than may arise from the danger of their injuring each other; besides, an employer, who has as many as four workmen or operatives regularly employed, reasonably may be counted on to have a payroll account that may be made the basis upon which to compute the premiums for state insurance; below four, the business perhaps hardly would pay the cost of administration, hardly give opportunity to distribute the loss, according to the general principle of insurance which runs throughout the Compensation Law.”

INSANITY:—(Jones Foundry & Machine Co. *vs.* Industrial Commission, Supreme Court of Illinois 135 N. E. Rep. 754.) An iron molder was working in the foundry when he was overcome by the heat and suffered a cerebral hemorrhage. Soon thereafter

he became insane. He had formerly been a heavy drinker and was afflicted with a high blood pressure and arteriosclerosis. A man in such a condition, according to the medical testimony, working hard in a heated atmosphere, would be more easily susceptible to a hemorrhage, resulting in insanity.

The award of compensation was affirmed. The following concludes the court's opinion:

"The time and place of Golembiewski's injury are certain. There is evidence tending to show that his exertion in his work in the heat of the molding room was the cause, and it occurred in the course of his employment unexpectedly and without any act or design on his part. It is probably true that an injury of a similar character might have happened to Golembiewski by reason of moderate exertion in a moderate temperature and not in the course of his employment, or even that he might have received a similar stroke in the absence of any exertion at all, while sitting in his home or lying in his bed, and the result would perhaps have been the same, but he did not suffer any injury in that way as a result of his disease. He was overcome while he was at work, under circumstances which furnish an adequate cause for the result, and we will not indulge in conjecture as to what might have happened under other circumstances. He might have suffered this stroke in the same way if he had stayed at home and not worked that day, but he did not, and he did suffer his stroke as the combined result of his disease and his work. The rupture of the blood vessel in the brain was an accidental injury, and although his existing disease predisposed him to an accident of this character we have held that death under such circumstances may be said to have resulted from an accidental injury and is a proper basis for an award of compensation."

OLD AGE:—(*Letourneau vs. Davidson*, Supreme Court of Michigan, 188 N. E. Rep. 462.) The claimant had been injured at the age of seventy-three, and had been awarded a weekly compensation of eight dollars. About five years later, with compensation still running, his employer filed a petition with the Industrial Accident Board to have the compensation discontinued for the reason that the only disability suffered by the claimant was due to old age.

The doctor appointed by the Board found that the claimant's disability was due equally to the injury and to old age. The Board thereupon ordered the compensation reduced to four dollars weekly. The claimant appealed to this court.

The court held it was beyond the Board's jurisdiction to reduce the compensation. The full amount of compensation was restored and the Board's order was reversed. An extract from the opinion follows:

"The provisions of our statute by which the amount of compensation is to be determined are applicable to all ages. The amount to be awarded is in no way dependent upon the probability of a more speedy and complete recovery by a person young in years than by one of advanced age. It depends entirely upon the nature and extent of the disability and the wages earned. So long as the disability continues, the payments must continue, within the limits fixed by the act. Any attempt to determine that a part of the disability is due to an injury from which there has not been a recovery, and a part to conditions incident to old age, would be entering upon a field of speculation, which we think neither the board nor this court should be at liberty to explore."

ILLEGAL EMPLOYMENT OF MINOR:—(*Gise vs. Fidelity & Casualty Co.*, Supreme Court of California, 206 Pac. Rep. 624.) The plaintiff (employer) insured his compensation liability in the defendant company. The policy contained several statements by the employer, which he declared to be true. One of these statements (Item 14) was to the effect that no person was or would be employed by him, in violation of law as to age. The same clause including the several statements also contained the following paragraph:

"Nothing in this condition and no default on the part of the assured with respect to any of the provisions or conditions of the policy, shall in any way affect the right of any employee, or his dependents, to recover from the company the compensation provided for by law and intended to be insured hereunder."

The plaintiff employed a fifteen year old boy, who was injured while at work. The boy filed a claim for compensation against both his employer and the defendant insurance company. The company refused to take part in the hearings before the Industrial Accident Commission, for the purpose of protecting the employer's interest, on the ground that the employer had breached the policy by the employment of the claimant, a minor, in violation of the law. The company maintained that it was not liable to the claimant for compensation, because of the breach of war-

ranty and also because the coverage did not extend to the claimant. The courts in a previous suit between the same parties held that the paragraph quoted above operated to save to the employee, his right to recover compensation from the company, which thereupon paid him \$1,600, the amount of the award.

The employer had gone to an expense of \$500 to defend the claim against him before the Industrial Accident Commission, which had resulted in an award of \$1,600 against the company. The employer brought this suit against the company to recover \$500, and the company set up as a counterclaim the \$1,600 which it had paid the claimant.

The opinion at this point reads:

“The trial court found, and the finding is amply supported by the evidence, that, by reason of the employment of Clark by the plaintiff, and because of the boy's age, the manner and place of his employment, and the nature of his work, coupled with the failure to obtain for him from the superintendent of schools a permit to work, the plaintiff breached the contract or policy of insurance. Consequently, it held, and correctly so, that the defendant was released from the obligation to defend the plaintiff in the proceeding before the Industrial Accident Commission. . . .

“ ‘A statement in a policy, which imports that it is intended to do or not to do a thing which materially affects the risk, is a warranty that such act or omission shall take place.’ Civil Code. Under this language it would seem that the terms of item 14 amounted clearly to a warranty. The item imported that plaintiff intended not to do a thing; that is, employ a person in violation of law as to age, and the thing he intended not to do, if done, would materially affect the risk, for immaturity of years is accompanied by immaturity of judgment, and lack of judgment in an employee will always affect the risks of his employment and, therefore, the risk insured against by such a policy as the one now in question. It is to be remembered, also, that, according to the provisions of condition M, the policy was issued in consideration of plaintiff's declaration of the truth of the statements made in items one to seventeen. In addition to the section of the Code the terms of which are above set forth, the fact that item 14 carried a warranty into the policy is established by several decided cases . . . We have to consider, therefore, nothing but the meaning of the exception (quoted paragraph.) . . . It saved to Clark (the injured employee) the right ‘to recover from the company the compensation provided for by law and intended to be insured’ under the policy; but, con-

sidering what we have said above, it saved nothing else. Upon plaintiff's violation of the law in the employment of Clark, the policy at once became ineffective as indemnity for any expense or outlay arising through any injury to Clark, save that covered by the exception. The plaintiff was not entitled to recover."

In regard to the right of the insurance company to recover from the employer, the court unanimously held in favor of the company. No cases of this description had ever been decided by the courts of any jurisdiction. The court also unanimously held that the employer could not recover his expenses from the company.

After ordering a judgment for \$1,600 entered against the employer in favor of the company, the court concluded its opinion in the following terms:

"It seems only reasonable to hold, and, in the absence of authority to the contrary, we are of the opinion, that, when the plaintiff, in plain disregard of the terms of the policy of insurance, employed Clark, in violation of the law as to age, the defendant, not having in any way consented thereto, and, not being estopped to deny its liability in the matter insofar as the plaintiff was concerned, a burden was cast upon defendant which it would not have had to assume but for the unwarranted and illegal act of the plaintiff. It was not contemplated by the parties to the contract that such a situation would arise. On the contrary, it was expressly stipulated against."

MISCELLANEOUS

AUTOMOBILE THEFT INSURANCE:—(Northwestern National Ins. Co. *vs.* Chambers, Supreme Court of Arizona, 206 Pac. Rep. 1081.) The plaintiff had his car insured in 1920 against loss or damage by fire or theft. He drove the car to another city and left it there with a real estate dealer to be insured for all the car could carry. The latter requested the insurer's agent to have the car inspected and insured for the largest amount permissible. The real estate dealer did not know the number nor whether it had been purchased new or second-hand. The agent wrote the policy describing the car as a 1916 model and purchased new by the insured; by due diligence he could have ascertained from published data that a car bearing that number was in fact a 1915 model. The policy was mailed to the insured, who did not

read the policy but relied upon the accuracy of the company's agent, relying upon the presumption that the policy accorded with his application. The automobile having been stolen and burned, the insurer denied liability upon the ground that the falsity of the warranties above mentioned avoided the policy.

The court held that where the insurer's agent made mistakes in a policy, that the policy could be reformed so as not to deprive the insured of the protection which rightly belongs to him. There was no intention on the part of the insured or the real estate dealer to mislead the insurer; the errors complained of were made by the insurer's agent in his examination and such errors are waived by the insurer, in spite of being entitled warranties in the policy. Judgment was allowed the insured on account of the reformation, for the amount allowable for a 1915 model instead of a 1916 model.

AUTOMOBILE THEFT INSURANCE:—(Hill *vs.* North River Ins. Co., Supreme Court of Kansas, 207 Pac. Rep. 205.) The plaintiff, an automobile dealer, held an insurance policy covering him against theft, robbery or pilferage. A mechanic named Cole was robbed of his check book and union card by a swindler who went to the plaintiff and represented himself as Cole with the aid of the check book and union card. The swindler tendered a check after banking hours as the first instalment in payment of a car, which by written agreement was not to be removed outside the county. The plaintiff telephoned the bank and was assured that the check was good for the amount drawn. The swindler was given possession of the car, with which he immediately disappeared.

The defendant company refused to pay the claim; it maintained that an automobile secured by a plan of impersonation, misrepresentation and fraud did not come within the definition of "theft, robbery or pilferage." The plaintiff brought suit.

The court affirmed the judgment which the plaintiff had secured in the trial court below. Resort could not be had to the local criminal law for a strict definition of "theft." Here was a contract of insurance, drawn up by the insurer, hence every liberality of construction was to be accorded the insured. The circumstances under which the car was obtained constituted a species of "theft" for which the insurer was liable.

BURGLARY LOSS:—(Halperin Bros. *vs.* Fidelity & Casualty Co., Supreme Court of Michigan, 189 N. W. Rep. 65.) The plaintiff, a retailer of men's clothing, took out a burglary policy for \$5,000 with the defendant company. Burglars entered the plaintiff's store and took a large amount of merchandise. Plaintiff took an inventory of the remaining goods and filed proofs of loss with defendant. The company refused to pay on the ground that plaintiff had overestimated the loss.

In proof of the amount of loss, the plaintiff introduced his books at the trial. His books showed that the cost price of the merchandise on the day of the burglary was \$37,700; the day thereafter the amount was only \$30,000 as shown by inventory, leaving a balance of \$7,700 as the amount of merchandise stolen.

The court affirmed the judgment for \$5,000 in the plaintiff's favor. It was necessarily difficult to determine the exact cost of the goods stolen, except through the medium of the accounts, inventories and invoices that had been employed at the trial. There was also some corroborative testimony by witnesses, which tended to convince the jury of the justice of the plaintiff's claim.

AUTOMOBILE LIABILITY INSURANCE:—(McMahon *vs.* Pearlman, Supreme Judicial Court of Massachusetts, 136 N. E. Rep. 154.) One Pearlman held an automobile liability policy in the Great Eastern Casualty Company. While the insured was operating her machine, an injury occurred within the conditions of the policy. The insured's license to run a car had expired four months prior to the issuance of the policy, but she believed it was still in force. The injured person secured a judgment against the insured which proved to be uncollectible.

Thereupon the injured person brought this suit in equity to secure payment under the policy existing between the insured and the insurance company. The company contended that since the insured was engaged in driving while unlicensed, a criminal act, it would be against public policy to allow a recovery. The court rejected this defense, because to so hold would defeat the object of the insurance and would deprive the injured person of his rights.

The court found for the plaintiff for the full amount of the judgment. Upon the ground of public policy, the unlawful act of driving while unlicensed is held not to relieve the insurer of liability to the injured person.

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.

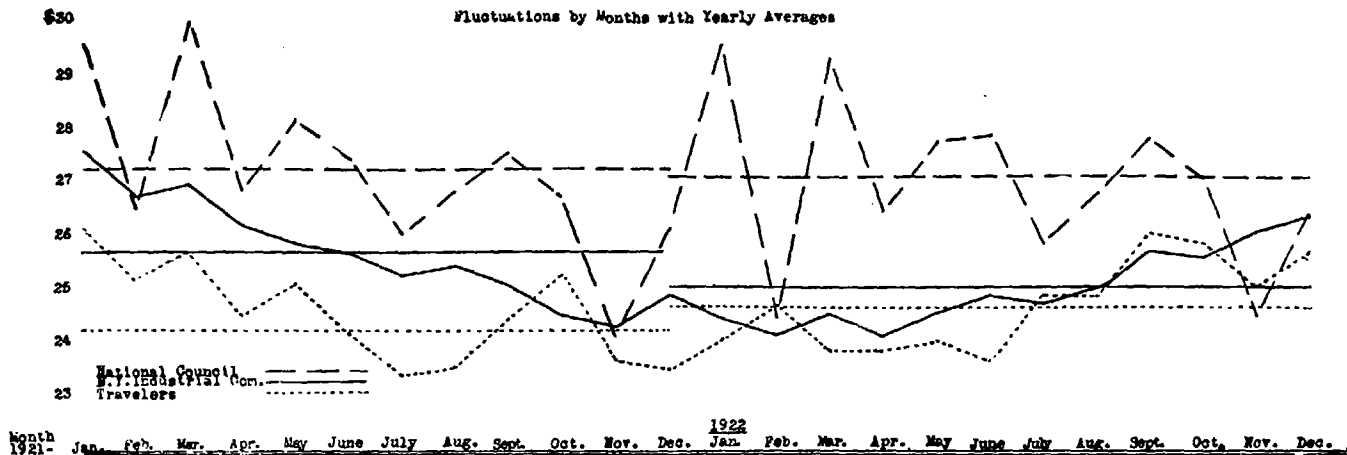
CHART I

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

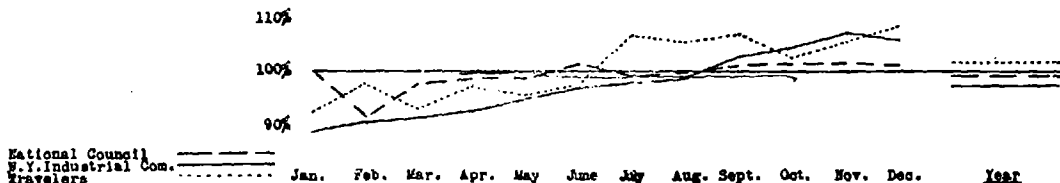
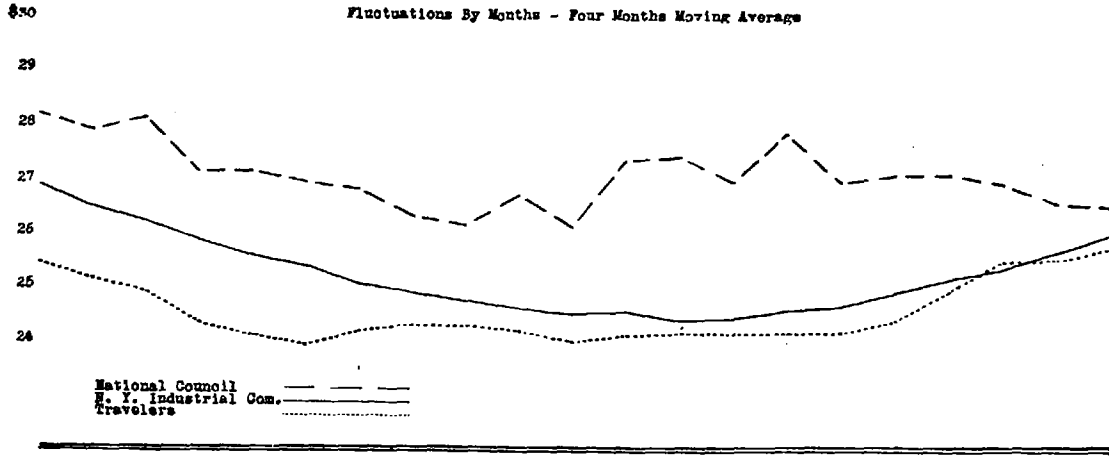
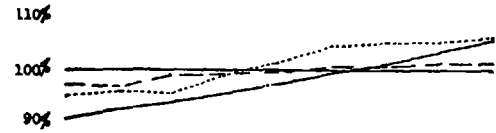


CHART II
 COMPARISON OF WAGE STATISTICS—NATIONAL COUNCIL, NEW YORK INDUSTRIAL
 COMMISSION AND TRAVELERS LOSS CARDS
 NEW YORK STATE—YEARS 1921 and 1922



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



DISCUSSION

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.

REVIEWS OF PUBLICATIONS

RALPH H. BLANCHARD, BOOK REVIEW EDITOR

The Making of Index Numbers. A Study of Their Varieties, Tests, and Reliability. (Publication Number One of the Pollak Foundation for Economic Research.) Irving Fisher. Houghton, Mifflin Co. Boston and New York, 1922. Pp. xxxi, 526.

On the paper cover of this book there is the publisher's assertion that it is "a complete treatise and the last word" on the subject. Such paper cover notices usually overshoot the mark, but in this instance the characterization appears fairly justified for that part of the subject to which the book is chiefly devoted, i.e., the formulae for making index numbers. The other side of the subject, namely, the data for index numbers involving the two questions of assortment of samples and number of samples, is, as Professor Fisher notes, left for similar intensive study by others.

This book furnishes the answer in full to the question of what is, or are, the best formulae for calculating index numbers, considered especially with reference to price index numbers but with universal application in mind. The problem of what is best, considered to be chiefly that of accuracy, though practicability, including speed of computation, ease of manipulation and simplicity, is also discussed.

The method of treatment followed is the exhaustive and severely practical one of finding all the formulae which have been or can be constructed within reason and of putting them to the test of actual computation of indexes for an extensive set of price data. The labor involved in this method was heavy but Professor Fisher was fortunate enough to enlist in this the aid of the Pollak Foundation for Economic Research. Without this aid the author notes that the carrying out of his exhaustive method would not have been possible, and the book is fittingly issued as the first of that Foundation's publications. Herein, it may be remarked, is a good example of the way in which the more ample resources of such funds may render important public service by enabling the individual scientific investigator to achieve results otherwise beyond his reach.

Another notable achievement in method of presenting results is an ingenious and highly successful arrangement of material in text, notes and appendices so that different classes of users may find by directions set down in the foreword those portions most easily comprehensible or useful to them. Lucidity and clearness are much enhanced throughout by use of a triple description and illustration of each topic in numerical, algebraic and graphic forms.

