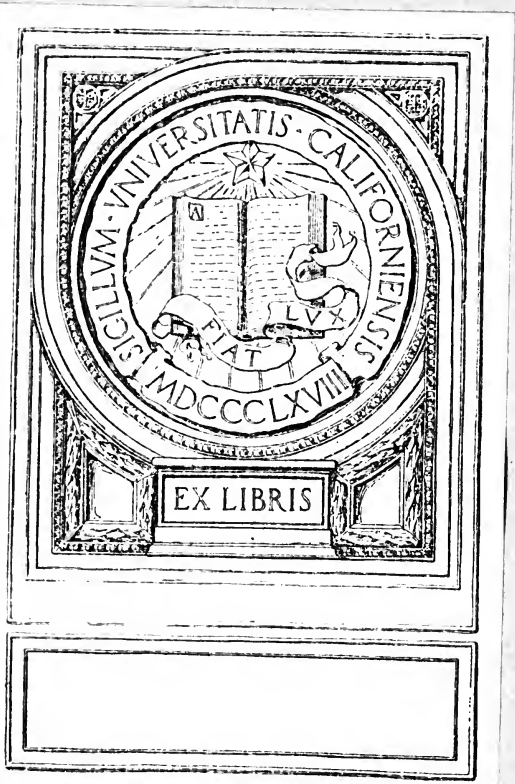


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REPORT ON 1920 REVISION  
OF  
WORKMEN'S COMPENSATION  
INSURANCE RATES



ISSUED BY  
NATIONAL COUNCIL ON WORKMEN'S COMPENSATION INSURANCE  
16 EAST 40TH STREET  
NEW YORK CITY

HD 7810  
u6N3

PRESS OF  
THE NEW ERA PRINTING COMPANY  
LANCASTER, PA.

70 VMI  
SINCE 1910

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## INTRODUCTION.

The last preceding general revision of compensation insurance rates was completed in 1917. An account of the proceedings has been published and is now a subject of historical interest.

The present revision has been prosecuted under more favorable conditions and brings to bear nearly three times as broad an insurance exposure as was available in 1917. In addition an entirely new and more scientific technique has been developed for the translation of the crude statistical data into actual rates.

It is not to be maintained, however, that the results are final and conclusive. The industrial and economic conditions which reflect themselves in compensation insurance statistics are continually shifting, so that the experience record of yesterday is contradicted by the changed indicia of today. In the attempt to solve the various problems of compensation rate-making, the best that can be done is to attain a reasonably close approximation to accuracy; to do more is impossible.



## CHAPTER I.

### GENERAL CONSIDERATIONS.

The problem of establishing rates for the insurance of workmen's compensation involves many diverse considerations and it is necessary, before attacking it, to have these considerations quite clearly in mind. A workmen's compensation insurance rate is the price at which an insurance carrier guarantees to make payments to injured workmen in accordance with the terms of a state law. This price is, of course, paid by the employer. The interests directly concerned with the establishment of proper rates are employees, employers, the public and insurance carriers. That rates shall be satisfactory to all of these interests requires that they be adequate but not excessive, and that they measure as accurately as possible the relative hazard of each industry.

#### *Adequacy of Rates.*

Adequacy of rates means that the collection of premiums by insurance carriers must, in the aggregate, yield a sufficient income to enable each carrier to make payments of compensation in accordance with the terms of the law and to meet the expenses and taxes incident to the conduct of the compensation insurance business. Adequacy is a prime consideration, for upon it depend the solvency of the insurance carrier, the guarantee to employer and employee that payments of compensation will be made when due, and the carrying out of the purposes of the compensation act. On the other hand, rates are excessive when premiums collected yield, in the aggregate, an amount larger than is necessary to enable carriers to meet their obligations and to make a reasonable profit. To the extent that they are excessive they represent an unjustifiable levy on employers and, through them, on consumers of their product.

#### *Rates as Measurements of Hazard.*

The third requirement, that rates shall measure accurately the relative hazard of industry, is based on the idea that each industry should bear the costs to which its conduct gives rise. To distribute

the cost of compensation on any other basis would not only be unjust to the employers and to the consumer, who ultimately pays the cost of carrying on industry; it would also violate the fundamental theory of workmen's compensation, that each industry is responsible for, and should bear the costs resulting from injuries which it occasions to employees. This reasoning for the industry is applicable to the individual plant as well and, where possible, rates for individual plants should also reflect relative hazard. As will be explained later, determination of relative hazard is impossible beyond a certain point and involves, in all cases, intricate and difficult processes.