After defining and illustrating what an index number is, the examination of formulae begins by describing the various types of index numbers, noting six according to the kind of average which may be used in their making and showing the six formulae for index numbers employing only simple averages. Next are noted the four primary methods of weighting which may be employed in computing the averages, thereby developing by application of different weights to the different kinds of averages a series of 28 primary formulae for computing index numbers.

The next step sets forth the tests by which the accuracy of an index number made according to any formula may be judged. The fundamental tests are found to be two, denominated the "time reversal," and the "factor reversal" tests. The former tests a formula by ascertaining if it produces the same result when applied between two points of time with either taken as the base, the latter by ascertaining if the same result is produced by applying the formula separately to quantities and to prices of the set of goods considered and multiplying the resulting indexes together, as by comparison of the total values of the goods, value being the product of the two factors, quantity and price.

Proceeding to application of these reversal tests to the 28 primary formulae previously developed, it is found that not one successfully meets both tests. The errors discovered differ widely in degree. Some are found to be erratic without discoverable reason. Others reveal a distinct bias, *i. e.*, a tendency to err in one particular direction, the reason for which is discoverable upon analysis. Some are so highly erratic as to be styled "freakish."

The problem now becomes that of discovering means of "rectifying" formulae so as to eliminate or reduce errors. This is found in the very tests by which the errors are revealed. The process

of rectification is to apply to a formula the time reversal and factor reversal tests, which produce two new formulae. These being the antitheses of the original formula are denominated its "time" and "factor" antitheses. Antithetical formulae will fail to satisfy the fundamental tests in opposite directions; hence, by "crossing" the two, *i. e.*, by averaging them geometrically, a formula will be secured which will satisfy the test. Carrying out this rectification by crossing, the series of formulae considered is increased to a total of 96.

A further process of rectification is then considered, which is that of crossing the weights used in two formulae and substituting such new crossed weights for the originals. This produces a further addition to the list of possible formulae, bringing the total up to 124. Finally ten more miscellaneous crossed formulae are added to the list, making a total of 134 possible formulae for computing index numbers which, singly or in groups, are described, illustrated and tested in this book.

The list of possible formulae worth considering having been developed, the discussion turns to the question of which are the best, considering first what is best when prices are used without weights and then what is the best when we have data for weighting, the result being a final grouping of all the formulae according to the degree in which they approach the ideal in accuracy.

To complete an outline of the book it remains to note a discussion of the so-called "circular test" of index numbers and consideration of fixed base (either first year or an average of several) or chain system numbers, after which, discussion of the formula is completed by setting forth the results of tests of speed of calculation for all the formulae considered, followed by a chapter on the subject of data for index numbers wherein, however, as frankly stated, what has been accomplished by others rather than original matter is used.

Professor Fisher's tests do not result in the discovery of any formula which is wholly accurate. In fact his results confirm the conclusion of others that index numbers can never be absolutely precise. But absolute precision is not necessary and not one but many formulae are found which are well within the limit of accuracy required for practical purposes. In his final selection superiority for accuracy is awarded to one formula which he denominates the "ideal." This is held to be demonstrably correct within

less than one-eighth of one per cent. Its superiority over others, however, is admittedly based on very fine distinctions and 29 others are found to be within less than one-half of one per cent. of the ideal, and quite "good enough to serve all for practical purposes"; and 53 in all would be usable on the basis that "in practise it is seldom that our standards require a closer approximation than two per cent."

All the formulae found to be accurate enough are not equally desirable in respect of other qualities, including speed of computation, simplicity (in the sense of being easily understood) and conformity to the so-called circular test, all of which require to be considered in practise. Taking these as well as accuracy into account, Professor Fisher again finds one formula which on the whole seems to be the best all-around practical formula, which "will seldom appreciably differ in its results" from the ideal formula for accuracy. A number of others are noted, however, which for many practical purposes will serve excellently.

In the degree of accuracy which he finds can be attained if only a properly constructed formula be used and the closeness of agreement in results shown by a larger number of different formulae Professor Fisher finds support for some significant general conclusions as to index numbers. One is the paramount importance of a proper formula; another is that there is no need of different formulae for different purposes but that a properly constructed formula will serve equally well for all; a third is that index numbers can be made entirely dependable as measuring instruments.

While claiming, undoubtedly with right, that both in detail and general results much is new in his book, Professor Fisher frankly notes that previous views on index numbers are largely confirmed and supported by new data. Thus neither of his two most highly recommended formulae, one for accuracy, the other for all-around practical usefulness, are original with him, and in his consideration of how far certain current index numbers pass muster by his criteria, while some are found quite faulty the dependability of others is confirmed. In other words, the book is not revolutionary either as to theory or practice, but what it does do is to supplement and complete the subject so far as the question of formula is concerned. So far as this part of the problem of index numbers goes, it would seem that this must be the standard work for some time to come, whether for the student, the practical specialist or the layman.

LEONARD W. HATCH

The Mathematical Theory of Probability and its Application to Frequency Curves and Statistical Methods. (Second edition). Arne Fisher. The Macmillan Co., New York, 1922. Pp. xxix, 289.

This is a second and enlarged edition of the author's work published in 1916 under the same title. It is divided into three parts of which the first is a reprint of the former edition without amendment other than correction of some but not all of the typographical errors therein.

While this first part is, therefore, probably familiar to many readers of the Proceedings, we may note for the benefit of those who have not studied the first edition that in Chapter I is discussed the philosophical ground work of the Theory of Probabilities. It is well that the student should early learn the limitations of the theory he is taking up yet the doubts and uncertainties raised in this chapter must be confusing to the beginner. If the reader has not had some previous introduction to the subject he may well read this chapter rather rapidly at first and come back to it for deeper study after he has got further into the subject.

Passing a rather hasty historical sketch in Chapter II we come in Chapter III to the fundamental definition of the theory. This is quoted from Czuber and is backed up by six examples quite fully worked out. The student who is to be fully grounded will need many more exercises to thoroughly familiarize himself with these ideas. These he will have to obtain from some other author who probably has not given so great care to presentation of the philosophical ground work as has Mr. Fisher. At this point it may be noted that herein lies one defect of this book for use as a text for beginners. There are other evidences that the author has written rather for those who are already grounded in the work, which may explain the absence of these essential helps to a thorough grasp of the subject.

In Chapter IV are presented very neat demonstrations of the Addition and Multiplication Theorems, though the demonstrations presume a considerable familiarity with the combinatorial analysis. In this chapter there is also a lack of exercises by means of which a student may test his grasp and develop his power.

In Chapter V the idea of Mathematical Expectation is briefly but clearly presented and thereafter much time is taken up with

that interesting curiosity, the St. Petersburg problem. If the assumption is correct that the book is intended for advanced students, this is well, but if it is intended for those who have not already some grasp of the theory, it would appear bad judgment to expend so much time on this rather than offer opportunities for driving home the fundamental concepts.

In Chapter VI we have a most illuminating discussion of the usually ill presented topic of *a posteriori* or Inverse Probabilities. The chapter, however, is not easy reading and requires more than one perusal. In the next chapter the author discusses the relation between *a priori* probabilities as deduced from the fundamental definitions and their empirical derivation from observation of statistical frequencies, thus laying a foundation for the fuller discussion of statistical series and The Dispersion Theory.

After a chapter to introduce some desired formulae from the infinitesimal calculus, the remaining chapters of this part are devoted to the study of the "Law of Large Numbers," the results of repeated trials, and the "Theory of Dispersion with the Criteria of Lexis and Charlier" as to the nature of statistical series, and to illustrated examples of their use.

In the chapters of Part II the author passes through the Theory of Errors, to the subject of Frequency Curves, where the data consist not of discontinuous items, as in the repeated trials of an event having a certain probability or in the observations of the occurrence or non-occurrence of certain characteristics but consist of continuous variations in an always present characteristic, "heterograde statistics" as he calls them, using the term "homograde" to distinguish series of the dichotomous type.

In this part he develops the Charlier A and B curves showing how the co-efficients may be found by means of the so-called "Semi-Invariants" of Thiele ("a peculiar system of symmetrical functions" somewhat resembling the system of moments usually used in fitting the Pearson types of curves) and certain other functions known as Hermite's polynomials, tables of which are available in certain Scandinavian publications, but apparently are not published in English.

He who would follow here would do well to carefully review his ground work in the higher mathematical analysis. He will have need to be well versed and to follow very carefully, if he wishes to read critically and with understanding.

Part III deals with the practical application of the theory and methods of computation and again assumes a ready working familiarity with the Method of Least Squares or, at least, that that familiarity may be acquired through study of a few brief paragraphs in the text.

The author is a great admirer of the Charlier system of curves, has little use for the Pearson system and has no hesitancy in making his views apparent.

In Sections 116 and 138 replying to criticisms that have been advanced the author shows his weakness and inability to accept criticism or courteous disagreement and lashes back at those who question the perfection of Charlier methods or express a preference for those of Pearson with a savagery that leaves a bad scar in the reader's impression of the book.

For those with the training in higher mathematics to follow the author, the book is, notwithstanding the bad taste shown in the sections above referred to, a valuable addition to our literature on the subject of the mathematical study of statistics.

A. H. MOWBRAY.

A First Course in Statistics. D. Caradog Jones. G. Bell and Sons, Ltd., London, 1921. Pp. ix, 286.

The purpose of the author is apparently to describe in an elementary way the methods of mathematical statistics which are in general use by scientists of the English speaking world, with particular emphasis, as is to be expected, upon the contributions of Pearson and his followers. Such a purpose is commendable. As the author says "The man who wishes his work to stand must make sure of his foundations. He cannot afford to rest satisfied, as too often the politician and social worker do, with wild and ill-formed generalizations where more exact knowledge is possible." If mathematical statistical methods are of value in the study of the social sciences, the attempt to make Pearson's writings comprehensible by larger and larger numbers of persons is most heartily to be welcomed. The number of students in America, outside of trained mathematicians, who can read Pearson's original memoirs, is small.

The book is divided into two parts, the first devoted principally to the subject matter of first courses in statistics in this country:

averages, dispersion, graphics and correlation. No attention is given to methods of collecting statistical data since the emphasis is primarily mathematical. The chapters on graphs are concerned with the graphs of various equations, graphic methods of indicating correlation, interpolation and the use of curves as an aid to reasoning, such as is ordinarily found in text books in the principles of economics.

Part II devotes three chapters to a very excellent introduction to probability and sampling. This is followed by three chapters on curve fitting which develop Pearson's generalized probability curves and the method of moments used in fitting them to data and give a number of illustrations of their use. The last two chapters treat of the normal curve of error and normal correlation.

BRUCE D. MUDGETT

Tables of $\sqrt{1-r^2}$ and $(1-r^2)$ for use in Partial Correlation and in Trigonometry. John Rice Miner, Sc.D. The Johns Hopkins Press, Baltimore, Md., 1922. Pp. 49.

These functions are in general tabulated to six places of decimals for values of r from 0 to .9999, the results being extended where necessary to include six significant figures. Differences are not tabulated but are small and interpolation may usually be done by inspection.

The $\sqrt{1-r^2}$ table is an extension of one given in the June, 1921, Quarterly Publications of the American Statistical Association and may be used in the calculation of partial correlation coefficients; a convenient arrangement of the working details is suggested in the introduction. It is useful also in determining the sine from the cosine and *vice versa*.

The $(1-r^2)$ table is an extension of Table VIII of Pearson's Tables for Statisticians and Biometricians and may be used in the calculation of the probable error of the correlation coefficient.

JOHN S. THOMPSON

Introduction to Economic Statistics. George R. Davies. The Century Company, New York, 1922. Pp. vi, 163.

This work should be very useful to those students who have little or no knowledge of statistical terms and procedure. It is written in such a way as to be easily assimilated by the layman

not steeped in mathematics and, as it was intended for use in the classroom, it contains many practical exercises which give the student ample opportunity to apply methods as well as to fix them in the memory.

The first Chapter, on Tabulation, treats briefly of Preliminary Schedules for field work, tables for inserting data, and describes the frequency curve.

Under "Types and Measures of Dispersion" are clearly defined such statistical terms as "mean," "mode" and "median." Methods of calculating the average, standard deviation, and skewness are given.

"Indexes of Wages and Prices" are dealt with quite extensively, and some attention is given to the method of calculating them. The exercises in connection with this Chapter should prove useful to the student who desires to obtain practice in calculating indexes. Considerable space is devoted to the subject of "Quantity Indexes," and methods of arriving at indexes of Production and Income are also given.

Under "Trends and Cycles," moving averages are explained and the use of the method of Least Squares is developed. Charts showing business cycles are very briefly explained.

The final Chapter on "Correlation" is best summed up in the writer's own words: "The purpose of this Chapter will have been served if the student has gained a knowledge of the simpler methods commonly employed in measuring correlation. The full theory of the subject is very complex, and is hardly within the scope of an introductory course."

The course laid out in the text is supposed to cover what can be mastered during a college term. It cannot treat every subject in minute detail but, on the whole, the work is easily read and is recommended to one who desires a key to open the door of this important subject.

GEORGE D. MOORE

Workmen's Compensation in Great Britain. Joseph L. Cohen.
"Post Magazine," London, 1923. Pp. 232.

The chief value of this book to the American reader is in the exposition of the British Workmen's Compensation Act and in the criticisms and suggested reforms contained in the concluding

chapter. The opening chapters deal with the economic aspect of industrial accidents, their causes, and statistics indicating the extent to which such accidents have occurred in the period 1910-1920. The problem engaging the attention of legislators in all countries is stated to be the making of provision for relieving workmen and their families from the economic consequences of industrial accidents and the adoption of devices for reducing the number of such accidents and of occupational diseases. The author states that, although Great Britain has the most comprehensive system of social insurance found in any industrial country, its organization of workmen's compensation itself is open to serious criticism because of disinclination to face the problem of reducing the number of accidents. This is contrasted with the interest in this subject in the United States. The author evidently believes in the principle of the safety movement and in rehabilitation but feels that neither has yet attained anything like satisfactory proportions. The figures given emphasize the results produced under intensive development of the safety-movement but there is no indication that the movement itself has become widespread.

The author holds that it is the duty of the State, as a matter of economic conservation, to develop expert methods of accident prevention and to adopt more stringent regulations. He also believes that accident prevention is an international question inasmuch as those countries whose industries are taxed in order to bear the expense of supporting suitable factory legislation find themselves at a disadvantage in competition with the industries of other countries. This is a matter which the International Labor Office is attempting to standardize by the adoption of uniform systems of accident statistics for disseminating knowledge relative to successful methods of preventing accidents and industrial sickness and also of providing compensation.

The author gives a brief summary of the types of compensation in vogue in the various European countries and in the United States together with a comparison of the ratio of management expenses to premiums under the various systems of insurance available in this country. This information is obtained from the *American Labor Legislation Review* for March 1920 and lays the principal emphasis on the administrative expense rather than upon the relative efficiency of the different types of insurance.

The systems of insurance available in Great Britain, namely self-insurance, mutual insurance and proprietary insurance are described in some detail. The proprietary system, which we are accustomed to call the stock company system, is referred to as "an ordinary commercial venture" organized "to secure the largest possible pecuniary profit out of the business." Therefore, the author states, the "human" factor is generally absent; although he concedes that competition naturally would influence companies to administer their contracts in a spirit of liberality.

The next part of the book deals with the history of employers' liability in general and of the Act of 1880 in particular. The case against the Act is stated from the viewpoint of the workman and of the employer. The introduction of the Workmen's Compensation Act of 1906 did not serve to abrogate the employers' liability acts nor were workmen debarred from taking action at common law. It is pointed out that in some cases it is to their advantage to do so and that far more cases have been brought before the lower courts under the Workmen's Compensation Act than under any other act of Parliament.

The British Workmen's Compensation Act of 1906 applies to virtually all industrial occupations, including domestic servants. It applies to any one who suffers personal injury "arising out of and in the course of employment whose remuneration does not exceed £250 a year" and it is estimated that about 15,000,000 working men and women are covered. Special provision is made for seamen, masters, apprentices and pilots. Some examples are given of interpretations of such expressions as "arising out of and in the course of employment" and "serious and willful misconduct" and the methods of administering the Act are described at some length, especially the manner of claim adjudication.

The schedule of benefits is described and certain amendments which would generally increase the benefits as advocated by the Departmental Committee on Workmen's Compensation (also known as the Holman Gregory Committee) are specifically set forth. The election of remedies available to claimants under the British Act has evidently created difficulties because of the fact that two principles of jurisprudence embodying different kinds of remedy remain open. It therefore depends largely upon the circumstances under which the accident arose whether

the injured will claim compensation or will proceed at common law. This situation is analogous to that obtaining in the states of New Hampshire and Arizona. In a lengthy chapter on the settlement of disputes, the author emphasizes the absence, under the British Act, of anything corresponding to the Industrial Commission or Accident Board system that has been so largely adopted by the American states.

In a chapter entitled "The Law at Work" appears a description of the procedure of effecting insurance. Here the author criticizes the administrative expenses of the proprietary companies and calls attention to the fact that the Departmental Committee in its report held that, since Parliament had made it practically imperative for employers to obtain workmen's compensation insurance, it was the duty of the State to see that the business was conducted on a reasonable and economical basis. He nevertheless concedes that there has been general satisfaction with the service rendered by the companies in the matter of settling claims. Mutual insurance associations are described as being generally limited to particular trade associations or firms in a given trade. Only one or two mutual associations are open to all employers, irrespective of trade. In general their plan of operation is to raise only sufficient funds to cover payments to be made during the year and the author feels that there is an urgent need for imposing upon these associations the same requirements for adequate reserves as are applied to proprietary companies.

It is estimated that there are at least 250,000 uninsured employees within the scope of the Compensation Act. So far as the large employers are concerned the liability for compensation is generally met because of their substantial character and standing, but the small employer is often in default and unable to meet his obligations. The lack of a guarantee for the protection of employees of small builders, farmers and those with only one or two workmen is one of the striking weaknesses of the British scheme. The Holman Gregory Committee proposes that this be remedied by requiring compulsory insurance coupled with a form of rate supervision similar to that in vogue in the United States.

There is a chapter on industrial diseases which contains a schedule giving a description of some 26 diseases and the industrial processes that constitute the most usual causes. Apparently

it is the policy of the government to extend the application of the Act to industrial diseases whenever the Home Secretary shall be convinced from special inquiries, either by a committee or by an expert medical officer, that specific diseases are peculiar to the occupation or industrial process to which workers are exposed.

Another chapter is devoted to costs and their incidence in each of the seven major groups of trades with a special tabulation for the coal and iron trades. These trades are broadly grouped into shipping, factories, docks, mines, quarries, construction work and railways. In this chapter a familiar question is raised as to who ultimately bears the costs of insurance. The author cites Professor Taussig and Professor Pigou and concludes that "even where employees bear the costs of workmen's compensation and similar social legislation, its ultimate effect has been undoubtedly to raise the real wages of the working classes as a whole." It is strikingly shown that the amount of compensation provided by the British Act leaves much to be desired and that in reality the workman bears about two-thirds of the money loss as well as the pain caused by the injury.

Under the heading "Insurance and the Prevention of Accidents," it is definitely stated that under the British system as thus far administered "accidents have not been prevented and that neither employer nor workman is more careful than hitherto." The author points out that compensation legislation has had a very different result in the United States and that it could have had more desirable results in Great Britain. Notwithstanding this state of affairs the form of rating which in this country would be known as experience rating has been tried, and the author states that "the power to raise or lower the rate may have important influence in increasing or decreasing the amount of attention paid to accident reduction."

While acknowledging the social good that has been achieved by the workmen's compensation acts, the author points out that there are three main lines of criticism; the first coming from those who favor a state social insurance fund, the second from those who favor a state fund for workmen's compensation only, and the third constituting the Holman Gregory Committee proposals. All three, however, are aiming at modification, but not fundamental change in the present organization of workmen's compensation. Those who desire a state social insurance fund

contend that Great Britain has the most comprehensive social insurance scheme of any country but that unfortunately the various types of benefits, such as compensation, old age, invalidity and unemployment insurance, are being dealt with through an unnecessarily large number of different types of organization. This is held to be absurd from the organization standpoint and wasteful as an economic proposition. Moreover, some of the opponents of the existing order believe that in the long run it matters not whether a scheme is contributory or non-contributory and that by centralizing all of the social insurance activities it would be possible to establish a single compulsory non-contributory scheme of social insurance for all those earning less than some specified amount, such as £350 a year.

Those who favor a compulsory monopolistic state fund for workmen's compensation alone are interested in eliminating the cost of solicitation, competitive advertising and share holders' profits on the theory that the amounts thus saved could be devoted to increasing the compensation benefits. The author states, however, that neither the proposed social insurance fund nor the state fund for workmen's compensation has yet received much public support in Great Britain. The Holman Gregory Committee, appointed in May 1919 to inquire into the working of the present system of compensation, made its report in July 1920. The Committee, recognized that a need for a change in the benefits payable had been brought about by the increase in living costs and recommended the compulsory insurance of small employers. At the same time, the Committee felt that if the state were to compel anyone to become insured it should exert its influence in the direction of lowering the cost of insurance. It recommended among other things the appointment of a special commissioner to supervise rates with a view to restricting the expenses and profits of insurance companies. The book concludes with the statement that, due to the fall in the cost of living since the Committee made its report, the rate of benefits advocated by it probably will not secure adoption, the view is expressed that the recommendations will influence the drafting of a new act which will demand prompt consideration.

The appendices, four in number, deal with the following subjects: (1) Working arrangements agreed upon between the Holman Gregory Committee and the British stock companies with refer-

ence to rate supervision. (2) Acts allied to the Act of 1906 relating to workmen's compensation. (3) Special schemes under the 1906 Act. (4) The National Insurance Act of 1911.

While the book under review contains useful information that has doubtless been gathered at the expense of considerable research, it can hardly be regarded as a work of importance from the standpoint of the American reader. The reviewer disapproves of the arrangement of the subject matter and believes that it would have been extremely desirable to group all references to accidents and accident prevention and also that the history of employers' liability logically should precede any description of compensation systems. The present arrangement of the material is disturbing to anyone who is accustomed to approach a subject of this kind with the expectation of continuity of treatment.

HARWOOD E. RYAN

Proceedings of the Eighth Annual Meeting of the International Association of Industrial Accident Boards and Commissions. (Bulletin of the United States Bureau of Labor Statistics No. 304). Government Printing Office, Washington, 1922. Pp. vi, 254.

Bulletin No. 304 of the United States Bureau of Labor Statistics contains a report of the Proceedings of the Eighth Annual Meeting of the International Association of Industrial Accident Boards and Commissions, which was held at Chicago, Ills., Sept. 19-23, 1921. The program of this meeting of the Association covered the following subjects, practically a whole half day's session being devoted to each topic:

1. Progress of Compensation Legislation
2. Administrative Problems under State Funds
3. Accident Prevention
4. Should Compensation Commissions Administer Accident Prevention and Other Labor Laws?
5. Court System of Administration
6. Rating of Permanent Disabilities
7. Medical Problems
8. Methods of Claim Procedure
9. Administrative Troubles

Under the first topic, recent legislation affecting compensation matters in the states of New York, Georgia, Michigan, Minnesota, Vermont, Washington, and Oklahoma, was discussed. The papers presented and the discussion which took place on this subject are of particular interest as indications of the tendency in legislation generally toward liberalization of compensation benefits and simplification of administrative procedure.

Problems peculiar to monopolistic state funds were discussed at the second session of the convention. The paper of most importance to those interested in compensation rating was that presented by Mr. Geo. A. Kingston on Merit Rating, describing the system of merit rating adopted by the Ontario Workmen's Compensation Board. This system is one of experience rating alone with no regard for schedule rating, and is applied retrospectively so far as both credits and charges are concerned. Another paper of considerable interest presented at this session was that by Major E. S. Gill of the Washington Department of Labor and Industries, explaining how the cost of medical aid is apportioned under the Washington system.

At the third session of the convention, a very interesting paper was read by Mr. Sidney J. Williams, Secretary of the National Safety Council, on the cost of industrial accidents. Starting with an estimate of the number of industrial fatalities occurring in the United States during a year, Mr. Williams by a system of further estimates finds the measurable cost of all industrial accidents to be upward of one billion dollars. Mr. Williams' formula takes into consideration the estimated wage loss of killed and injured workmen less probable living costs of those killed, plus direct payments made by workmen for medical and hospital service, and plus the administrative and overhead expense of insurance companies in the payment of compensation claims. This formula would seem to be open to question to some extent. Mr. Williams says that, "it would be incorrect to add to this amount the compensation paid to workmen, because the latter represents simply a shifting of a part of the burden from the workman or his family to the employer." Even though this is true, from one point of view at least, compensation payments would seem to have a proper place in the cost formula. In the case of a workman who is killed for instance, not only does society lose his surplus earnings, but it must in addition bear the cost of the

compensation payments made to his dependents, which in turn are shifted to the public by the employer, along with the expense of making these payments, which is borne directly by the insurance company.

The papers read under the fourth subject listed above provoked an extended discussion of the probable benefits to be gained or the dangers to be encountered through a consolidation of state departments having to do with social and industrial problems. There seemed to be quite a diversified opinion as to just how far consolidation should go, although the general view was expressed that too much consolidation was harmful.

The discussion of the topic "Court System of Administration" was quite brief but interesting as a record of the inadequacies of the court system of administering compensation laws as compared with the commission system.

Once more the California system of rating permanent disabilities was explained to the association in a paper read by Mr. A. J. Pillsbury of the California Industrial Accident Commission. This subject seems to be a perennial one with the association. It was treated in practically the same manner at this meeting as at former meetings.

The following papers were presented at the session of the Convention dealing with medical problems:

X-Ray Interpretation and Standardization, by Francis D. Donoghue, M.D.

X-Ray Standardization and Interpretation, by Hollis E. Potter, M.D.

Concussion and Contusion of the Brain with Post-Concussional Conditions, by Samuel C. Plummer, M.D.

The Neuroses: Their Handling from an Industrial Commission Standpoint, by Lewis J. Pollock, M.D.

Medical Aspect of Women's Ills in Industry, by Clara P. Seippel, M.D.

The Influence of Industrial Accidents in the Production of Cardiac Failure, by William H. Holmes, M.D.

These papers are somewhat technical and of greater interest to those of the medical profession engaged in compensation work than to the layman.

On the subject of Methods of Claim Procedure, Mr. Carl Hookstadt presented a very complete report of an investigation

conducted by the United States Bureau of Labor Statistics, of the methods followed by compensation commissions and funds in twenty states. Mr. Hookstadt's paper contains a great deal of information valuable to those interested in this question.

At the last session of the convention, the work of the Massachusetts Industrial Accident Board and the Delaware Industrial Accident Board was discussed in detail in papers presented under the topic Administrative Troubles.

On the whole this bulletin contains a great deal of valuable information. Discussions will be found in it on practically every important phase of compensation administration.

VICTOR MONTGOMERY

Insurance by Industry Examined. Joseph L. Cohen. P. S. King & Son, Ltd., London, 1923. Pp. 120.

This book is in the nature of a supplement to "Insurance Against Unemployment" by the same author. The author contrasts the causes of discontent with the policy of unemployment insurance as pursued by the British Government and examines the various proposals which have been suggested to combine unemployment insurance with other forms of insurance. The book reviews the growth of unemployment insurance in Great Britain, and devotes a chapter to the supplementary and special schemes in connection with the Act. The insistent propaganda in favor of new schemes has caused the author to analyze the criticisms of the last two years, as a result of which he concludes that, while there have been serious omissions and errors on the part of those responsible for the legislation bearing on, and the administration of, unemployment insurance schemes, nevertheless, most of the current criticism seems to be almost entirely without foundation. The chief criticism which the author sustains is that sufficient attention has not been paid to prevention; another is that the low benefits tend toward calling in the machinery of the poor law.

In Chapter IV the suggestion of unemployment insurance by industry as a means of eliminating dissatisfaction, is examined. Various schemes for carrying out this proposal, together with the different interpretations of "Insurance by Industry," and the arguments pro and con, are discussed. The conclusion is reached

that insurance by industry would be a very troublesome and costly method, involving many difficulties at the outset, with no direct advantages over the state scheme, and that such indirect benefits as this method might grant, which are not very great, can be achieved by a slight amendment of the existing scheme.

In the last chapter the author discusses unemployment insurance as a part of social insurance, considering the demands for a unified scheme combining old age pensions, health insurance, unemployment insurance, workmen's compensation, burial insurance, or different combinations of these under the same management. The estimated amount spent in 1922 and the various expense ratios for each kind of insurance are given, as are also certain of the different schemes proposed and the arguments for and against. Following the plan laid out in the previous chapter, five tests are applied to schemes of social insurance, and the author concludes that from the experience of Great Britain neither private companies nor the Government have paid much attention to reducing undesirable emergencies; the Government funds have considerably lower administrative expenses than private companies; there is little to choose with respect to the security of funds between Government and private companies; but the Government is more prompt in payment of benefit, is subject to no temptation to give lower benefits than the claimant has a right to expect and is exempt from the abuse of lapsed policies.

The arguments for and against Professor Pigou's dictum that a powerful plea can be built up for making insurance, like education, free, are presented, and it is pointed out that this free insurance would not have the demoralizing effect alleged to be inevitable therefrom. But it is stated that the simplicity implied in such a scheme might be wholly or at least partly an illusion, that it might not be desirable to abolish the contributions from employers and workmen, as such a shift in the burden of taxation might not prove desirable, that the interest in, and the definite knowledge of what the Government is doing with the money raised for insurance would be lost and that there would be no correlation between benefits and contributions.

The author then discusses in three appendices the various schemes of unemployment insurance outside of Great Britain, Professor Commons' unemployment schemes as outlined in the bill presented to the Wisconsin legislature and the administrative cost of schemes for social insurance.

JAMES D. CRAIG

Facing Old Age. Abraham Epstein. Alfred A. Knopf, New York, 1922. Pp. xvi, 352.

A Critical Analysis of Industrial Pension Systems. Luther Conant, Jr. The Macmillan Company, New York, 1922. Pp. xi, 262.

Mr. Epstein's book covers the subject of old age dependency in general and gives a descriptive survey of the various existing systems for the relief of poverty in old age with special emphasis upon governmental old age pensions. Mr. Conant's book is more limited in scope and concerns itself mainly with an analysis of the economic principles underlying the systems of pensions for employees which have been adopted by large industrial corporations in the United States.

As is stated in the introduction, Mr. Epstein's volume is a frank appeal for social action and, while its obvious purpose is to hasten the enactment of old age pension legislation in the various states, the author has not hesitated to state fully and with copious citations from authorities the arguments in opposition to the theory that old age dependency should be dealt with by means of a system of pecuniary relief provided through general taxation.

A joint review of two books on the same general subject, which nevertheless deal with the matter from such different points of view, naturally suggests the question whether on the one hand managers of industry should leave to society in general the problem of providing for the superannuation of worn out industrial workers or, on the other, whether the state should look upon this question as primarily a problem of industry to be dealt with in the same manner as in the case of compensation for industrial accidents. The problem is so vast and so exigent, however, that it would appear that more than one agency must be invoked before any approximately complete solution can be reached. The maximum relief provided under any feasible legislation for old age pensions is very small—much smaller than the pension which would be regarded as reasonable under an industrial pension system for employees who have given long and faithful service. We cannot avoid some distinction between service pensions and a state system of old age poor relief. Both are necessary.

Mr. Conant recognizes no compelling moral obligation on the part of the employer to provide pensions as a matter of kindness, charity or social duty but bases his philosophy of a pension sys-

tem squarely on the grounds of increased efficiency and improved morale. After a searching examination into the economic principles involved he reaches the conclusion that industrial pensions, whether contributory or not, are to be regarded as a form of deferred pay, and his criticisms of existing plans follow logically from the deferred-pay principle. Mr. Conant classifies existing private systems as follows: (1) non-contributory discretionary pensions, being pensions which are absolutely contingent upon the continued willingness of the employer to pay them and where no contractual obligation of any kind exists; (2) non-contributory limited-contractual pensions, which are those where limited contractual rights are conferred upon the pensioner to the extent that once a pension has been granted and entered upon, it may not be discontinued at the option of the employer; (3) contributory pension systems, which are necessarily and unavoidably contractual in so far as the benefits provided by the employees' own contributions are concerned.

Mr. Conant concludes that the plan which, on the whole, best meets the criteria which he lays down, consists of a system of single premium deferred annuities under which the employee receives each year a bond or policy contract providing a paid-up deferred annuity to be entered upon at the pension age in respect of the service performed by the employee during the year. It may be noted that although group pension plans of this type have been offered to employers by insurance companies for several years past, there seems to have been very little sale for them and it seems doubtful whether, in spite of the advantages which Mr. Conant finds in them, they are likely to meet with wide spread adoption. The principle reason for this is because they necessarily involve the granting of a withdrawal equity to employees who resign or are dismissed and few employers can be persuaded to pay the additional cost which the allowance of such a withdrawal equity represents. The book includes a chapter on the cost of pension systems in which actual experience of several large private pension plans is described, and also a chapter on the benefits to be included in a pension or annuity system. In the appendix is given a valuable tabular analysis of the pension plans of a large number of American employers. Mr. Conant's book is based on original study and research, is fundamentally sound in the conclusions which it reaches and cannot fail to have a wide-spread and beneficial influence.

Mr. Epstein, who was until 1921 Director of the Pennsylvania Old Age Commission, covers a much wider field and includes a large amount of descriptive matter and of loosely coordinated statistical data. The familiar arguments for old age pensions as a branch of a general system of social insurance are restated and existing methods of relief, whether private or public, are classified and described. Part V contains a valuable summary of existing governmental systems in foreign countries and in an appendix is reprinted the Pennsylvania bill to provide old age pensions as presented by the old age pension commission to the 1921 legislature. A modified form of this bill has recently been passed by both houses and was signed by Governor Pinchot on May 7, 1923. It provides a minimum pension age of 70 and a maximum pension of one dollar a day. No pensions can be paid, however, until by subsequent legislative action appropriations are made available for the purpose.

J. H. WOODWARD

Selected Articles on Social Insurance. Julia E. Johnsen, compiler. H. W. Wilson Company, New York, 1922. Pp. xlvi, 381.

The Handbook Series is a collection of volumes for debaters, of which this is one; as such it is "designed specifically for debaters" and it would be unfair to judge it as a text or even as a series of essays. The book attempts to give a digest of the arguments for and against various proposals commonly included in the term "social insurance," and succeeds fairly well. A separate consideration of workmen's compensation, health insurance, unemployment insurance, old age insurance, etc., necessarily leads to some duplication in the consideration of such matters as the proper function of the state. Naturally, also, since it was essential to obtain the more striking arguments for and against the various proposals, the articles selected are in many cases written by persons who present a one-sided discussion of the matter at issue, being interested primarily in justifying the private insurance company, state insurance, the trade-union concept, the employer's opinion, the attitude of the medical profession, etc.

To the uninitiated the most superficial arguments are likely to be the most impressive. It requires considerable background for a reader to weigh the various arguments presented, separate

the sound from the unsound and the important from the trivial, and reach his own conclusion as to the actual merits and defects of the various propositions. But reflections of this sort are beside the point because, in fact, the compiler had no such object in mind; and as a compact and painstaking collection of various viewpoints the volume will evidently be valuable to those who desire to find the largest number of diverse arguments with the least exertion. To a person who has a position in a controversy to defend this is a great service and with this in mind one may be permitted to express appreciation of the considerable body of annotated and listed material from which selection has been made. With judicious selection, some of the material might also be used as a basis for discussion in insurance classes.

ROBERT RIEGEL

Public Relief of Sickness. Gerald Morgan. Macmillan Company, New York, 1922. Pg. 195.

The book is a plain statement on the operation of voluntary and compulsory systems of health insurance in Denmark, Germany and England. It also reviews the health insurance proposals made to American Legislatures in recent years.

The author shows how necessary it is to avoid the strutting phrases of the propagandists and to substitute facts on sickness and its consequences for the intriguing, and sometimes acrimonious, verbalism which characterizes the published utterances on both sides of the question. Fortunately, the flood of printed matter has subsided, and mere insurance persons may now rest long enough to read Morgan's book and find out what the disturbance was all about. Taken in conjunction with Dr. News-holme's "Public Health and Insurance," the book under review will serve as a frank statement of the things still to be done or undone in England, or the Continent and in America with respect to the relief of sickness among self-respecting groups of the population.

Mr. Morgan sums up the German compulsory sickness insurance situation in this manner:

1. The adequacy of both cash and medical benefits decreased as the average wages of the members of the various Funds decreased, being especially low where wages were especially low.