### *Function of the Insurance Carrier.*

With these considerations in mind it is evident that the insurance carrier occupies an important position in the administration of workmen's compensation laws. In the collection of premiums and in the disbursement of indemnity, together with the services incidental thereto, the carrier is performing a public function. This function is performed properly only when the interests of the public are consulted and when justice is done so far as may be to each of the various interests which go to make up the public.

### *The 1920 Revision.*

The 1920 revision of rates for workmen's compensation insurance represents a careful application of fundamental rate-making principles in the light of the fullest possible statistical information by a non-partisan organization working in close touch with state officials. It was undertaken by the National Council on Workmen's Compensation Insurance early in the fall of 1919 and has occupied approximately a year. The present report is a detailed presentation of the principles and methods followed in the revision and is an attempt to place before the public the basis of the new manual of rates.

Specifically, the 1920 revision is notable for the extent to which *a priori* theory has been eliminated from its proceedings. It was early decided that available statistics of insurance experience should, to the greatest possible extent, be made the basis of the new rates. This end has been accomplished both by the accumulation of extensive data and by the development of new statistical and actuarial methods for their interpretation.

## CHAPTER II.

### DEVELOPMENT OF RATE-MAKING SINCE 1917 CONFERENCE.

Considerable steps forward in theory and in practical results were made in the 1915 and 1917 revisions of workmen's compensation rates.<sup>1</sup> These revisions represented the first attempts to bring together the various competitive and localized insurance interests for the purpose of pooling experience and of establishing more accurate rates for the use of all types of carriers. Cooperation on a national scale proved of such distinct advantage that, after the 1917 conference, it was generally conceded that such cooperation should be placed on a continuing basis.

#### *The National Reference Committees.*

The Augmented Standing Committee which had in charge the 1917 revision ceased to exist with the completion of its work. There was some question concerning the status of the old "Standing Committee" although this Committee continued to meet after the completion of the revision. After considerable discussion by insurance carriers and supervising officials it was decided to create a national advisory body representative of rate-making organizations. Accordingly there was established, under articles of organization adopted August 9, 1917,<sup>2</sup> the National Reference Committee on Workmen's Compensation Insurance for the purpose of promoting:

1. Uniform classification of industry for workmen's compensation insurance.
2. A consistent relationship between rates for individual classifications in the several states.
3. Uniform rules and procedure.

<sup>1</sup> See "Proceedings of the Joint Conference on Workmen's Compensation Rates, 1915" and "Report of the Work of the Augmented Standing Committee on Workmen's Compensation Insurance Rates—1917." The 1915 report was issued by the New York State Insurance Department, that for 1917 by the National Workmen's Compensation Service Bureau.

<sup>2</sup> See "Report of the Work of the Augmented Standing Committee on Workmen's Compensation Insurance Rates—1917," Appendix XV.

This committee consisted of the representatives of six insurance carriers,<sup>3</sup> with a state insurance department as chairman, elected by the rating boards subscribing to the agreement. Expenses were met by these boards in proportion to the premium writings of their members.

The National Reference Committee was wholly advisory in character. Proposed changes in classifications, rules, and rates were submitted to it and its conclusions were communicated to its constituent boards and bureaus for final action. By this means some degree of uniformity was attained. Absolute uniformity would have been neither possible nor desirable for each state presents certain exceptional conditions demanding specific treatment.

The Standing Committee on Schedule Rating which had been coordinate with the Standing Committee already mentioned was likewise reorganized and became the National Reference Committee on Schedule Rating under articles of organization similar to those of the committee on workmen's compensation insurance.<sup>4</sup>

#### *The National Council.*

These two committees continued until December, 1918, when, as a result of conferences of insurance carriers, managers of rating boards and state officials, there was adopted a new agreement which brought them together under one organization. This organization was known as the National Council on Workmen's Compensation Insurance and was maintained and directed by the rating boards subscribing to the agreement on which it was founded.<sup>5</sup> Its general management was in the hands of a Committee of Managers of rating boards who elected other committees. Its technical work was carried out by a new National Reference Committee similar to the preceding one, and by two auxiliary committees advisory to the Reference Committee; The Actuarial Committee, and the Engineering Committee. This new organization was formally established in December, 1918 and, like its predecessors, was purely advisory in character. That its purposes were of somewhat wider scope, however, is evidenced by a provision in the articles of organization that the council should undertake general rate revisions

<sup>3</sup> Three stock companies, two mutuals, one state fund.

<sup>4</sup> These articles of organization are contained in Appendix I.

<sup>5</sup> This agreement is given in full in Appendix II.

whenever necessary, having power to enlarge its committees for this purpose.

Early in 1918 the advisability of a general rate revision was discussed but it was decided not to undertake the work during that year. The Pennsylvania rating bureau undertook a revision of rates for that state in October, 1918, in which were applied several new principles, most of which had been discussed by the national organization.<sup>6</sup> Pennsylvania conducted another revision in 1919 as did also New Jersey and Massachusetts. During this time the question of a general rate revision continued to be discussed and considerable differences of opinion were developed as to the extent to which rates for individual states should be predicated on national experience. Out of this discussion grew the generally accepted opinion that there should be constituted with the least possible delay a national, non-partisan, advisory, rate-making body which should be fully equipped to perform all of the functions of rate-making.

#### *Reorganization of the National Council.*

Conferences were accordingly held and as a result the National Council on Workmen's Compensation Insurance was entirely reorganized and its functions, staff and equipment considerably enlarged. A constitution<sup>7</sup> was adopted on September 5, 1919, the effective date of the new organization. The objects of the Council are best stated by quoting Article II of the Constitution.

The objects of the National Council on Workmen's Compensation Insurance hereinafter called "The Council" shall be: to cooperate with rating organizations and public officials in all states in the determination of equitable rates for workmen's compensation insurance, and to promote a true public understanding concerning the establishment of such rates. To this end the Council shall:

1. Collect and compile experience for rate-making purposes.
2. Establish classifications for rate-making, and rules and procedure governing the application of the same.
3. Establish basic pure premiums and formulate fundamental general principles applicable to all states for translating such pure premiums into rates.

<sup>6</sup> For an account of the methods employed in the Pennsylvania revision, 1918, see paper by E. H. Downey and G. C. Kelly, "The Revision of Pennsylvania Compensation Insurance, 1918"—*Proceedings Casualty Actuarial and Statistical Society of America*, Vol. V, Part II.

<sup>7</sup> See Appendix III.

## 6 DEVELOPMENT OF RATE-MAKING SINCE 1917 CONFERENCE.

4. Establish rating plans for the purpose of modifying manual rates on individual risks.
5. Assist its members in deciding questions concerning manual rates, rules, classifications and rating plans.
6. Encourage and assist in the organization of non-partisan bureaus for rate regulation for states where the laws permit or require the organization of such bureaus.

The council is made up of ten subscribing rating bureaus, each having jurisdiction over compensation rates in its own state. The National Association of Mutual Casualty Companies and the National Workmen's Compensation Service Bureau are also members. The conduct of its business affairs is in the hands of a Governing Committee, while technical matters are handled by special committees elected by the Committee of Managers, composed of the managers of all the subscribing bureaus. These technical committees are the General Rating Committee, the Actuarial Committee, the Engineering Committee and the Coal Mine Committee. Each is a "balanced committee" made up of an equal number of participating and non-participating carriers. A state insurance department having supervision of workmen's compensation insurance rates is invited to preside at the meetings of each committee.

The General Rating Committee, on which the companies are usually represented by compensation underwriters, prepares and amends the manual of classifications, rules and rates on the basis of analyzed experience, and has final authority over the fundamental principles of the experience and schedule rating plans. The Actuarial Committee, on which the representatives are casualty insurance actuaries, acts for the General Rating Committee in an advisory capacity on actuarial and statistical problems in the general rating program or in the more specific problems of the experience rating plan. The Engineering Committee, made up of representatives of the carriers' engineering staffs, advises the General Rating Committee on engineering problems, particularly in connection with schedule rating, and has authority to make detailed amendments to the schedule rating plan. The Coal Mine Committee, with a membership limited to carriers writing coal mine insurance, deals with all questions affecting the rating of coal mines.<sup>8</sup>

<sup>8</sup> The membership of the committees of the National Council is given in Appendix IV.



The work of conducting the Council is in the hands of a General Manager. A staff of assistants is being developed to handle all phases of rate-making. The urgency of the 1920 revision was such that there was no opportunity for the development of a staff to perform the necessary mechanical and clerical work. Fortunately, arrangements could be made with the National Workmen's Compensation Service Bureau for the use of its committee rooms, mechanical equipment, and clerical staff under the direction of the officers of the Council. Without this assistance it would have been impossible without undue delay to have carried through the revision.