2. The inadequacy of medical treatment was sometimes greater than the inadequacy of cash benefits, because of dissatisfied, underpaid, and occasionally overworked contract doctors, and because the families of the insured seldom or never received adequate medical treatment, and frequently received no medical treatment at all.

3. The inadequacy of medical treatment among the poorer wage earners who are most often sick, had been tending year by year to become even greater than the inadequacy of cash benefits, owing to the increasing cost of modern medical treatment, which still continues, as medical knowledge increases, everywhere to outstrip increases of wages.

The author points out that the unworkable combination of cash and medical benefits within the same legislative provision. "In view of the relative simplicity of cash relief by insurance, and in view not only of the financial difficulty of providing, in addition, medical relief in the same way, but also of its increasing cost and inherent disadvantages to doctors and patients, why not separate the two sides of the problem? Serious advantages would evidently be gained in America by leaving cash relief to be provided by insurance, and by attempting medical relief, not by insurance, but in some other way. Why not, if practicable, make a clean break?!"*

Mr. Morgan, advocating compulsory cash-benefit sickness insurance, then considers the Compulsory Contributory Health Insurance Bill which passed the New York State Senate in 1919, but which was smothered in the Assembly. In his statement of the principal sources of opposition to compulsory health insurance, the author catalogs "commercial life insurance companies, particularly those companies chiefly dealing in industrial life insurance. . . . It is easy to see what the effect would be upon the business of the industrial life insurance companies, if \$100, plus part of the expenses of the last illness, were paid to all wage-earners by compulsory health insurance funds. Except in the case of wage-earners' dependents, the industrial life insurance companies might be driven almost from the field. Therefore, these companies regard compulsory contributory health insurance with bitter aversion." This seems to be contrary to fact. Mr. Morgan should have known that one or two vocal individuals do not constitute the body of informed opinion among American industrial insurance officials. He should have inquired further. In that event, he would have learned that the temperate, helpful

*Pp. 103-104.

comment of certain officials of these companies helped materially to modify some of the earlier proposals made to American Legislatures, especially along lines of the administration of medical and claim service. The plain sense of the recommendations was recognized even by the most ardent propagandists of the earlier proposals. One of the companies assisted investigating commissions of several States in determining the facts of disabling sickness among wage-earners.

The revival of extensive discussion of compulsory health insurance seems unlikely under the existing strained relationship between the money dollar and the goods dollar, and in the face of a substantial upward trend of the good-health rate. The taxpayer cannot "see" a contribution to compulsory cash-benefit insurance for the benefit of a group of the population whose rise in material well-being is so eloquently portrayed by a rapidly falling death rate. It remains for insurance statisticians and economists to study the newer economic fabric, to determine what sickness means to the wage-earner *now*, what a successful public health movement has accomplished and may still achieve, and to provide coverage through existing voluntary institutions.

E. W. KOPF

ACTUARIAL AND STATISTICAL NOTES

ACCIDENTS ACCORDING TO ORIGIN OF HAZARD

In our paper before the Society on May 17, 1922, we promised (page 223) that we would present data showing the origin of fatal accidents, whether arising in industry, in or about the home, on public highways, or in the use of other public facilities. Beginning with the experience of 1922, we had classifications prepared under these headings and the results are shown in the annexed tables. It is thought that the data will be instructive to statisticians, actuaries and underwriters in the casualty field and that perhaps other insurance organizations, and registrars of vital statistics, will be encouraged to set up similar arrangements of data in tabulating future accident experiences. There is a real need for identifying the levels of human activity which give rise to fatal accidents.

All of the tables accompanying this note relate to the mortality experience of the Industrial Department of the Metropolitan Life Insurance Company during the calendar year 1922. An explanation of the inclusions under the several classes according to "origin of hazard" will be in order. Under "*industrial accidents*" we placed deaths where the accident arose out of, or in the course of, gainful employment. In the category "*public accidents*" we classed all deaths which resulted from accidents occurring in the use of public facilities, that is to say, in passenger and commercial vehicles, on public highways, in public buildings or in places for sport or recreation operated for the general use of the public.

In Table 3, we show a sub-classification of the "*public accidents*" group under the following headings: *transportation* (this included steam and electric railways, automobiles, wagons and other means of transportation); *sport and recreation*; *pedestrian use of streets, highways, side-walks and bridges*; *use of public buildings* (includes elevators and stairways of buildings, and other places of public assemblage); "*other public accidents*" includes fatalities resulting from the use of any other public facility than the ones specifically mentioned in the other sub-classes under "*public accidents*."

"*Domestic accidents*" included deaths arising out of activities in or about the home.

All other accidents which could not be accommodated in the foregoing classes or sub-classes, were grouped under "*other and not specified accidents*."

It is realized that both the classification and the resulting statistics are a first attempt to sub-divide fatal accident experience of life insurance companies according to "origin of hazard." The authors would appreciate suggestions from the membership of the Society as to the possible betterment of the classification and in the tabular display of facts. In the records which have been compiled for the calendar year 1922 among the Industrial policyholders of the Metropolitan Life Insurance Company, there is a great deal of additional material, and quotations from the manuscript will be made gladly. On the office manuscript, classifications were shown for color and sex of the insured and a variety of recombinations of the data is possible.

LOUIS I. DUBLIN AND EDWIN W. KOPF.

TABLE 1
PERCENTAGE OF TOTAL ACCIDENTAL DEATHS ARISING OUT OF SPECIFIED HAZARD AT EACH AGE GROUP. DEATH RATE PER 100,000 PERSONS EXPOSED

Age Period	Percentage of All Accidents					Death Rate per 100,000 Exposed				
	All Accidents	Origin of Hazard				All Accidents	Origin of Hazard			
		Ind'l Accidents	Public Accidents	Domestic Accidents	Other & not Spec. Accidents		Ind'l Accidents	Public Accidents	Domestic Accidents	Other & not Spec. Accidents
All ages—one and over.....	100.0	16.7	46.3	15.2	21.8	57.7	9.6	26.7	8.8	12.6
Under 15.....	100.0	.3	59.2	18.1	22.4	53.7	.1	31.8	9.7	12.1
Ages 15 to 64.....	100.0	27.3	41.7	11.0	20.0	53.7	14.6	22.4	5.9	10.7
15 to 24.....	100.0	21.6	55.9	5.5	17.0	46.2	10.0	25.8	2.5	7.9
25 to 34.....	100.0	28.4	40.1	9.7	21.8	42.3	12.0	17.0	4.1	9.2
35 to 44.....	100.0	36.2	35.2	9.0	19.6	51.3	18.6	18.1	4.6	10.1
45 to 54.....	100.0	30.3	34.8	15.4	19.5	66.5	20.2	23.1	10.3	12.9
55 to 64.....	100.0	22.1	34.9	19.6	23.4	98.6	21.8	34.4	19.3	23.1
65 and over.....	100.0	10.1	28.4	30.6	30.8	203.6	20.7	57.9	62.2	62.8

TABLE 2
PERCENTAGE OF DEATHS FOR EACH ACCIDENT ARISING OUT OF SPECIFIED HAZARD. DEATH RATE PER 100,000 PERSONS EXPOSED

Accident	Percentage of Total in Accident Group						Death Rate per 100,000 Exposed				
	No. of Deaths	Total	Origin of Hazard				Total	Origin of Hazard			
			Ind'l Accidents	Public Accidents	Domestic Accidents	Other & Not Spec. Accidents		Ind'l Accidents	Public Accidents	Domestic Accidents	Other & Not Spec. Accidents
All accidents.....	7996	100.0	16.7	46.3	15.2	21.8	57.7	9.6	26.7	8.8	12.6
Burns (conflagration excepted)	842	100.0	5.1	4.6	50.6	39.7	6.1	.3	.3	3.1	2.4
Absorption of poisonous gases	307	100.0	7.8	.7	62.2	29.3	2.2	.2	...	1.4	.6
Drowning.....	1001	100.0	7.7	79.9	2.4	10.0	7.2	.6	5.8	.2	.7
Traumatism by firearms.....	253	100.0	2.8	23.3	11.9	62.1	1.8	.1	.4	.2	1.1
Falls.....	1012	100.0	19.5	14.7	34.8	31.0	7.3	1.4	1.1	2.5	2.3
Mine and quarry accidents....	142	100.0	95.1	4.9	...	...	1.0	1.0	.1	...	...
Traumatism by machines.....	222	100.0	87.4	8.1	.5	4.1	1.6	1.4	.1	*	.1
Railroad accidents.....	569	100.0	33.9	65.7	...	.4	4.1	1.4	2.7	...	*
Street-car accidents.....	251	100.0	8.4	91.2	...	.4	1.8	.2	1.7	...	*
Automobile accidents.....	1869	100.0	6.4	93.5	...	.1	13.5	.9	12.6	...	*
Injuries by other vehicles.....	228	100.0	35.1	64.5	...	.4	1.6	.6	1.1	...	*

TABLE 3
PUBLIC ACCIDENTS CLASSIFIED ACCORDING TO DETAIL OF HAZARD AND AGE

Age Period	Percentage in Detailed Hazard Class						Percentage in Specified Age Group					
	Total Public Accdts.	Transportation	Sport & Recreation	Pedestrian Use of Streets	Use of Public Bldgs.	Other Public Accdts.	Total Public Accdts.	Transportation	Sport & Recreation	Pedestrian Use of Streets	Use of Public Bldgs.	Other Public Accdts.
All ages—one and over.....	100.0	20.3	12.8	42.3	1.5	23.1	100.0	100.0	100.0	100.0	100.0	100.0
Under 15.....	100.0	8.6	14.9	53.8	.8	21.8	42.3	17.8	49.5	53.9	23.6	40.0
Ages 15 to 64.....	100.0	30.6	12.3	29.8	1.8	25.4	51.9	78.2	49.9	36.7	63.6	57.0
15 to 24.....	100.0	29.1	25.8	16.0	1.6	27.5	19.0	27.1	38.3	7.2	20.0	22.5
25 to 34.....	100.0	39.3	7.6	22.8	2.4	28.0	10.3	19.9	6.1	5.6	16.4	12.5
35 to 44.....	100.0	35.9	6.4	31.5	1.0	25.2	8.1	14.2	4.0	6.0	5.5	8.8
45 to 54.....	100.0	26.9	2.5	44.7	2.9	22.9	7.4	9.8	1.5	7.9	14.5	7.4
55 to 64.....	100.0	20.1	.....	59.5	1.5	18.9	7.1	7.0	.....	10.0	7.3	5.8
65 and over.....	100.0	14.1	1.4	69.0	3.3	12.2	5.8	4.0	.6	9.4	12.7	3.0

TABLE 4
PUBLIC ACCIDENTS CLASSIFIED ACCORDING TO DETAIL OF HAZARD AND TYPE OF ACCIDENT

Type of Accident	Percentage in Detailed Hazard Class						Percentage for Each Type of Accident					
	Total Public Accdts.	Transportation	Sport & Recreation	Pedestrian Use of Streets	Use of Public Bldgs.	Other Public Accdts.	Total Public Accdts.	Transportation	Sport & Recreation	Pedestrian Use of Streets	Use of Public Bldgs.	Other Public Accdts.
All public accidents.....	100.0	20.3	12.8	42.3	1.5	23.1	100.0	100.0	100.0	100.0	100.0	100.0
Absorption of poisonous gases.....	100.0	.....	.....	.....	.....	100.0	.1	.....	.....	.....	.....	.2
Drowning.....	100.0	.4	37.4	.6	.....	61.6	21.6	.4	63.2	.3	.....	57.6
Falls.....	100.0	2.7	22.8	36.9	14.1	23.5	4.0	.5	7.2	3.5	38.2	4.1
Railroad accidents.....	100.0	38.5	.....	54.0	.....	7.5	10.1	19.1	.....	12.9	.....	3.3
Street-car accidents.....	100.0	36.2	.4	55.0	.....	8.3	6.2	11.0	.2	8.1	.....	2.2
Automobile accidents.....	100.0	25.6	.8	63.1	.....	10.5	47.3	59.4	3.0	70.6	.....	21.5
Injuries by other vehicles.....	100.0	44.9	12.9	36.1	.....	6.1	4.0	8.8	4.0	3.4	.....	1.1
Other public accidents.....	100.0	2.0	42.4	7.6	13.6	34.4	28.4	.7	22.4	1.2	61.8	10.0

CURRENT NOTES

LEON S. SENIOR, CURRENT NOTES EDITOR

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INDUSTRIAL COMPENSATION RATING SCHEDULE—1923

In the early part of 1918 it was resolved that steps should be taken to collect statistical information to use as the basis for a new schedule. It was not until the latter part of 1920 that definite action was taken to put this resolution into effect. At that time it was further resolved that any new schedule should be a rating schedule rather than one designed to bring about the safeguarding of plant conditions. Previous schedules insofar as the rating factors entering into the rating formulae are concerned, have been founded almost exclusively on judgment, for the reason that conclusive statistical data were not available. Obviously a schedule for measuring risks on the basis of physical characteristics cannot be a properly effective device along accident prevention lines unless the various elements are proportioned in accordance with the extent to which they have been accident causes. In other words there is no conflict between an accident prevention schedule and a statistical schedule.

The theoretical formula adopted as a foundation for the new rating schedule included a personnel index or morale factor which was multiplied by the residue or portion of the manual rate not subject to schedule rating plus several increments measuring the groups of hazards included in the schedule, weighted to take account of the relative size and relative exposure to hazard in the individual risk as compared to that in the average risk for the classification involved.

Following consideration of the practical aspects of the problem of applying the schedule, this somewhat complicated formula resolved itself into a simpler form which did not take account of the relative size of the risk and degree of exposure, and which did not include the personnel factor but provided for the measurement of safety organization and hospital activities by way of a credit as in the previous schedule.

The formula for the new schedule contemplates first, the division of the manual rate into two main parts, namely, that portion which includes relatively important groups of accident causes and which has been made amenable to schedule treatment, and the remainder which is not directly subject to schedule rating and which has been designated as the residue. The first portion is rated on the principle of comparing the individual plant condition with the average plant condition for the industries involved on the basis of the standards laid down in the schedule.

Whereas the previous or Industrial Compensation Rating Schedule—1918, brought about a schedule rate for a risk by beginning with the manual rate and adding or subtracting from it certain charges or credits dependent on whether it was felt that the conditions involved were unusual or usual to the industry as a whole,—the Industrial Compensation Rating Schedule—1923, begins with the residue for the classification involved adding thereto such part of the remainder of the manual rate as has been determined proper for the various groups of accident causes, proportioned to take account of the condition of the risk being rated as compared with the average risk in the industry.

It will be improper to call the new schedule a purely statistical schedule. In the first place such a schedule is almost impossible to achieve since there will probably always be necessity for the element of judgment as to what portion of the full hazard of a particular unguarded condition is removed by standard guarding. Even aside from this, the 1923 Schedule is not statistical to the fullest extent but it does represent a long step in the right direction.

The remark has already been made that a schedule which is not truly a rating schedule is not a properly effective method for encouraging improvement of hazardous conditions, aside from the fact that it is not an accurate means of rating. In this connection the following illustration is to the point:

A shoe manufacturing risk which had absolutely no power driven machinery of any kind received no credit under the 1918 Schedule for the absence of this hazard, this being for the reason that the principle of the schedule was to measure accident prevention work. In order to obtain any credit such an assured would have to install a machine and guard it in accordance with the standards. Briefly, in such cases, an increased hazard

brought about a lower rate. Under the new schedule a risk of this character would receive no increment to the residue to take account of power transmission and machine hazard including point of operation, since this hazard was missing. The result would be equivalent to a $54\frac{1}{2}\%$ credit for the reason that the elements which statistics have indicated to be responsible for $54\frac{1}{2}\%$ of the manual rate, are absent from the risk.

Certain advocates of experience rating have held that two rating systems are unnecessary and that schedule rating is superfluous. This much may be said in contradiction:

The creation of the Industrial Compensation Rating Schedule—1923 has demonstrated that a schedule which is as purely statistical as is possible for manual rates themselves, is easily possible of achievement. Such a schedule would have the advantage over any experience rating plan of tending toward the absolute rather than the empirical; of providing balance almost automatically, and of measuring the variation in hazard of risks, otherwise in the same class, upon consideration of tangible and up-to-date evidence in the shape of physical plant conditions rather than intangible and more or less *passé* experience.

EXPERIENCE RATING

Approval of the plan of experience rating which since June 30, 1920, has been in force in New York State, with certain modifications from time to time, was withdrawn by the New York Insurance Department, effective March 17, 1923. It was understood that a new plan would be submitted for approval in time to be put into effect on that date.

The question of revising the experience rating plan has engaged the attention of the National Council as well as of various Boards and Bureaus for more than a year. A plan proposed by a special Committee of Managers appointed after the regular committees of the Council were unable to reach an agreement was adopted by the Compensation Inspection Rating Board of New York in the early part of the year and filed with the Insurance Department for approval.

Objections presented to the Board and the Superintendent of Insurance resulted in the appointment of a special committee of four carriers, a representative of the Insurance Department

presiding, which was to devise proper tests of the proposed plan, have them carried out and report back to the Superintendent not later than April 30th.

The committee held a number of meetings and outlined several tests which were made by the staff of the New York Board and presented to the Committee. At these meetings it appeared that the chief question at issue was one which had not hitherto been brought to the front and which had no direct relation to the structure of the proposed plan. This was whether the modification factors used should be such as to produce a net balance of debits and credits, or whether the existing condition of a considerable net credit, which has admittedly arisen without design or intention, should be perpetuated. Those in favor of an unbalanced plan advanced the theory that the loss ratio becomes lower as the size of the risk increases. One of the tests was planned to decide this point but the committee did not agree upon the reliability of the test nor upon the results indicated by it. This question, therefore, remained undecided and the committee reported to the Superintendent approving the structure of the proposed plan, submitting some minor amendments and admitting inability to agree on the question of a balanced plan. They stated, however, that the plan should be balanced unless it could be conclusively proven that the loss ratio improves as the size of the risk increases. The Superintendent was requested to act as arbitrator on the disputed point. Following a hearing held on May 11th the Superintendent approved the principle of a balanced plan with a concurrent reduction in the manual rates of 5% sending the plan back to the committees of the Board to have the final details worked out. This being done, the plan, definitely approved by the Superintendent, was put into effect as of June 30, 1923.

The new plan was immediately thereafter adopted by the New Jersey bureau and by the National Council for states under its jurisdiction.

An outline of the principal features of the new experience rating plan may be of interest to those who have not been closely in touch with this matter.