## CHAPTER III.

### THE MANUAL.

While the manual of compensation insurance rates itself represents the completed work of the Council in the 1920 revision it is well to describe its form and purposes as an introduction to the processes of rate-making.

The manual is made up of three sections containing:

1. Classifications of industry to which compensation rates apply.
2. Rates applicable to each classification.
3. Rules governing the application of rates.

#### *Classifications.*

The setting up of classifications and their definition is of fundamental importance, for on these depend the charging of the proper rate for employers' operations and the proper recording of payrolls and losses for the development of "experience." Misclassification of a risk, whether accidental or intentional, works injustice to the employer or the insurance company if it involves an incorrect charge, and causes inaccuracy in the statistics of payroll and losses on which future rates will be based. It is further important that each classification represent operations of sufficient extent to furnish an adequate statistical basis for rate-making. Classifications may be multiplied to so great a length that many will represent operations so limited that classification loss records will be practically useless for rate-making purposes.

It was generally agreed that the manual as it stood before the 1920 revision contained too many classifications, a large number representing insignificant operations, or only minor differences of hazard.<sup>1</sup> In the new manual the number of classifications has been cut down from 1319 to 953, the net result of the elimination of 466 old, and the erection of 100 new classifications. The erection, abolition, or consolidation of classifications is necessarily based on an intimate knowledge of engineering and of underwriting processes.

<sup>1</sup> For a discussion of this point see "The Uses and Abuses of Schedule Z" by E. H. Downey, published by the National Council.

Each classification should be homogeneous and should not lend itself to competitive abuse.

The classifications contained in the manual are in most cases applicable to all states without modification. Uniformity on a national scale is desirable but many states have certain peculiarities which must be recognized with exceptional classifications. These are separately listed in the manual for each state.

### *Rates.*

Each classification has assigned to it a code number for reference purposes. The manual for each state contains a series of rate sheets<sup>2</sup> on which are given the rates per \$100 of payroll exposed and the minimum premiums applicable to the code numbers.<sup>3</sup>

### *Rules.*

The third essential of the manual, a body of rules governing the application of rates, is uniform for all states with some minor exceptions. These rules have been gradually developed as underwriting experience has indicated the need of interpretation and regulation.

The manual is the embodiment of two purposes of the Council; the maintainance of national uniformity wherever possible, as illustrated by the classifications and rules; and adaptation to the peculiar circumstances of each jurisdiction, as evidenced by exceptional rules and classifications and by the entire system of rates.

<sup>2</sup> A sample set of rate sheets is reproduced in Appendix V.

<sup>3</sup> "A minimum premium is an expression of the lowest premium amount for which a single risk can be written and carried for any period not exceeding one year." (Extract from rules.)

## CHAPTER IV.

### COMBINATION OF LOSS EXPERIENCE.

Insurance carriers operate upon the fundamental theory that the past is an index to the future. Specifically, losses and expenses under workmen's compensation insurance contracts are a guide to probable future losses and expenses and hence are a basis for rates. For this reason careful records of the experience of carriers have been kept. The present chapter explains these records and their combination on a national scale.

#### *Criteria of Experience.*

In the use of insurance experience certain criteria of its value should be kept in mind. In the first place the data must be accurate. This requirement may seem so obvious as not to need statement but it is so fundamental and so often neglected that it should be emphasized. Misclassifying the payroll or losses of a large risk may materially affect the experience record for a classification. Insistence upon careful checking of data is essential if the experience recorded is to present a true statement of past events. To the extent that the statement is untrue, action predicated upon it will be inaccurate.

Secondly, data, to be useful, must be sufficiently extensive to be indicative of underlying conditions rather than a mere record of chance events. In workmen's compensation this quality in the experience may be viewed from several different angles; period of time covered, payroll of risks which produced the experience, amount of losses, nature of losses, amount of premiums, hazard of the classification. Subject to qualification, it may be said that the greater the amount of experience compiled for a given industry in terms of payroll, of premiums or of losses, the greater the value of the experience as an indication of the loss-producing characteristics of that industry and hence of the rate which should be charged.

Lastly, it must be remembered that, although accurate experience may have been compiled for extensive operations, it will not serve

as a basis for future charges unless there is some correspondence between the conditions of the future and of the past period during which the experience was produced. Ideally, the conditions should be exactly the same; actually, an adjustment may be necessary to adapt experience indications to new conditions.

### *Schedule Z.*

In workmen's compensation insurance the basic report of experience by carriers is known as Schedule Z. This report is submitted in two general forms; one, a summary of experience for each classification and the other, a report to be made for each individual case of death or serious disability.<sup>1</sup> Two complete reports are filed for each policy year, one during the year following the termination of the experience period and another one year later when the experience is more fully matured. The entire subsequent structure of experience is based upon these reports and the greatest care is taken to insure their accuracy. To this end they are audited by statisticians and doubtful figures are investigated. Official Schedule Z reports are required by the supervising authorities of eight states<sup>2</sup> and reports are filed with the National Council for other states in which competitive insurance carriers operate.

The compiling of up-to-date and accurate experience in workmen's compensation insurance is peculiarly difficult because of the policy-year method of accounting and because of the continuing and often indeterminate nature of losses. The policy-year is the period covered by all policies issued during a given year and extends over two calendar years, from the time the first policy is written in a given year to the time of expiration of the last policy written during that year. This basis for accounting is necessary since premiums and payrolls, to which losses and rates are related, are in terms of a full policy-year and to use a calendar-year basis would be highly impractical.

Even after the expiration of a policy year accurate statements of loss experience are difficult to make. Payments under the law may have to be made for the lifetime of the beneficiary and in many cases payments depend upon continuance of disability for a period which cannot be definitely ascertained at the time of making the

<sup>1</sup> Typical examples of these reports are given in Appendix VI.

<sup>2</sup> California, Delaware, Maine, Massachusetts, New Jersey, New York, Pennsylvania, Wisconsin.

report. Statistics of losses for a considerable period after a policy is written cover losses already liquidated as well as "outstanding" losses, those incurred but not yet paid. These two parts combined make up the total losses incurred under the policy for which provision must be made in rates.

Further, conditions affecting compensation losses change rapidly, so rapidly that experience loses its value in a relatively short time. When one also considers that it is only recently that experience of large volume has been properly collected it is evident that there must be some compromise between the use of recent experience involving estimates of outstanding losses and the use of fully matured experience developed under earlier conditions. When the accumulation of data for the 1920 revision was begun in November, 1919, the latest experience available was for policy year 1917, covering the calendar period 1917-1918. Second reports on Schedule Z forms were likewise available for the policy-year 1916, except in a few states the compensation laws of which were not in effect in 1916. Some earlier experience could have been secured but it was considered too old to be of value. It was accordingly decided to make use of policy years 1916 and 1917 and figures were collected from twenty-seven states representing total payrolls of approximately \$12,000,000,000 and total losses of approximately \$79,000,000.

#### *Combination of Experience.*

Had all of this experience been produced under identical laws and under exactly similar conditions for each industry it would have been possible to add losses and payrolls for each classification and work from the results. But as this volume of experience was originally collected it was representative of operations under widely varying laws, varying distributions of industry and diverse underlying conditions. In order to bring together sufficient data to be indicative of probable losses it was necessary to combine the figures from all states on a single basis.<sup>3</sup> The state of New York contributed the largest amount of experience, its Schedule Z data was carefully collected and audited by state officials, and its schedule of benefits was representative and called for higher payments than

<sup>3</sup> As will be seen, it was also necessary to further combine the data for numerous individual classifications in order to secure adequate exposure.

that of any other state. With these considerations in mind the experience of that state for policy-year 1917 was selected as a standard to which the losses of other states should be converted.

### *Conversion Factors.*

In previous revisions the work of conversion to a common level had been effected by the use of flat theoretical differentials. The cost of compensating one hundred thousand accidents distributed by results had been calculated, using the Standard Accident Table and the terms of each state law as a basis. The cost for the basic state had then been compared with the cost for each additional state<sup>4</sup> and the ratio became a factor to be applied to the losses of the additional state to convert them to the level of the basic state. This factor was applied alike to all types of losses and all classifications within a given state. It has long been realized that this method is unsatisfactory as it does not rest on statistics of actual experience and gives no recognition to certain variants between states. It is only recently that such statistics and methods adapted to their use have been developed.