The first of these relates to the "split" of premiums and losses. Under the old plan "Death and Permanent Total Disability" cases on the one hand, and "All Other" and "Medical" losses

on the other were compared separately with the corresponding portions of the premium. In the new plan all losses are divided on a monetary basis into "Excess" and "Normal." Any case costing not more than the equivalent of fifty weeks indemnity at the maximum statutory rate of benefit, or \$100 medical is considered "Normal." If a case exceeds those limits, that part of the cost which is within the limits is considered "Normal" while the remainder (subject to a maximum equal to the average value of D. & P. T. cases) is "Excess." The "Excess" portion is subject to lower credibility than the "Normal" just as under the old plan the D. & P. T. side received less credibility than the "All Other" and "Medical." An important result of this change is that no accident can have a greater effect in the rating than can a death case. Formerly an assured was charged less for a death or permanent total case than for a serious major accident. It actually cost him more in the premium he must pay if a workman lost one arm than it would if he lost both or was killed. Now the charge increases with the severity of the accident with the proviso that no accident shall be given more weight than a death case.

One of the provisions originally reported in the new plan was that the credibility factors (Z_1 and Z_2) should be computed on the basis of the entire premium subject to experience rating and that the constants in these formulae should be such that no single case would have a greater effect than 20%, 15% of which might be on the normal side, on a risk with \$1000 subject premium. As adopted in final form this feature was modified so that the partial premiums corresponding to the "Excess" and "Normal" losses are used respectively in determining the values of Z_1 and Z_2 . The constants selected are such that with an average premium split the limits of 20% and 15% for a single case are retained. This will prevent the occurrence of large debits due to a single injury such as the old plan frequently produced before the temporary and unsatisfactory expedient of the "Stop Limit Formula" was devised.

There is a noticeable departure in the rating procedure in the new plan. In the past only the losses have been modified to take account of differences in conditions between the time when the experience was developed and the time of rating and also to raise the losses to the level of premiums by the application of an

expense loading factor. In the new plan losses are modified only by a factor representing the value of amendments to the law while premiums are modified to take care of all other changes in conditions, as well as to reduce them to the basis of expected losses, by removing the expense loading, in order to compare them with actual losses.

Another change, largely administrative in character, is that experience of completed policy years only will be used, the experience period terminating one year prior to the date of the policy for which rates are to be determined. While this innovation sacrifices to some extent the freshness of the experience used it is believed that this disadvantage will be more than offset because a more accurate valuation of outstanding losses will be possible and, furthermore, carriers will be able to file their experience with the rating boards early enough so that practically all rates may be issued before renewal.

SCHEDULE Z

In the instructions for compiling 1923 Schedule Z comprising the second report on policy year 1920 and the first report on 1921, the State Insurance Department governing business in New York State and the National Council for other states, have asked for individual reports on the minor permanent and temporary disability cases where the cost of the accident equals or exceeds fifty weeks indemnity at the maximum rate of compensation. Such individual reports will not only serve to facilitate the work of audit in that data is given for determining whether cases have been correctly classified as to nature of injury, but the data will be most valuable in furnishing statistical evidence in connection with the new experience rating plan recently adopted for New York and other States. One of the causes of great dissatisfaction with the former plan was the split of losses into "Death and Permanent Total Disability" with low credibility and "All Other" with high credibility notwithstanding the fact that some of the former cases might have been of low cost as in case of no dependents and some of the "All Other" losses may have been of very heavy monetary cost and therefore because of the split resulted in heavy charges. The

new plan divides losses into "Normal" and "Excess"—the "Normal" representing losses up to an amount equal to the cost of fifty weeks indemnity at the maximum statutory allowance of compensation and the "Excess" representing losses in excess of this amount. Whereas in the former plan it was not difficult to separate the premiums into component parts because of the fact that the pure premiums are divided into "Death and Permanent Total," "All Other" and "Medical," the new plan presented difficulties in the determination of the split because of the fact that some of the minor permanent and temporary cases were of heavy cost and could not be separated. With individual reports of these cases a complete check upon the partial premiums by classification is possible.

Further correlation between Schedule Z reports and reports of other functions of the rate is possible. The Schedule Z data can be compared with losses reported on experience rating applications and where there is no stamping office the Schedule Z reports disclose risks with heavy losses which for some reason have not been filed for experience rating, the risks enjoying a manual rate instead of receiving a heavy charge. It is also true that the new schedule which is capable of statistical check can be tested by using Schedule Z data. Therefore, with attention in making out the Schedule Z report in company offices and with careful audit and tabulation of data in the ratemaking bureaus, it may be said that workmen's compensation rates have a sound foundation in Schedule Z and that more than ever before the other elements of the rates, *viz.*, schedule and experience rating, are superimposed upon this foundation by means of comparative data in proper statistical proportion.

AUTOMOBILE CASUALTY INSURANCE

Automobile Casualty Insurance has passed through two or three periods of rapid development, but the indications are that it will be at least another ten years before the business reaches its maturity.

Policy forms have developed, of course, but there have not been as many radical changes as one might expect.

Public Liability coverage is very broad. It covers almost everything in the way of the automobile owner's legal liability

for accidents arising out of the operation and maintenance of his car. It even covers all of the owner's relatives and friends who drive with his permission. About the only restrictions are that he is not to use the car for racing, speed contests and shall not permit persons under the legal age limit or under the age of sixteen years, to drive. Also he must not use his car for purposes other than as described. If he has insured his car as a regular private car the company will not cover in the event he is using it for livery or rental purposes.

The standard Public Liability Policy is for 5/10 limits but the tendency is towards higher and higher limits, and the owner may purchase practically any desired amount by merely paying a proportionately small additional premium. The companies have considered the excess limits business as desirable from an underwriting point of view and also from the assured's point of view. The tendency today, however, is towards larger and larger verdicts and it is not at all unlikely that the excess limits business will not be as desirable in the future as it has been in the past if the present scale of rates is continued.

The Property Damage coverage is just as broad as the Public Liability coverage, except that it excludes property of the assured and property in the custody of the assured or property carried in or upon the insured automobile. The standard limit is also very low, only \$1000. The companies have not been selling as much excess limits coverage for Property Damage as for Public Liability for the reason that the large property damage accidents are not as frequent as the large personal injury claims. However, there are a number of instances where an automobile has done more than \$1000 damage. In one or two cases the damage has reached \$100,000. The additional charge is proportionately small and many more excess limits policies will be sold in the future than have been sold in the past.

In this connection it is interesting to observe the tendency towards the treatment of Public Liability and Property Damage as one coverage instead of two coverages. As a matter of fact, the two are so closely allied that they ought to be treated as one. In a number of instances it is hard to differentiate between the property damage claim and personal injury claim, because the injured party makes one claim for both combined. Many states have passed laws making it compulsory for owners of cer-

tain classes of automobiles to carry insurance or put up a bond, and in one or two instances these laws make no separation between Public Liability and Property Damage. For example, the statutory policy required in New York State for public automobiles in cities of first class is a flat twenty-five hundred dollar policy for any judgment whether it be personal injury or property damage, and with no limit whatever as to the number of these judgments that can be collected under the policy for any one accident. This is a logical course to pursue and it will be surprising indeed if other states do not adopt similar measures in the future. There is good reason for a first limit to a policy, but when the state makes it compulsory for automobile owners to guarantee a certain amount of protection to injured parties, it does not seem logical that the state should specify any fixed "upper limit." If each injured party is to have the right of redress up to \$2,500 or up to \$5,000, he ought to have the same privilege if he happen to be one of twenty injured in an accident as he would have if he were the only person injured in the accident.

While on this question of compulsory automobile insurance, it will be interesting to observe the trend of legislation. The trend towards compulsory automobile insurance is one that may revolutionize the business of automobile insurance during the next ten years. At the present time an automobile policy is merely a voluntary contract between an insurance company and an automobile owner. It is true that the contract reacts to the benefit of the public at large, but that feature of the contract is secondary. Under compulsory legislation, however, the public at large comes first and the automobile owner is second. The contracts must be changed therefore, to react to the benefit of the injured party regardless of any act of commission or omission on the part of the automobile owner.

There is an attempt to go even further and to specify the amounts that shall be paid for each kind of injury, similar to workmen's compensation enactments.

There have been a number of complaints that the present automobile underwriting methods are inadequate and undoubtedly these complaints have a certain amount of justification in fact. It is not at all easy to establish scales of rates that do perfect justice to each type of risk, when the assured himself

cannot specify in advance how his car is going to be used during the coming twelve months. The present rates are established according to the type of car, the general description of uses, and the territory in which the car is located. It is not possible to differentiate between the various types of drivers, nor is it possible to distinguish between the car that is driven 2,000 miles a year and the car that is driven 10,000 miles a year. Undoubtedly the companies will be able to overcome difficulties which now seem insurmountable and the future may witness a rating program that measures each risk in accordance with the mileage and the actual hazards developed.

The suggestion has been made that where the assured has had a perfect experience for a year he shall receive a discount upon renewal. This would hardly be fair because the owner of a private type car is not expected to have an accident in five or ten years, so it is no particular credit to him if he goes without an accident over a period of one year. As a matter of fact, nine out of ten policy holders do not have any personal injury accident during the year. If a man goes ten years without an accident, then there might be some good reason for offering him a reduction, but if the reduction is to be offered every policy holder who has a perfect record at the end of the first year, then the company is merely accepting a flat reduction in premium without any corresponding benefit.

The Collision experience has been bad up until 1922. The companies as a whole lost money year after year prior to that time. A large increase was made in the rates during 1921 and this fact coupled with the decline in list prices and the decline in the cost of parts and repairs were responsible for the profit in 1922. The rates have now been reduced about 25%. The present level of rates is still higher than the level back in 1920 and a number of people who used to carry Collision insurance have been forced off the books. The companies are not very hopeful of developing any large volume of Collision business, because the rates will always have to be high and the average assured will not pay the price. Different coverages have been experimented with but the coverages which appear to be most popular with the companies today are the two forms of deductible coverage, \$50 deductible and \$100 deductible.

BURGLARY INSURANCE

Until about two years ago no discount from Burglary Insurance rates could be allowed for the use of any burglar alarm system not approved by the Association. One of the results of the so-called "crime wave," which probably reached its peak in 1920, was a flood of new burglar alarm systems and other devices intended to frustrate burglars and robbers from plying their trade. It also was found that even the "approved" burglar alarm systems did not always prevent burglary losses, particularly those occasioned by burglars smashing the glass in a show window or front door and seizing a number of fur garments or other articles and rushing away in automobiles before the watchmen employed by the burglar alarm companies could answer the alarm. Five or six burglars using two automobiles have stolen a quantity of fur coats valued at \$15,000 or more in three minutes or less, and if the burglar alarm central station were eight or ten blocks away, or even further, the watchmen could not reach the premises in time to prevent the burglary. As far as known, there has been no plan developed that will prevent these so-called "snatch and run" losses, which in New York City alone amounted in the aggregate to a large sum last year.

Owing to the new burglar alarm systems placed on the market and the necessity for properly testing and classifying them and fixing Burglary Insurance discounts therefor, the Burglary Insurance Underwriters Association decided about two years ago to have this work done by the Underwriters Laboratories, and a rule was adopted which provided that after a given date, which was at least a year after the rule was adopted, no discount would be allowed for any burglar alarm system unless the system had been submitted to and not disapproved by the Underwriters Laboratories. In the meantime, the Laboratories were testing and classifying the various alarm systems as rapidly as possible. The Association's action resulted in the Burglar Alarm Companies forming an Association known as the International Electric Protective Association, which comprises concerns engaged in this class of business all over the United States. The Alarm Companies welcomed the action of the Burglary Insurance Underwriters Association as they believed such action would weed out the poorer alarm systems and at the same time provide

standards set up by an independent body so that alarm companies could at least endeavor to bring their systems up to these standards.

The Underwriters Laboratories established a Burglary Council composed of representatives of the Burglar Alarm Companies, the Burglary Insurance Companies and the Underwriters Laboratories. This Council held many meetings during the last two years and while the work progressed slowly, much progress was made; but there was one seemingly insurmountable difficulty, which was the cost of furnishing certificates by the Underwriters Laboratories to the merchants or storekeepers, which certificates were intended to indicate that the alarm system was of a certain class and, what was probably more important, that it was properly installed. In other words, the main question related to the installation of the system rather than to the general plan of the system itself as originally submitted to the Underwriters Laboratories. Obviously a first class alarm system improperly installed would be of little if any value in fixing discounts therefor, as respects Burglary Insurance rates. It was estimated that the certificates would cost probably from \$2.00 to \$3.00 each and the Underwriters Laboratories did not believe such certificates should be furnished by them without inspecting each installation or at least a certain number of installations selected at random in each district. The Burglar Alarm Companies objected to paying for the cost of these certificates, claiming that they had always done business without having their systems approved by the Underwriters Laboratories or any other body, and the Burglary Insurance Companies objected to paying this cost, believing that the premium rates and the discounts therefrom for the burglar alarm systems took care of this condition, which if improved by the proposed plan would eventually produce lower loss ratios and consequently lower premium rates.

In view of the fact that the Burglary Insurance Companies had allowed discounts heretofore by warranting in their policies a complete description of the alarm system and whether or not it protected all openings, as well as the ceilings, floors and partition walls enclosing the premises, which information was invariably obtained by the insurance companies' inspectors, it was evident that without certificates referring to the installation, the Burglary Insurance Companies would be in no worse position than before

so far as this point was concerned, and they would be in a better position than formerly because of the testing and classification of each alarm system as a system and the specifications regarding the installation, even though such specifications might not always be strictly observed.

The Underwriters Laboratories set up three standard classifications—A, B and C. An alarm system to be classified as "A" would have to be perfect and qualify for all credits set up for various features. There are not and probably never will be any alarm systems entitled to an "A" classification, but there are a certain number of Class B alarms that qualify for a certain number of credits and a considerable number of Class C alarms that qualify for a smaller number of credits. Inasmuch as the highest discount heretofore allowed from Burglary Insurance rates for the very best alarm system was 50%, the Burglary Insurance Companies believed—particularly in view of the experience on the Mercantile Open Stock Business—that under the new classifications the maximum discount for the best alarm should in no event be higher than 50%, but as it was doubtful if there ever would be any Class A alarm, it was finally agreed that the discount for such alarms could be fixed at 60% and for the first Class B alarms at 50%, with a lower discount for Class C alarms. However, the Burglar Alarm Companies suggested 70% for Class A alarms with corresponding lower discounts for systems falling in other classifications, but because of the high loss ratio on Mercantile Open Stock business as a whole the Burglary Insurance Companies were unwilling to agree to this suggestion as it was doubtful if even the 50% discount that has prevailed for several years could be continued in view of the increasing number of so-called "snatch and run" losses on grade floor premises—few, if any, of which are prevented by burglar alarm systems.

During the deadlock over this question between the Burglary Insurance Companies and the Burglar Alarm Companies, the latter circularized each Burglary Insurance Company, asking if it would agree to sell burglary insurance at the discounts suggested by the Burglar Alarm Companies. So far as can be learned all companies refused except one non-Bureau company, which agreed to the proposition of the Burglar Alarm Companies, except as respects grade floor risks, upon the theory that while

burglar alarm protection would not prevent the "snatch and run" losses, the increased discounts were evidently justified in the opinion of that company so far as risks above the grade floor were concerned, because the latter class of risks do not have the so-called "snatch and run" exposure. When this non-Bureau company announced the increased discounts from Open Stock Burglary Insurance rates for risks above the grade floor, one or two other companies having a large volume of Open Stock business insisted upon action being taken by the Independent Rating Bureau, which had taken over the making of Burglary rates on April 2nd last. The Bureau held a meeting at which the representatives of some companies expressed the opinion that the competition of the non-Bureau company should be met, but this was objected to by other companies because such action would indicate approval of the discounts of 60% and 70% formerly requested by the Burglar Alarm Companies. After considerable discussion it was finally decided to let the burglar alarm discounts stand as formerly but reduce all Mercantile Open Stock rates 25% on both protected and unprotected risks, and while on the protected risks this produced approximately the same premium for risks above the grade floor that was charged by the non-Bureau Company, it also produced lower rates for the unprotected risks as well as grade floor protected risks. The non-Bureau Company continued its new discounts and also allowed the 25% reduction, whereupon the Independent Rating Bureau announced a 40% cut in all Mercantile Open Stock rates.

Shortly after the 40% cut was announced, the New York Insurance Department called a hearing of all interested companies and requested the Independent Rating Bureau to produce the experience. After reviewing the experience the New York Insurance Department publicly expressed the opinion that it was not justified in taking any action that would restore or would even increase existing Burglary rates, and that presumably the reduced rates were satisfactory to the companies who had voluntarily reduced them through the Independent Rating Bureau of which they were members. However, several companies objected to the action of the Independent Rating Bureau and some of them have resigned. There are now at least six important companies that are not members and there are several others who, while still members, are desirous of having the old rates restored.

ACCIDENT PREVENTION BY PUBLIC UTILITY COMPANIES

There is a certain feeling that the operations of public utility companies, particularly the gas and electric companies, are extremely dangerous. The manual rates however show that there are many contracting and even manufacturing classifications which possess greater hazards. The rates for the electric operations as well as for some other public utility classifications show a decrease as the result of general revisions in the manual rates. For example the 1920 revision decreased the manual rate for electric operations in the State of New York from \$7.29 to \$5.91. This reduction can in part be charged to the element of judgment which necessarily entered into the application of the limited statistical data used for determining the earlier rate. Some part of the decrease may however be attributed to the very active safety work which has been done by many public utility companies. The rates do not give an absolutely accurate index of the trend since many of the larger companies which are most active in safety work are self-insurers and their improved experience therefore has no effect on the calculation of the manual rates.

Because of the very nature of the industry, accident prevention work in public utility operations must deal with rather involved technical problems. The interchange of experience through the national associations of public utility companies and the insurance carriers is extremely important. The questions of working methods, protective equipment, and standardized construction need careful analysis and study. Much credit is due the accident prevention committees of the National Electric Light Association, the American Gas Association and the American Electric Railway Association for the constructive work which has been done along these lines. These committee meetings bring together the responsible managing officials as well as those directly connected with safety work from representative companies over the entire country.