An innovation was applied in the 1920 revision which had been strongly urged in 1917 and which had been tested out in Pennsylvania and New Jersey, viz. the partial experience *conversion factor*. A conversion factor is a factor which, when applied to the losses of an additional state, will produce theoretically the losses which the same accidents would have occasioned under the law and conditions of the basic state. For example, if losses in a given state amounted to \$50,000 and the factor for converting to the New York 1917 basis was 1.50 the probable New York losses would be \$75,000. One of the first problems of the actuarial committee was the development of a method of thus comparing the loss experience of New York and other states in such a way as to discover factors of this sort which would represent the difference in actual experience between the states. The method used to this end is described below.

A secondary, but vital, question arose concerning the loss divisions of the experience to which the conversion factors should be applied. As has been explained such factors had in the past been

<sup>4</sup> The term "basic state" is used to refer to the state which has been selected as a standard, and the term "additional state" to refer to states, the experience of which is to be converted to this standard.

applied to total losses for each state. But the variation between state laws is not the same for all classes of benefits. For example, the total benefits payable for an entire group of accidents under the New York law might be twice as great as under the law of another state. Analysis of benefits by type however might show that death and permanent disability benefits in New York were three times as liberal, benefits for other types of disability one and one-half times as liberal and medical provisions the same in both compensation acts. Conversion on the basis of a single factor would accordingly distort the experiences and it was therefore determined to develop separate factors by type of benefit. Another variation in the relationship between any two states is that dependent upon the class of industry considered. Referring to the example just cited, although benefits for industry as a whole in New York might be twice as great as in another state, this relationship might not hold for particular industries or groups of industries.

Hence, to allow for these variations it was deemed necessary to convert separately the losses for different classes of benefits and also for different groups of industry. For this purpose losses were first divided into the following categories:

1. "D. and P. T. D." (death and permanent total disability).
2. "A. O. Indemnity" (all other indemnity).
3. "Medical."

The first of these classes included indemnity losses in fatal and permanent total disability cases; the second, indemnity losses in permanent partial disability and temporary disability cases; the third, all medical losses irrespective of the nature of the injury. For the purpose of converting "all other" and "medical" losses a further division into three groups of industries was made:

1. Classifications involving essentially contracting and building operations, including excavation and other heavy out-door work.
2. Classifications characterized by a marked dismemberment hazard.
3. All classifications not included in groups 1 and 2.

Each of these divisions of losses presented peculiar characteristics which marked it off from other divisions. It would have been possible to have divided losses to an even greater extent but for practical purpose the divisions used were regarded as sufficient.



*1920 Conversion Factors.*

Death and permanent total disability losses are so infrequent and the amount of indemnity payable so variable that it was decided to use an average value method of conversion. An amount was selected for each schedule to represent the average cost of compensating D. and P. T. D. cases in that schedule under New York 1917 conditions. This average amount was multiplied by the number of D. and P. T. D. cases for each classification in each state. The results represented the additional state losses reduced to the New York 1917 level. For example, sixteen D. and P. T. D. cases occurred under the classification "Tanning" in Massachusetts during the policy years 1916-1917. The average value assigned to the leather schedule, under which "Tanning" is found, was \$3500. The converted losses for Massachusetts for this classification were, therefore, \$56,000.

"All Other" and "medical" losses have been converted to the basic level by a formula method which was developed by Mr. W. W. Greene.<sup>6</sup> In brief this method consists in first securing an approximate conversion factor and in correcting this first approximation by applying the Greene formula. The corrected conversion factor is applied to the losses of the additional state and the result represents probable losses on the New York 1917 level. Separate factors were worked out in each state<sup>7</sup> for "all other" losses and for "medical" losses in each of the three groups of industry.<sup>8</sup>

*Greene's Method.*

The first approximation for each division of experience is obtained by securing the ratio of the average loss per \$100 of payroll in an additional state and the average for the New York 1917 experience. This ratio is then used in the following formula to secure a corrected conversion factor:

$$E = \frac{R - D \frac{\text{Total Losses for Basic State}}{\text{Total Losses for Additional State}}}{1 + D}$$

<sup>5</sup> For a full list of these average values see Appendix VII.

<sup>6</sup> For an explanation of the development of Greene's formula see "Upon Combining Compensation Experience from Several States" by W. W. Greene. *Proceedings of the Casualty Actuarial and Statistical Society of America*, Vol. VI, Part I.

<sup>7</sup> With certain minor exceptions.