An example of the work of these committees is the thorough investigation of the various methods of resuscitation after electric shock, gas poisoning, drowning, and suffocation. The interest taken in the work by the National Electric Light Association and the publicity given by it to the prone pressure method of artificial respiration which is now recommended as the most

effective as well as the simplest method of resuscitation, have been the means of saving the lives of hundreds of men receiving electric shocks. Even now the American Gas Association is financing and supervising a very exhaustive investigation to determine the best method of resuscitating persons overcome by gas. The preliminary report recommends the use of the prone pressure or Shaeffer method coupled with the administration of oxygen containing a small amount of carbon-dioxide so as to eliminate the poisonous elements as quickly as possible.

In public utility work the employees usually work in small groups so that the need for individual care and skill is very much more important than in many industrial operations where the work can be more closely supervised. Bulletins, rule books, safety talks, first aid lectures, and company magazines or "house organs," are valuable and important methods of educating and training employees. The success of safety work in any industry depends upon the cooperation and interest of the responsible executives and it is fortunate that practically every public utility official recognizes the importance of accident prevention work. On public utility properties however it is important that close contact be made with the subordinate supervisors and foremen. The dangers of a moving machine can be seen and understood by anyone but gas and electricity are intangible commodities which sometimes act in very peculiar and unexpected ways. This means that the safety man must understand the hazards and be able to bring to the employees a knowledge gained from the study of a large number of accidents.

Educational courses given in a systematic way offer a further means of acquainting the employee with the dangers which may arise and at the same time such a plan increases his efficiency, his value to this company and his earning capacity. Most of the larger utilities and many of the smaller ones have seen the value of accident prevention work and it requires very little persuasion on the part of insurance carriers to induce this type of employer to give earnest consideration and constant thought to the safeguarding of the lives entrusted to his care.

RATE REVISION IN NEW JERSEY

Revised rates for workmen's compensation insurance in New Jersey were made effective July 4th. The new rates are designed

to meet both the new schedule of benefits provided by the amended law and such changes as a review of Schedule Z experience for policy years 1917 to 1920 has indicated are necessary. The increase in the benefit schedule amounts to approximately 25 per cent.

PERSONAL NOTES

A. H. Mowbray is now Consulting Actuary and Associate Professor of Insurance and Statistics, University of California, 21 Wheeler Hall, Berkeley, California.

R. B. Robbins, formerly Assistant Professor of Actuarial and Statistical Mathematics at the University of Michigan, has been appointed Assistant Actuary in the New York Office of the State Insurance Department.

Charles C. Dubuar resigned his position as Assistant Actuary of the Western National Life Insurance Company of Denver to become Assistant Actuary in the Albany office of the New York Insurance Department.

Ralph H. Blanchard, for some time Assistant Professor of Insurance at Columbia University, has been advanced to Associate Professor.

T. T. Tarbell is now Actuary of the Accident and Liability Department of the Aetna Companies.

Claude E. Scattergood has been appointed Vice President of the General Casualty & Surety Company of Detroit.

W. W. Greene has joined the National Council on Compensation Insurance as Actuary for the period of the impending general rate revision, which it is expected will occupy the committees and staff of the Council for about six months.

Clarence W. Hobbs has resigned his position as Commissioner of Insurance of Massachusetts in order to accept appointment as representative of the National Convention of Insurance Commissioners at the office of the National Council on Compensation Insurance.

Samuel W. McCulloch has been appointed Insurance Commissioner of Pennsylvania to succeed Thomas B. Donaldson who recently resigned that office to go into business for himself.

Gen. S. H. Wolfe last April received the Cross of the Legion of Honor from the Consul General of France, M. Gaston Liebert, who represented the President of France.

I. M. Rubinow is now Executive Director, Jewish Welfare Society, 726 Spruce St., Philadelphia, Pa.

C. S. Coates, has been advanced to Assistant Actuary of the Western States Life Insurance Company.

William Leslie is now the General Manager of the National Council on Compensation Insurance, 151 Fifth Avenue, New York.

Louis Buffler has been advanced to Assistant to the General Manager, Employers Mutual Insurance Company.

J. J. Pallay has been appointed Secretary of the London Guarantee & Accident Co., 134 South La Salle Street, Chicago, Ill.

F. W. Lawson has been elected Chairman of the United States Board of the London Guarantee & Accident Co., 134 South La Salle Street, Chicago, Ill.

NEW FELLOW

William A. Granville, Director, Educational Dept., National Life Insurance Company, 29 South La Salle St., Chicago, Ill.

NEW ASSOCIATES

Joseph P. Moore, Vice President, North American Accident Insurance Co., 275 Craig St., Montreal, Canada.

Joseph M. Vinter, Comptroller, Standard Accident Insurance Co., 640 Temple Avenue, Detroit, Michigan.

H. Economidy, Assistant Secy.—Comptroller, American Indemnity Company, Galveston, Texas.

Arthur B. Upshur, Actuary, Virginia Bureau of Insurance, Richmond, Va.

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ABSTRACT FROM THE MINUTES OF THE MEETING
MAY 25, 1923.

The semi-annual (twentieth regular) meeting of the Casualty Actuarial Society was held at the Hotel Pennsylvania, New York, on Friday, May 25, 1923.

President Ryan called the meeting to order at 10:30 A. M. The roll was called showing the following forty-seven Fellows and twelve Associates present:

FELLOWS

BLANCHARD	GREENE	OUTWATER
BUCK	HAMMOND	PALLAY
BUDLONG	HATCH	PINNEY
CAMMACK	LAIRD	RIEGEL
CARPENTER	LAWRENCE	RYAN
COGSWELL	LESLIE	SCATTERGOOD
CRAIG, J. D.	LITTLE	SENIOR
DEKAY	MCMANUS	SMITH, C. G.
DEARTH	MADDRILL	STRONG, W. M.
DORWEILER	MAYCRINCK	TARBELL
DUNLAP	MELTZER	VAN TUYL
FLYNN	MICHELbacher	WHITNEY
FONDILLER	MILLIGAN	WILSON
GOULD	MOORE, G. D.	WOODWARD
GRAHAM, T. B.	MORRIS	YOUNG, C. N.
GRAHAM, W. J.	MOWBRAY	

ASSOCIATES

ACKERMAN	GINSBURGH	MONTGOMERY, J. C.
BARBER	GRAHAM, C. M.	PIKE
CONSTABLE	HALL	SMITH, A. G.
GIBSON	HULL	SPENCER

The President's address was presented.

The minutes of the meeting held November 17, 1922 were approved as printed in the *Proceedings*.

The Secretary read the report of the Council and upon motion it was adopted by the Society. H. E. Economidy, J. P. Moore,

A. B. Upshur and J. M. Vinter had been enrolled as Associates without examination.

The Council recommended the following for election to Fellowship in the Society without examination under the terms of Article III of the Constitution:

W. A. GRANVILLE, Educational Director, National Life Insurance Company of the U. S. A., Chicago, Ill.

After ballot, this nominee was declared a duly elected Fellow. The papers printed in this Number were read or presented.

Recess was taken until 2:15 P. M.

By invitation of the President, Professor Wesley C. Mitchell, Director of Research, National Bureau of Economic Research, addressed the Society upon "The Statistical Approach to the Business Cycle;" and Count Alfred Korzybski spoke upon "The Mathematics of Human Engineering."

Mr. A. R. Goodale, Superintendent, Automobile Division, Travelers Insurance Company, spoke upon "Automobile Underwriting;" and Mr. R. I. Catlin, Superintendent, Automobile Department, Aetna Affiliated Companies, spoke upon "Fire and Theft Automobile Underwriting."

The papers read at the last meeting of the Society were discussed.

A motion was carried that the Council be instructed to consider the appointment of a committee to compile a table showing the mortality among lives that are totally and permanently disabled by accident.

Upon motion, the meeting adjourned at 5:15 P. M.

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1923 YEAR BOOK

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May 24, 1921	Bond, E. J., First Vice-President, Maryland Casualty Co., Baltimore, Md.
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	† Breiby, William, Partner in firm of Fackler & Fackler, Consulting Actuaries, 35 Nassau St., New York.
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*Nov. 21, 1919	Carver, Harry C., Associate Professor of Mathematics and Insurance, University of Michigan, Ann Arbor, Mich.
Feb. 25, 1916	Close, Charles L., Manager, Bureau of Safety, U. S. Steel Corporation, 71 Broadway, New York.
*Nov. 15, 1918	Coates, Barrett N., Assistant Secretary and Actuary, Western States Life Ins. Co., 995 Market St., San Francisco, California.
*Nov. 17, 1922	Coates, Clarence S., Western States Life Ins. Co., 995 Market St., San Francisco, California.

FELLOWS.

Date Admitted	
Oct. 27, 1916	Cogswell, Edmund S., General Manager, National Association of Mutual Casualty Companies, 25 W. 43d St., New York.
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Feb. 19, 1915	Collins, Henry, Assistant Manager, Ocean Accident & Guarantee Corporation, 114 Fifth Avenue, New York.
	† Copeland, John A., Consulting Actuary, Hurt Building, Atlanta, Ga.
	† Cowles, Walter G., Vice-President, Travelers Ins. Co., Hartford, Conn.
	† Craig, Arthur H., Fredk. C. Smith Co., Insurance Brokers, 1 Liberty St., New York.
	† Craig, James D., Actuary, Metropolitan Life Ins. Co., 1 Madison Ave., New York.
Nov. 15, 1918	Davis, Mervyn, Assistant Actuary, Equitable Life Assurance Society, 120 Broadway, New York.
	† Dawson, Alfred B., Miles M. Dawson & Son, 36 W. 44th St., New York.
	† Dawson, Miles M., Counsellor at Law and Consulting Actuary, 36 W. 44th St., New York.
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May 19, 1915	Deutschberger, Samuel, Chief Examiner of Fire Companies, New York Ins. Dept., 165 Broadway, New York.
*Nov. 17, 1920	Dorweiler, Paul, Aetna Life Insurance Co., Hartford, Conn.
	† Dublin, Louis I., Statistician, Metropolitan Life Ins. Co., 1 Madison Ave., New York.
May 19, 1915	Dunlap, Earl O., Metropolitan Life Ins. Co., 1 Madison Ave., New York.
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	† Fallow, Everett S., Actuary, Accident Dept., Travelers Ins. Co., Hartford, Conn.
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	† Flynn, Benedict D., Secretary, Travelers Ins. Co., Hartford, Conn.

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†	Franklin, C. H., Manager, Casualty Dept., Northwestern Casualty & Surety Co., Brumder Bldg., Milwaukee, Wis.
Feb. 25, 1916	Froggatt, Joseph, President, Joseph Froggatt & Co., Insurance Accountants, 25 Church St., New York.
†	Furze, Harry, Treasurer, Globe Indemnity Co., Washington Park, Newark, N. J.
Feb. 19, 1915	Garrison, Fred S., Assistant Secretary, Travelers Indemnity Co., Hartford, Conn.
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May 19, 1915	Glover, James W., Professor of Mathematics and Insurance University of Michigan, 620 Oxford Road, Ann Arbor, Mich.
†	Goodwin, Edward S., Goodwin-Beach & Co., Bankers, 720 Main St., Hartford, Conn.
†	Gould, William H., Consulting Actuary, 75 Fulton St., New York.
Oct. 22, 1915	Graham, George, Vice-President, Central States Life Ins. Co., St. Louis, Mo.
Oct. 22, 1915	Graham, Thompson B., Assistant Secretary, Metropolitan Life Ins. Co., 1 Madison Ave., New York.
†	Graham, William J., Second Vice-President, Equitable Life Assurance Society, 120 Broadway, New York.
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Oct. 27, 1916	Hardy, Edward R., Assistant Manager, New York Fire Ins. Exchange, 123 William St., New York.
Oct. 22, 1915	Hatch, Leonard W., Manager, State Insurance Fund, 124 E. 28th St., New York.
Nov. 17, 1920	Heath, Charles E., Chief Examiner of Casualty Companies, New York Ins. Dept., 165 Broadway, New York.
Nov. 21, 1919	Henderson, Robert, Second Vice-President and Actuary, Equitable Life Assurance Society, 120 Broadway, New York.
May 17, 1922	Heron, David, Secretary & Chief Statistician, London Guarantee & Accident Co., 20 Lincoln's Inn Fields, London, W. C. 2, England.
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Nov. 15, 1918	Hinsdale, F. W., Secretary, Workmen's Compensation Board, Vancouver, B. C., Canada.
Oct. 22, 1915	Hodgkins, L. G., Secretary, Massachusetts Protective Assn., Worcester, Mass.
†	Hoffman, Frederick L., Consulting Statistician, Prudential Ins. Co., and Dean, Advanced Course, Babson Institute, Wellesley Hills, Mass.
Oct. 22, 1915	Holland, Charles H., President, Independence Indemnity Co., Third & Walnut Sts., Philadelphia, Pa.
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†	Hughes, Charles, Auditor and Actuary, New York Ins. Dept., 165 Broadway, New York.
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Nov. 18, 1921	Hutcheson, William A., Second Vice-President and Actuary, Mutual Life Ins. Co., 32 Nassau St., New York.
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May 19, 1915	Johnson, William C., Vice-President, Massachusetts Protective Assn., Worcester, Mass.
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†	Kopf, Edwin W., Assistant Statistician, Metropolitan Life Ins. Co., 1 Madison Ave., New York.
Feb. 19, 1915	Laird, John M., Actuary, Connecticut General Life Ins. Co., Hartford, Conn.
Feb. 19, 1915	Landis, Abb, Consulting Actuary, 1107 Independent Life Building, Nashville, Tenn.
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Nov. 18, 1921	Little, James F., Associate Actuary, Prudential Insurance Co., Newark, N. J.
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May 23, 1919	McDougald, Alfred, Ellerflie, Beddington Gardens, Wallington Surrey, England.
*Oct. 31, 1917	McManus, Robert J., Travelers Ins. Co., Hartford, Conn.
Feb. 19, 1915	Maddrill, James D., Actuary, Pennsylvania Mfrs. Assn. Casualty Ins. Co., Finance Bldg., Philadelphia, Pa.

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Date Admitted	
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Feb. 19, 1915	Mead, Franklin B., Secretary and Actuary, Lincoln National Life Ins. Co., Fort Wayne, Ind.
Apr. 20, 1917	Meltzer, Marcus, Statistician, National Bureau of Casualty & Surety Underwriters, 120 W. 42nd St., New York.
†	Michelbacher, G. F., Secretary-Treasurer, National Bureau of Casualty & Surety Underwriters, 120 W. 42nd St., New York.
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†	Mitchell, James F., First Asst., U. S. Manager, General Accident Fire and Life Assur. Corp., 421 Walnut St., Philadelphia, Pa.
†	Moir, Henry, Managing Director, United States Life Insurance Co., 105 Fifth Ave., New York.
*Nov. 18, 1921	Montgomery, Victor, Actuary, California Ins. Dept., Pacific Finance Building, San Francisco, Cal.
†	Moore, George D., Actuary, Royal Indemnity Co., 84 William St., New York.
May 19, 1915	Morris, Edward B., Actuary, Life Dept., Travelers Ins. Co., Hartford, Conn.
Nov. 21, 1919	Morrison, Charles E., Vice-President and General Manager, Utilities Mutual Ins. Co., 53 Park Place, New York.
†	Morrison, James, Secretary-Treasurer, Independence Indemnity Co., Third & Walnut Sts., Philadelphia, Pa.
†	Mowbray, Albert H., Actuary, National Council on Workmen's Compensation Insurance, 16 E. 40th St., New York.
May 20, 1918	Mudgett, Bruce D., Associate Professor of Economics, University of Minnesota, Minneapolis, Minn.
*Nov. 17, 1920	Mueller, Louis H., Actuary-Statistician, Associated Industries Insurance Corporation, Wells Fargo Bldg., San Francisco, Cal.
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May 28, 1920	Murphy, Ray D., Associate Actuary, Equitable Life Assurance Society, 120 Broadway, New York.
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†	Olifiers, Edward, Consulting Actuary, Andrades 64, P. O. Box 1817, Rua dos Rio-de-Janeiro, Brazil.
†	Orr, Robert K., President, Michigan Employers Casualty Co., Lansing, Mich.
†	Otis, Stanley L., Referee, Bureau of Workmen's Compensation, New York Labor Dept., 124 E. 28th St., New York.
*Nov. 21, 1919	Outwater, Olive E., Assistant Actuary, National Bureau of Casualty & Surety Underwriters, 120 W. 42nd St., New York.

FELLOWS.

Date Admitted	
†	Pallay, Julius J., Chief Statistician, London Guarantee & Accident Co., Ltd., 134 So. La Salle St., Chicago, Ill.
May 26, 1916	Parker, John M., Jr., Secretary, Accident and Liability Department, Aetna Life Ins. Co., Hartford, Conn.
*Nov. 18, 1921	Perkins, Sanford B., Actuary, Compensation & Liability Dept., Travelers Ins. Co., Hartford, Conn.
Nov. 15, 1918	Perry, W. T., Assistant Manager, Ocean Accident and Guarantee Corporation, 36 Moorgate, London, E. C. 2, England.
*Nov. 17, 1922	Pinney, Sydney D. Travelers Ins. Co. Hartford Conn.
†	Remington, Charles H., Vice-President, Aetna Life Ins. Co., Hartford, Conn.
May 23, 1919	Richardson, Frederick, U. S. Manager, General Accident Fire and Life Assur. Corp., 421 Walnut St., Philadelphia, Pa.
May 24, 1921	Riegel, Robert, Professor of Insurance, University of Pennsylvania, Philadelphia, Pa.
†	Rubinow, I. M., Care of Zionist Organization of America, 55 Fifth Ave., New York.
†	Ryan, Harwood E., General Manager, National Council on Workmen's Compensation Insurance, 16 E. 40th St., New York.
†	Scattergood, Claude E., Vice-President, A. M. Best & Co., 75 Fulton St., New York.
†	Scheitlin, E., Asst. Treasurer, Globe Indemnity Co., Washington Park, Newark, N. J.
†	Senior, Leon S., Manager and Secretary, Compensation Inspection Rating Board, 370 Seventh Ave., New York.
†	Smiley, J. W., Actuary and Chief Accountant to the West Virginia State Compensation Commissioner, Charleston, W. Va.
Apr. 20, 1917	Smith, Charles G., Actuary, New York Ins. Dept., 165 Broadway, New York.
Feb. 25, 1916	Strong, Wendell M., Associate Actuary, Mutual Life Ins. Co., 32 Nassau St., New York.
Oct. 22, 1915	Strong, William Richard, Care of Mr. H. W. Ivory, 131 Derby St., Kew, Melbourne, Australia.
†	Sullivan, Robert J., Vice-President, Travelers Indemnity Co., Hartford, Conn.
*Nov. 17, 1920	Tarbell, Thomas F., Aetna Life Ins. Co., Hartford, Conn.
May 19, 1915	Thiselton, Herbert C., Care of Harris & Dixon, 81 Gracechurch St., London, E. C. 3, England.
†	Thompson, John S., Assistant Actuary, Mutual Life Ins. Co., 32 Nassau St., New York.
Nov. 18, 1921	Toja, Guido, General Manager, Government Institute of Insurance, Rome, Italy.
†	Train, John L., Secretary and General Manager, Utica Mutual Ins. Co., 239 Genesee St., Utica, New York.
Nov. 17, 1922	Traversi, A. T., Government Actuary for New Zealand, Wellington, New Zealand.
*Nov. 21, 1919	Van Tuyl, Hiram O., Examiner, New York Ins. Dept., 165 Broadway, New York.

FELLOWS

Date Admitted	
*Nov. 17, 1920	Waite, Alan W., Aetna Life Ins. Co., Hartford, Conn.
May 23, 1919	Welch, Archibald A., Vice-President, Phoenix Mutual Life Ins. Co., Hartford, Conn.
†	Whitney, Albert W., Associate General Manager, National Bureau of Casualty & Surety Underwriters, 120 West 42nd St., New York.
*Nov. 18, 1921	Wilson, W. Norbert, Travelers Ins. Co., Hartford, Conn.
†	Wolfe, Lee J., Consulting Actuary, 165 Broadway, New York.
†	Wolfe, S. Herbert, Consulting Actuary, 165 Broadway, New York.
May 24, 1921	Wood, Arthur B., Actuary, Sun Life Assurance Company, Montreal, Canada.
†	Woodward, Joseph H., Woodward and Pondiller, Consulting Actuaries, 43 Cedar St., New York.
Nov. 17, 1920	Young, Charles N., Globe Indemnity Co., Washington Park, Newark, N. J.
†	Young, William, Actuary, New York Life Ins. Co., 346 Broadway, New York.

ASSOCIATES

Those marked (*) have been enrolled as Associates upon examination by the Society.

Those marked (1) or (2) have passed Part I or Part II of the Fellowship Examination.

Date Enrolled	
*Nov. 15, 1918	Ackerman, Saul B., New York University, 32 Waverly Place, New York.
Nov. 15, 1918	Ankers, Robert E., Actuary, Continental Life Ins. Co., District Natl. Bank Bldg., Washington, D. C.
(2)*Nov.17,1920	Barber, Harmon T., Travelers Ins. Co., Hartford, Conn.
*Nov. 17, 1922	Barter, John L., Hartford Accident & Indemnity Co., 430 California St., San Francisco, Calif.
Nov. 17, 1920	Black, Nellis C., Supt., Statistical Division, Maryland Casualty Co., Baltimore, Md.
*Oct. 31, 1917	Bessey, John M., Nutley, N. J.
*Oct. 22, 1916	Brann, Ralph M., Supt. Compensation Dept., London & Lancashire Indemnity Company of America, 20 Trinity St., Hartford, Conn.
Nov. 15, 1918	Brooks, LeRoy, Statistician, U. S. Fidelity & Guaranty Company, Baltimore, Md.
*Nov. 15, 1918	Brunnquell, H. G., Actuary, Wisconsin Ins. Dept., Madison, Wis.
*Oct. 22, 1915	Buffer, Louis, Employers Mutual Ins. Co., 61 Broadway, New York.
Mar. 31, 1920	Burt, Margaret A., Office of George B. Buck, Consulting Actuary, 25 Frankfort St., New York.
Nov. 17, 1922	Cavanaugh, L. D., Actuary & Assistant Secretary, Federal Life Insurance Co., 166 N. Michigan Boulevard, Chicago, Ill.
*Nov. 17, 1920	Comstock, W. Phillips, Statistician, Continental Casualty Co., 910 Michigan Ave., Chicago, Ill.
*Nov. 18, 1921	Constable, William J., Assistant Secretary, National Council on Workmen's Compensation Insurance, 16 E. 40th St., New York.
Nov. 15, 1918	Egli, W. H., Statistician, Zurich General Accident & Liability Ins. Co., 431 Insurance Exchange, Chicago, Ill.
May 23, 1919	Fletcher, Nicholas, Secretary, Workmen's Compensation Board, Winnipeg, Manitoba, Canada.
*Nov. 17, 1922	Gibson, Joseph P., Jr., 122 N. Main St., Rockford, Ill.
*Nov. 17, 1922	Ginsburgh, Harold J., Aetna Life Insurance Co., Hartford, Conn.
*Nov. 17, 1922	Graham, Chas. M., National Council on Workmen's Compensation Insurance, 16 E. 40th St., New York.
*Nov. 18, 1921	Haggard, Robert E., Supt. Permanent Disability Rating Dept. Industrial Accident Commission, 525 Market St., San Francisco, Cal.
*Nov. 17, 1922	Hall, H. L., Life Actuarial Dept., Travelers Insurance Co., Hartford, Conn.
Nov. 21, 1919	Haydon, George F., General Manager, Wisconsin Compensation Rating & Inspection Bureau, 373 Broadway, Milwaukee, Wis.

ASSOCIATES.

Date Enrolled	
May 23, 1919	Hoage, Robert J., Chief Statistician, U. S. Employees Compensation Commission, Washington, D. C.
Nov. 18, 1921	Hull, Robert S., Travelers Ins. Co., Hartford, Conn.
*Oct. 31, 1917	Jackson, Edward T., Statistician, General Accident, Fire & Life Assur. Corp., 421 Walnut St., Philadelphia, Penn.
(2)*Nov.18,1921	Jensen, Edward S., Travelers Ins. Co., Hartford, Conn.
*Nov. 21, 1919	Jones, Loring D., Claim Auditor, State Ins. Fund, 124 E. 28th St., New York.
*Nov. 17, 1922	Kirk, Carl L., Zurich Gen. Acc. & Liab. Ins. Co., 431 Insurance Exchange, Chicago, Ill.
(1)*Oct.27,1916	McClure, Laurence H., Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
*Nov. 17, 1922	McClurg, D. Ralph, Peters Trust Bldg., Omaha, Neb.
*Oct. 22, 1915	McGuire, Vincent G., Asst. Actuary-Auditor, Pension Division, Dept. of Finance, Municipal Bldg., New York.
*Nov. 17, 1922	McIver, R. A., Assistant Actuary, American National Insurance Co., Galveston, Texas.
*Nov. 17, 1922	Michener, Samuel M., American Telephone and Telegraph Co., 195 Broadway, New York.
Nov. 17, 1922	Montgomery, J. C., Assistant Treasurer, Utilities Mutual Insurance Co., 53 Park Place, New York.
*Nov. 21, 1919	Mothersill, R. V., Secy. & Actuary, Compensation Insurance Board, State Capitol, St. Paul, Minn.
*Oct. 22, 1915	Müller, Fritz, Friedrich Wilhelm Life Ins. Co., Behren St., Berlin, Germany.
(1)*Oct.27,1916	Newell, William, Supt. Compensation & Liability Dept., Sun Indemnity Co., 55 Fifth Ave., New York.
May 23, 1919	Otto, Walter E., Treasurer, Michigan Mutual Liability Co., Cadillac Square, Detroit, Mich.
*Nov. 17, 1920	Pike, Morris, Examiner, New York Ins. Dept., 165 Broadway, New York.
*Nov. 17, 1922	Poorman, William F., Manager Underwriting Dept., Farmers National Life Insurance Co., 3401 Michigan Ave., Chicago, Ill.
Nov. 17, 1922	Powell, J. M., Actuary, Columbian National Life Insurance Co., 77 Franklin St., Boston, Mass.
*Nov. 15, 1918	Raywid, Joseph, Vice-President, Underwriters Statistical Bureau, 153 Fifth Ave., New York.
*Nov. 18, 1921	Roerber, William F., University of California, 2008 Shattuck Ave., Berkeley, Cal.
*Nov. 21, 1919	Robbins, Rainard B., Assistant Professor of Mathematics, University of Michigan, 1113 Ferdon Road, Ann Arbor, Mich.
*Nov. 18, 1921	Shepard, Elmer I., Asst. Professor of Mathematics, Williams College, Williamstown, Mass.
Nov. 15, 1918	Sibley, John L., Statistician, United States Casualty Co., 80 Maiden Lane, New York.
*Nov. 18, 1921	Smith, Arthur G., Auditor Compensation Inspection Rating Board, 370 Seventh Ave., New York.
*Nov. 15, 1918	Spencer, Harold S., Aetna Life Insurance Co., Hartford, Conn.
Nov. 15, 1918	Sullivan, Oscar M., Director of Re-education, State Department of Education. St. Paul. Minn.

ASSOCIATES.

Date Enrolled	
Mar. 23, 1921	Thompson, Arthur E., Chief Statistician, Globe Indemnity Co., Washington Park, Newark, N. J.
(1)*Nov.21,1919	Trench, Frederick H., Mgr., Underwriting Dept., Utica Mutual Ins. Co., 239 Genesee St., Utica, New York.
*Nov. 21, 1919	Voogt, Walter G., State Compensation Ins. Fund, 525 Market St., San Francisco, Cal.
(1)*Oct.27,1916	Waite, Harry V., Statistician, Compensation & Liability Dept., Travelers Ins. Co., Hartford, Conn.
May 23, 1919	Warren, Charles S., Chief Statistician, Ocean Accident & Guarantee Corp., 114 Fifth Ave., New York.
(1)*Nov.18,1921	Waters, Leland L., Actuary, National Accident Ins. Co., Lincoln, Neb.
Nov. 17, 1920	Watson, J. J., Asst. Genl. Mgr., Texas Employers' Ins. Assn., Dallas, Texas.
*Nov. 17, 1920	Webber, Charles W., Asst. Statistician, Liberty Mutual Ins. Co., 210 Lincoln St., Boston, Mass.
*Nov. 18, 1921	Welch, Eugene R., Secretary, Associated Industries Insurance Corporation, Wells Fargo Bldg., San Francisco, Calif.
Mar. 23, 1921	Wheeler, Roy A., Actuary, Liberty Mutual Ins. Co., 210 Lincoln St., Boston, Mass.
Nov. 15, 1918	Wilkinson, Albert E., Statistician, Standard Accident Ins. Co., Detroit, Mich.
*Nov. 17, 1920	Willbach, Harry, Zurich General Accident & Liability Ins. Co., 55 John St., New York.
Sept. 17, 1919	Williams, John F., Actuary, Division of Insurance, State Department of Trade, Springfield, Ill.
*Oct. 22, 1915	Williamson, W. R., Assistant Actuary, Life Dept., Travelers Ins. Co., Hartford, Conn.
*Oct. 22, 1915	Wood, Donald M., of Childs, Young & Wood, Insurance Brokers, Insurance Exchange, Chicago, Ill.
*Oct. 22, 1915	Woodman, Charles E., Comptroller, Ocean Accident & Guarantee Corp., 114 Fifth Ave., New York.
*Nov. 17, 1922	Young, Floyd E., Instructor in Mathematics, Oregon Agricultural College, Corvallis, Oregon.

SCHEDULE OF MEMBERSHIP, NOVEMBER 17, 1922.

	Fellows	Associates	Total
Membership, Nov. 18, 1921.....	157	55	212
Deductions:			
By resignation.....	1	—	1
By withdrawal.....	2	—	2
By death.....	2	—	2
Additions:	152	55	207
By election, May 17, 1922.....	1	—	1
By election, Nov. 17, 1922.....	2	3	5
By 1922 examinations.....	3	11	14
	158	69	227
Transfers from Associate to Fellow.....	—	3	3
Membership, November 17, 1922.....	158	66	224

STUDENTS

The following candidates for the grade of Associate have passed one of the two Parts of the examination, during the last three years:

Part 1 only.

- AULT, G. E., 43 Cedar Street, New York.
BJORN W., Travelers Ins. Co., Hartford, Conn.
DARKOW, A. C. (Miss) Pennsylvania Mfrs. Assn. Casualty Ins. Co. Finance Bldg., Philadelphia, Pa.
DUBUAR, C. C., International Life Ins. Co., St. Louis, Mo.
FAIRBANKS, E. M., Travelers Ins. Co., Hartford, Conn.
FITZ, L. L., Liberty Mutual Ins. Co., 210 Lincoln Street, Boston, Mass.
ROBINSON, E. E., National Bureau of Casualty and Surety Underwriters, 120 West 42nd Street, New York.
ROCKWELL, C. P., Actuary, State Department of Insurance and Banking, Austin, Texas.
SOMMER, A., 1374 Race St., Denver, Colo.
WETHERALD, D. (Miss) Pennsylvania Mfrs. Assn. Casualty Ins. Co., Finance Bldg., Philadelphia, Pa.

Part 2 only.

- GILDEA, J. F., Travelers Ins. Co., Hartford, Conn.
WALKER, C. A., Utica Mutual Ins. Co., Mayro Bldg., Utica, N. Y.

EX-PRESIDENTS AND EX-VICE-PRESIDENTS

EX-PRESIDENTS

	Term
I. M. RUBINOW	1914-1916
JAMES D. CRAIG	1916-1918
JOSEPH H. WOODWARD	1918-1919
BENEDICT D. FLYNN	1919-1920
ALBERT H. MOWBRAY	1920-1922

EX-VICE-PRESIDENTS

	Term
GEORGE D. MOORE	1918-1920
WILLIAM LESLIE	1919-1921
LEON S. SENIOR	1920-1922

CONSTITUTION

(AS AMENDED NOVEMBER 17, 1922.)

ARTICLE I.—*Name.*

This organization shall be called the CASUALTY ACTUARIAL SOCIETY.

ARTICLE II.—*Object.*

The object of the Society shall be the promotion of actuarial and statistical science as applied to the problems of casualty and social insurance by means of personal intercourse, the presentation and discussion of appropriate papers, the collection of a library and such other means as may be found desirable.

The Society shall take no partisan attitude, by resolution or otherwise, upon any question relating to casualty or social insurance.

ARTICLE III.—*Membership.*

The membership of the Society shall be composed of two classes, Fellows and Associates. Fellows only shall be eligible to office or have the right to vote.

The Fellows of the Society shall be the present members and those who may be duly admitted to Fellowship as hereinafter provided. Any Associate of the Society may apply to the Council for admission to Fellowship. If the application shall be approved by the Council with not more than three negative votes the Associate shall become a Fellow on passing such final examination as the Council may prescribe. Otherwise no one shall be admitted as a Fellow unless recommended by a duly called meeting of the Council with not more than three negative votes followed by a three-fourths ballot of the Fellows present and voting at a meeting of the Society.

Any person may, upon nomination to the Council by two Fellows of the Society and approval by the Council of such nomination with not more than one negative vote, become enrolled as an Associate of the Society provided that he shall pass such examination as the Council may prescribe. Such examination may be waived in the case of a candidate who for a period of not less than two years has been in responsible charge of the statistical or actuarial department of a casualty insurance organization or has had such other practical experience in casualty or social insurance as in the opinion of the Council renders him qualified for Associateship.

ARTICLE IV.—*Officers and Council.*

The officers of the Society shall be a President, two Vice-Presidents, a Secretary-Treasurer, an Editor, and a Librarian. The Council shall be composed of the active officers, nine other Fellows and, during the four years following the expiration of their terms of office, the ex-Presidents and ex-Vice-Presidents.

CONSTITUTION.

ARTICLE V.—*Election of Officers and Council.*

The officers shall be elected by a majority ballot at the annual meeting for the term of one year and three members of the Council shall in a similar manner, be annually elected to serve for three years. The President and Vice-Presidents shall not be eligible for the same office for more than two consecutive years nor shall any retiring member of the Council be eligible for re-election at the same meeting.

The terms of the officers shall begin at the close of the meeting at which they are elected except that the retiring Editor shall retain the powers and duties of office so long as may be necessary to complete the then current issue of *Proceedings*.

ARTICLE VI.—*Duties of Officers and Council.*

The duties of the officers shall be such as usually appertain to their respective offices or may be specified in the by-laws. The duties of the Council shall be to pass upon candidates for membership, to decide upon papers offered for reading at the meetings, to supervise the examination of candidates and prescribe fees therefor, to call meetings, and, in general, through the appointment of committees and otherwise, to manage the affairs of the Society.

ARTICLE VII.—*Meetings.*

There shall be an annual meeting of the Society on such date in the month of November as may be fixed by the Council in each year, but other meetings may be called by the Council from time to time and shall be called by the President at any time upon the written request of ten Fellows. At least two weeks notice of all meetings shall be given by the Secretary.

ARTICLE VIII.—*Quorum.*

Seven members of the Council shall constitute a quorum. Twenty Fellows of the Society shall constitute a quorum.

ARTICLE IX.—*Expulsion or Suspension of Members.*

Except for non-payment of dues no member of the Society shall be expelled or suspended save upon action by the Council with not more than three negative votes followed by a three-fourths ballot of the Fellows present and voting at a meeting of the Society.

ARTICLE X.—*Amendments.*

This constitution may be amended by an affirmative vote of two-thirds of the Fellows present at any meeting held at least one month after notice of such proposed amendment shall have been sent to each Fellow by the Secretary.

BY-LAWS

(AS AMENDED OCTOBER 27, 1916.)

ARTICLE I.—*Order of Business.*

At a meeting of the Society the following order of business shall be observed unless the Society votes otherwise for the time being:

1. Calling of the roll.
2. Address or remarks by the President.
3. Minutes of the last meeting.
4. Report by the Council on business transacted by it since the last meeting of the Society.
5. New membership.
6. Reports of officers and committees.
7. Election of officers and Council (at annual meetings only.)
8. Unfinished business.
9. New business.
10. Reading of papers.
11. Discussion of papers.

ARTICLE II.—*Council Meetings.*

Meetings of the Council shall be called whenever the President or three members of the Council so request, but not without sending notice to each member of the Council seven or more days before the time appointed. Such notice shall state the objects intended to be brought before the meeting, and should other matter be passed upon, any member of the Council shall have the right to re-open the question at the next meeting.

ARTICLE III.—*Duties of Officers.*

The President, or, in his absence, one of the Vice-Presidents, shall preside at meetings of the Society and of the Council. At the Society meetings the presiding officer shall vote only in case of a tie, but at the Council meetings he may vote in all cases.

The Secretary-Treasurer shall keep a full and accurate record of the proceedings at the meetings of the Society and of the Council,

BY-LAWS.

send out calls for the said meetings, and, with the approval of the President and Council, carry on the correspondence of the Society. Subject to the direction of the Council, he shall have immediate charge of the office and archives of the Society.