<sup>8</sup> For the purposes of the calculation of each conversion factor twenty representative classifications of industry were selected.

where  $E =$  Corrected conversion factor,  
 $R =$  First approximation to conversion factor,  
 $1 + D = \frac{\text{Expected Losses for Basic State (Using } R)}{\text{Actual Losses for Basic State}}.$

As an example of the process employed, the calculation of a conversion factor for "all other losses" in Group I for the state of Illinois may be taken. The total payroll for twenty selected classifications in New York (1917) was \$52,825,000. For the same classifications, total payroll for Illinois for 1916-1917 was \$44,504,600. Total "all other" losses for the same period amounted, in New York, to \$721,384, or \$1.366 per \$100 of payroll and, in Illinois, to \$330,563, or \$0.743 per \$100 of payroll. Dividing 1.366 by .743 produces a first approximation of 1.838. Multiplying the Illinois losses in each of the twenty classifications by this figure converts them to the New York 1917 basis. It is then possible, by adding the converted losses to the actual New York 1917 losses and comparing the total with the combined payrolls of the two states, to determine losses per \$100 of payroll on the New York 1917 basis as indicated by combined New York and Illinois experience. If the Illinois losses have been properly converted this should give more accurate results than could have been secured by using the figures for either state by themselves since the broader the exposure, the more reliable the experience as an indication of probable losses.

As a test of the accuracy of this combination the loss indication per \$100 of payroll for each classification may be applied to the New York 1917 payroll for that classification. While the results of this application cannot be expected to reproduce the actual New York losses for individual classifications because the exposure will be, in most cases, too small, the total of New York 1917 losses as indicated by the combined experience should closely reproduce the actual losses because the total New York exposure is sufficiently broad to give reliable results. Such a test showed that the total loss indications of the combined experience was \$725,869, six tenths of one per cent. more than the actual losses of \$721,384.

But, as has been indicated, this result was obtained by the use of an approximate conversion factor which was to be corrected by the application of Greene's formula. The substitution of figures

for the symbols may now be made:

$$R = 1.838,$$

$$1 + D = \frac{\$725,869}{\$721,384} = 1.006,$$

$$D = 1.006.$$

Substituting in the formula

$$E(\text{Corrected conversion factor}) = \frac{1.838 - .006 \frac{721,384}{330,563}}{1.006} = 1.814.$$

The approximate conversion factor of 1.838 has now been corrected to 1.814, a factor from which more accurate results may be expected. A final test, using 1.814 as the conversion factor, shows that New York 1917 losses as indicated by the combined experience amount to 721,869 or 100.07 per cent. of the actual New York losses. An error as small as this may properly be disregarded.<sup>9</sup>

Similar calculations and tests were made by types of losses and by groups for each state.<sup>10</sup> With a complete set of factors representing the difference between the level of losses for a given state and the New York 1917 level the process of converting to the latter level was simply one of multiplying losses for each type of benefit for each classification by the appropriate conversion factor. The sum of the results in each case constituted the total national loss experience. With this total loss experience and with total payrolls the indicated loss per \$100 of payroll could be calculated for individual classifications and states or for any groups of classifications or of states.<sup>11</sup>

<sup>9</sup> The complete working sheet used for the calculation and test of the factor considered in this example is given in Appendix VIII.

<sup>10</sup> A complete table of conversion factors is given in Appendix IX. Certain exceptions in the division of experience are there noted.

<sup>11</sup> In Appendix X is presented a statement of the entire experience collected. The columns headed "P. P." contain the amount of converted losses per \$100 of payroll.

## CHAPTER V

### SELECTION OF BASIC PURE PREMIUMS.

The next step in the rate-making process is the selection of basic pure premiums, using as a guide the combined experience. Basic pure premiums are quantities expressing the probable losses under the conditions of the basic state, in this case New York for the policy year 1917. These basic pure premiums do not indicate the amounts which must be collected in order to pay losses in the future. They furnish simply a standard of reference (analogous to index numbers) on the basis of which rates can be constructed and serve to indicate the *relative hazards* of the various classifications of industry.