The Secretary-Treasurer shall also send out calls for annual dues and acknowledge receipt of same; pay all bills approved by the President for expenditures authorized by the Council of the Society; keep a detailed account of all receipts and expenditures, and present an abstract of the same at the annual meetings, after it has been audited by a committee of the Council.

The Editor shall, under the general supervision of the Council, have charge of all matters connected with editing and printing the Society's publications. The *Proceedings* shall contain only the proceedings of the meetings, original papers or reviews written by members, discussions on said papers and other matter expressly authorized by the Council.

The Librarian shall, under the general supervision of the Council, have charge of the books, pamphlets, manuscripts and other literary or scientific material collected by the Society.

ARTICLE IV.—*Dues.*

The dues shall be ten dollars for Fellows and five dollars for Associates payable upon entrance and at each annual meeting thereafter, except in the case of Fellows not residing in the United States, Canada, or Mexico, who shall pay five dollars at the times stated.

It shall be the duty of the Secretary-Treasurer to notify by mail any Fellow or Associate whose dues may be six months in arrears, and to accompany such notice by a copy of this article. If such Fellow or Associate shall fail to pay his dues within three months from the date of mailing such notice, his name shall be stricken from the rolls, and he shall thereupon cease to be a Fellow or Associate of the Society. He may, however, be reinstated by vote of the Council, and upon payment of arrears of dues.

ARTICLE V.—*Amendments.*

These by-laws may be amended by an affirmative vote of two-thirds of the Fellows present at any meeting held at least one month after notice of the proposed amendment shall have been sent to each Fellow by the Secretary.

EXAMINATION REQUIREMENTS
RULES REGARDING EXAMINATIONS FOR
ADMISSION TO THE SOCIETY

(AS AMENDED MAY 23, 1921.)

The Council adopted the following rules providing for the examination system of the Society:

1. Examinations will be held on the first Wednesday and Thursday during the month of May in each year in such cities as will be convenient for three or more candidates.

2. Application for admission to examination should be made on the Society's blank form, which may be obtained from the Secretary-Treasurer. No applications will be considered unless received before the fifteenth day of March preceding the dates of examination.

3. A fee of \$5.00 will be charged for admission to examination. This fee is the same whether the candidate sits for one or two parts and is payable for each year in which the candidate presents himself. Examination fees are payable to the Secretary-Treasurer and must be in his hands before the fifteenth day of March preceding the dates of examination.

4. The examination for Associateship consists of two parts. Subject to the provisions of Rule 5 following, no candidate will be permitted to present himself for Part II unless he has previously passed in Part I or takes Parts I and II in the same year. If a candidate takes both parts in the same year and passes in one and fails in the other, he will be given credit for the part passed.

5. In the case of applicants not less than thirty years of age who have had not less than five years' experience in actuarial or statistical work in insurance offices, the Council may, upon receipt of satisfactory evidence of general education, waive the passing of Part I of the Associateship Examination. Such applicants may thereupon become Associates by passing Part II thereof.

6. Admission to Fellowship examinations is granted only to those who are Associates of the Society. The examination for Fellowship is divided into two parts. No candidate will be permitted to present himself for Part II unless he has previously passed in Part I or takes Parts I and II in the same year. If a candidate takes both parts in the same year and passes in one and fails in the other, he will be given credit for the part passed.

EXAMINATION REQUIREMENTS.

7. As an alternative to the passing of Part II of the Fellowship examination, a candidate may elect to present an original thesis on an approved subject relating to casualty or social insurance. Candidates electing this alternative should communicate with the Secretary-Treasurer as to the approval of the subject chosen. All theses must be in the hands of the Secretary-Treasurer before the first Thursday in May of the year in which they are to be considered. Where Part I of the Fellowship examination is not taken during the same year, no examination fee will be required in connection with the presentation of a thesis. All theses submitted are, if accepted, to be the property of the Society and may, with the approval of the Council, be printed in the *Proceedings*.

 SYLLABUS.

ASSOCIATESHIP.

Part I.

1. Elementary algebra up to and including the binomial theorem and the use of logarithms, and compound interest and annuities-certain.

NOTE.—Under this topic the student is expected to understand what is presented in the ordinary college algebras through the binomial theorems but excluding exponential and logarithmic series. He is expected to understand the ordinary use of logarithms and to be able to handle the simpler problems in compound interest and annuities-certain as they are presented in the average college algebra, without going into the more intricate problems of bond amortization and similar matters.

2. Double entry bookkeeping.

3. Elements of statistics, including theory of compilation, tabulation and presentation, but excluding critical mathematical analysis.

Part II.

1. Elements of the theory of probabilities—algebraic treatment only.

2. Policy forms and underwriting practice in casualty insurance, viz., personal accident, health, liability, workmen's compensation, fidelity, surety, plate glass, steam boiler, burglary, fly wheel, automobile, workmen's collective, credit.

3. Simple practical problems relative to procedure in compilation and use of statistics relating to casualty (including social) insurance problems.

EXAMINATION REQUIREMENTS.

4. Simple practical problems relating to procedure in insurance accounting and statistics, including the preparation of annual statements and schedules.

NOTE.—As respects items 3 and 4, the student is expected to be prepared to carry through, under instructions, such compilations of statistical data as are usually made in the office of a casualty company and to carry through the usual accounting work, including the preparation of the statement. He should also be prepared to adapt, for the use of his particular company, statistical and accounting methods in general use. It is not expected that the candidate for Associateship should be prepared to work out new plans and methods for developing data and answering intricate questions, facility for coping with the latter type of problems being among the qualifications required for Fellowship.

5. Insurance law, including the more important statutes of the United States and Canada (for Canadian candidates) relating to casualty insurance.

FELLOWSHIP.

Part I.

1. Advanced algebra, elementary differential and integral calculus and elementary calculus of finite differences.

2. Critical analysis of statistics, including elementary mathematical theory.

3. Elements of the theory of life contingencies, including the calculation of present values of annuities based upon life contingencies.

4. Economic theory of insurance, including the theory of social insurance.

Part II.

1. Advanced practical problems in the compilation and use of statistics relating to casualty (including social) insurance problems.

2. Calculation of premiums and reserves for accident, sickness, workmen's compensation and other branches of casualty insurance, including consideration of basis of reserve.

3. Advanced practical problems in insurance accounting and statistics, including the preparation of annual statements and schedules.

4. Underwriting problems in casualty insurance, including inspection of risks, adjustment and settlement of claims, etc.

“Recommendations for Study” is a pamphlet which outlines the course of study to be followed in connection with the above syllabus. Copies of this pamphlet and also past examination questions may be obtained without charge, upon application to the Secretary-Treasurer.

1922 EXAMINATIONS OF THE SOCIETY

EXAMINATION COMMITTEE

E. S. FALLOW, - - - CHAIRMAN

IN CHARGE OF
ASSOCIATESHIP EXAMINATIONS
OLIVE E. OUTWATER, CHAIRMAN
H. O. VAN TUYL
H. FARRER

IN CHARGE OF
FELLOWSHIP EXAMINATIONS
P. DORWEILER, CHAIRMAN
S. MILLIGAN
V. MONTGOMERY

EXAMINATION FOR ENROLLMENT AS ASSOCIATE

PART 1.

1. Find the two middle terms of $\left(\frac{a}{b} - \frac{b}{a}\right)^9$
2. Find the fifth root of $x^{10} - 10x^9 + 30x^8 - 120x^6 + 48x^5 + 240x^4 - 240x^2 - 160x - 32$
3. The product of three numbers in geometrical progression is 8, and the sum of their squares is 21. What are the three numbers?
4. Andrews sells Brown an invoice of goods valued at \$1,240. Andrews accepts a \$500 Liberty Bond as payment on account. There is interest for two months accrued at $4\frac{1}{4}\%$ and the market value at time of receipt is 98. What entries should Andrews make covering these transactions?
5. Define:
 - Real Account
 - Nominal Account
 - Turnover
 - Balance Sheet
 - Sinking Fund
 - Stock Dividend
6. What is the nature of the account representing the outstanding capital stock? Is it a liability? Discuss, giving your own views.
7. Define:
 - Median
 - Index Number
 - Average
 - Graph
 - Mode
8. You desire to ascertain the relative efficiency with which farming operations are conducted in two grain growing states. What data would you consider pertinent? How would you proceed to obtain it? How would you arrange it?

1922 EXAMINATIONS OF THE SOCIETY

9. Solve the equations:

$$(a) \quad x^2 + xy + y^2 = 84 \quad (b) \quad \frac{1}{m} + \frac{1}{n} = \frac{1}{2}$$

$$x - \sqrt{xy} + y = 6 \quad \frac{1}{mn} - \frac{1}{18} = 0$$

10. A cistern can be filled by two pipes running together in $22\frac{1}{2}$ minutes; the larger pipe would fill the cistern in 24 minutes less than the smaller one: find the time taken by each.

11. A man agreed to lend \$1,000 at 6% interest compounded annually for a time long enough for the principal to double itself. How long was the money at interest?

12. What is the present value at 4% of an annuity of \$600 per year payable quarterly for a period of three years, the first payment being made three months hence?

13. Discuss briefly the general theory of double entry book-keeping, and give the basic rules for debit and credit.

14. An insurance company is being organized to conduct a general casualty insurance business. What books are required; (a) during organization; (b) to record the transactions of all kinds after organization?

15. You are employed to make a detailed investigation as to sickness among workmen in a city of 100,000 particularly seeking to ascertain the proportion properly attributable to their employment. What would you consider the best method of getting this information and how would you classify it?

16. Discuss the advantages of punch cards as a means of classifying data.

PART II.

1. If there are m copies each of n different volumes, in how many different orders can they be arranged on one shelf?

2. An archer hits his target on an average three times out of four; find the chance that in the next 4 trials he will hit it three times exactly.

3. Are the answers to the questions in accident and health applications warranties or representations? Discuss the difference between a breach of warranty and a material misrepresentation. Give hypothetical cases to illustrate each.

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4. What are the three common law defenses in actions against an employer to recover for injuries to an employee? Define them.

5. A casualty insurance company is organized with a capital of \$1,000,000 and a surplus of \$500,000. During its first year it writes \$1,400,000 gross premiums; the cancellations amount to \$150,000; and \$100,000 is paid other companies for reinsurance. The commissions paid agents average just 20%. The rate of commission allowed on reinsurance ceded is 30%. The expenses other than commissions are \$110,000. The losses paid total \$150,000. All funds are kept invested in bonds except for a working fund in bank which at the end of the year was \$60,000. The interest received on investments is \$85,000. Assuming that all premiums have been collected, what would the trial balance show at the close of the year?

6. Define the three parties involved in a contract of suretyship. Discuss briefly the nature of the obligations assumed by a surety company in writing a construction bond.

7. Which is the more important in burglary underwriting, the moral hazard or the physical hazard? Give reasons for your answer.

8. (a) Name three methods of analysis of Plate Glass premiums needed by the accounting department in their preparation of the annual statement.

(b) Illustrate, by sketch of a punch card, how you would provide the means of obtaining this analysis. Indicate headings of columns.

9. A and B throw with one die for a stake of \$11 which is to be won by the player who first throws 6. If A has the first throw, what are their respective expectations?

10. If eight coins are tossed up, what is the chance that one and only one will turn up head?

11. Explain in detail the various conditions under which a person has an insurable interest in property.

12. What is the method of obtaining the following items in the Underwriting and Investment Exhibit of Annual Statements?

Underwriting Income Earned during year

Losses Incurred during year

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13. (a) What are the "Mean Invested Assets" of an Insurance Company?
 (b) Discuss the serious errors that have been made in underwriting practice, in connection with the writing of automobile theft insurance.
14. What line of casualty insurance is issued with co-insurance? What is co-insurance? Give example of adjustment of loss under such a policy.
15. (a) Describe briefly the purpose of inspecting risks before and after the issuance of a policy.
 (b) How is a compensation rate modified by Schedule Rating and how is the information obtained?
16. What factors enter into the calculation of the premium for non-cancellable Accident and Health Insurance?

EXAMINATION FOR ADMISSION AS FELLOW

PART I.

1. Solve:

$$cy + bz = az + cx = bx + ay = abc$$

2. (a) The sums of
- n
- terms of two arithmetic series are in the ratio:
- $7n + 1 : 4n + 27$
- . Find the ratio of their 11th terms.

- (b) Sum to infinity:

$$\frac{2}{3} + \frac{3}{3^2} + \frac{2}{3^3} + \frac{3}{3^4} + \dots$$

3. Show that the series

$$1 + \frac{2^p}{2} + \frac{3^p}{3} + \frac{4^p}{4} + \dots$$

is convergent for all values of p .

4. (a) If
- α
- and
- β
- are the roots of the equation
- $ax^2 + bx + c = 0$

find the equation whose roots are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$.

- (b) Derive the formula:

$$\frac{d(uv)}{dx} = u \cdot \frac{dv}{dx} + v \cdot \frac{du}{dx}$$

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5. (a) If $u = 3x^2 + 4e^{-x} - 5x \log_a x$, find $\frac{du}{dx}$.

(b) Integrate $\int \frac{(x-1) dx}{x^2 + 6x + 8}$.

6. (a) A tangent drawn to the curve $y = x^2 + \frac{x}{2} + 3$ has a slope of 1. Find the co-ordinates of the point of tangency.

(b) Evaluate $\int_1^{2^3} \frac{x dx}{3 + x^2}$

7. Prove the formula:

$$u_n = u_0 + n \Delta u_0 + \frac{n(n-1)}{2} \Delta^2 u_0 + \frac{n(n-1)(n-2)}{3} \Delta^3 u_0 \dots + \Delta^n u_0$$

Given $u_0 = 89685, u_1 = 88994, u_2 = 88294, u_3 = 87585$, find u_9 .

8. (a) Prove that

$$\Delta x^{(-m)} = -mx^{(-m-1)}$$

where

$$x^{(-m)} = \frac{1}{x(x+1)(x+2)\dots(x+m-1)}$$

(b) Sum by finite differences the first ten terms of the series:

$$1, 3, 5, 13, 33, \dots$$

9. (a) Define:

- Frequency Curve
- Arithmetic Mean
- Median.

(b) Define Probable Error.

Find the probable error of a correlation coefficient of .3 which has been determined from 64 cases. What would you conclude in regard to this coefficient?

10. (a) What statistical measures are available for determining spread, scatter or dispersion?

(b) Compute the standard deviation of the first n natural numbers.

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11. Name two methods of fitting a straight line to the following series, in order to show the underlying trend of the rates.

Total accidents per 10,000 mean personnel in a manufacturing industry:

Year	No. of Accidents	Year	No. of Accidents
1910	2	1916	6
1911	2	1917	8
1912	1	1918	10
1913	3	1919	5
1914	3	1920	3
1915	4		

Explain how to fit the line by one of the methods.

12. (a) Find an expression for ${}_{n-1}|q_{xy}^1$.
 (b) Develop the approximate formula generally used for $a_{\overline{x}|}^{(m)}$.

13. (a) Explain what is meant by a Table of Mortality and describe its usual form.

(b) Upon what hypothesis as to the law of mortality is Makeham's formula based?

What are the advantages of having a mortality table graduated according to Makeham's formula?

14. Of two persons, one age x and the other y , what is the probability that: (a) the first life will fail in the n th year from the present time; (b) the second life will fail in the n th year; (c) only one of the two lives will fail in the n th year; (d) that neither of the two lives will fail in the n th year; (e) that one life at least will fail in the n th year.

15. In a recent trial for damages, a counsel in quoting life annuity values stated "In the case of life annuities the average number of years for which the annuity is likely to be paid is calculated and the annuity becomes an annuity certain for this period."

- (a) Discuss the truth or fallacy of this statement.
 (b) Prove your conclusions mathematically.

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16. *Discuss the advisability of adopting in this country:
- (a) Compulsory Unemployment Insurance
 - (b) Compulsory Health Insurance

PART II.

1. Outline a method, using punch cards, of keeping Automobile Collision loss experience under the present premium basis.

2. What information is necessary for the calculation of non-cancellable accident and health premiums? Is the Manchester Unity experience a good basis for the calculation of rates for non-cancellable policies in this country? Discuss fully.

3. Discuss the value of comparative (as to periods) wage statistics in connection with workmen's compensation insurance rate making.

4. It is desired to determine rates, expressed as percentages of standard limit rates, for higher policy limits (both per person and per accident) on Public Liability lines of insurance. What available information could be used in calculating these percentage rates? Outline a plan for calculating these rates.

5. What is the function of experience rating in Workmen's Compensation insurance?

Outline an experience rating plan used at present in Workmen's Compensation insurance.

6. Explain the "projection" method used to bring Workmen's Compensation state pure premiums to current level.

7. Make an outline of the present premium basis in Private Passenger Automobile Theft insurance.

8. Discuss state supervision of casualty insurance rates from the point of view of both stock and mutual companies.

9. In the convention blank for casualty insurance companies under the heading "Liabilities: Losses and Claims" the item "Incurred but not reported" appears. What is intended to be included in this item? Indicate a method of computing this item in connection with personal accident and health insurance.

*Discuss either (a) or (b).

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10. Give the principal items appearing in the underwriting and investment exhibit of the convention blank for casualty insurance companies. What is the purpose of this exhibit?

11. (a) Explain the purpose of Schedule O in the Annual Statement blank of casualty companies.

(b) Explain why the indications in the above schedule would differ considerably under Automobile Property Damage and Automobile Collision insurance as compared with Accident insurance.

12. (a) What is the difference between corporate surety-ship and insurance?

Differentiate between surety bonds and fidelity bonds.

(b) What minimum information should an underwriter have in deciding favorably on an application for a contractor's bond to cover the construction of a five-story concrete office building?

13. What coverage is furnished under "Owners' or Contractors' Protective Liability" policies? What is the basis of the premium?

14. (a) On what unit is the premium computed in the case of "Theatre Public Liability" policies?

What items are of primary consideration in the inspection of theatres?

(b) What is the difference between "Paymaster Robbery" insurance and "Messenger Robbery" insurance?

15. Discuss the following points in connection with the underwriting of non-cancellable accident and health insurance:

- Physical condition
- Personal and family history
- Age
- Sex
- Earnings
- Habitat
- Occupation.

16. What are the relative advantages and disadvantages from the standpoint of the public of casualty insurance conducted by:

- (a) Private competitive enterprise
- (b) State monopoly.