#### *Presentation of Experience.*

As the converted experience was to be used by the General Rating Committee in the selection of basic pure premiums it was essential that it be presented to them in such form as to furnish all of the information required and to simplify interpretation. It was desired to have readily available figures for individual classifications by states, by groups of states, and for the country as a whole. Combinations of related classifications were also presented. A sample experience sheet for classification 3632 is given on page 19. It will be seen that this sheet presents the payroll of the classification, the number of cases (except medical), the total amount of losses, and the pure premiums or losses per \$100 of payroll.<sup>1</sup> Space is provided for notations by members of the committee. The classifications of industry included in the manual have been combined into 899 groups and the groups into 37 schedules.<sup>2</sup> On sheets

<sup>1</sup> This is the indicated pure premium, the amount of converted losses per \$100 of payroll. It is to be distinguished from the selected pure premium, the amount selected by the rating committee as representative of the hazard of each classification.

<sup>2</sup> Classifications which are homogeneous from an insurance point of view have been selected to make up each group and schedule. Reference to Appendix VII (average values) will indicate the general nature of the schedules.

Machine Shop - no foundry

CODE NO. 3632

SELECTION OF BASIC PURE PREMIUMS.

19

STATE	POLICY YEAR	PATROLL (IN HUNDREDS)	DEATHS & PERMANENT			CONVERTED LOSSES (NEW YORK 1917 BASIS)			MEDICAL			TOTAL AMOUNT	TOTAL P.P.
			NO. DEATHS	AMOUNT	P.P.	NO. CASES	AMOUNT	P.P.	AMOUNT	P.P.			
1	NEW YORK	1917	302390	39600	.13	1178	232661	.77	78872	.26	261923	1.16	
2	NEW YORK	1918	346150	70400	.20	2038	303414	.88	63769	.19	439583	1.27	
3	CONNECTICUT	1918-17	103660	26400	.26	490	83889	.81	29070	.28	132359	1.25	
4	MAINE	1918-17	25260	8800	.35	35	28532	1.15	8428	.33	48760	1.81	
5	MARTLAND	1918-17	27595	13200	.48	64	25681	.93	7173	.26	46054	1.67	
6	MASS.	1918-17	351694	83600	.22	284318	67	97179	.25	435097	1.15		
7	NEW JERSEY	1918-17	203966	22000	.07	855	212052	.70	77364	.26	211417	1.03	
8	PENNA.	1918-17	754410	149600	.20	2691	565946	.75	198539	.28	914086	1.21	
9	RHODE ISLAND	1918-17	39843	4400	.11	94	12428	.31	6762	.17	28600	.69	
10	VERMONT	1918-17	31989	8800	.28	94	24869	.78	6546	.21	40305	1.27	
11	TOTAL EASTERN STATES		2316947	426800	.19	7492	1744781	.75	575602	.25	2747763	1.13	
12	ILLINOIS	1918-17	243550	73080	.13	1826	193480	.79	64500	.27	288780	1.19	
13	INDIANA	1918-17	76571	13200	.17	460	64495	.84	22742	.30	100437	1.21	
14	IOWA	1918-17	21422	17600	.82	110	11180	.62	5273	.25	24053	1.59	
15	KANSAS	1918-17	3942	3080	.24	31	3840	.98	1780	.45	5620	1.43	
16	MICHIGAN	1918-17	126261	73080	.24	482	113402	.90	36312	.29	180514	1.43	
17	MINNESOTA	1918-17	23997			142	25873	.76	8006	.24	33879	1.00	
18	NEBRASKA	1918-17	5955			45	5625	.95	1784	.30	7419	1.25	
19	S. DAKOTA	1917	164										
20	WISCONSIN	1918-17	164153	4400	.03	1143	121426	.79	37773	.25	162611	1.07	
21	TOTAL CENTRAL STATES		665951	229600	.15	4238	529343	.81	178170	.27	814313	1.22	
22	CALIFORNIA	1918-17	97282	22000	.23		76564	.79	25263	.28	123822	1.28	
23	COLORADO	1918-17	20448			75	17305	.85	752	.38	25057	1.23	
24	MONTANA	1918-17	963			2	92	.10	246	.26	338	.36	
25	NEW MEXICO	1917	35										
26	UTAH	1917	1816			13	2932	1.62	829	.46	3761	2.08	
27	TOTAL WESTERN STATES		120609	22000	.19	90	96893	.80	4035	.28	162978	1.27	
28	KENTUCKY	1918-17	11964	4400	.37	69	7027	.59	3423	.29	14855	1.25	
29	LOUISIANA	1918-17	3531			96	7560	.89	2804	.32	10354	1.21	
30	OKLAHOMA	1918-17	4895			42	10536	2.15	1955	.40	12501	2.55	
31	TEXAS	1918-17	16654	4400	.26	110	8307	.50	3757	.22	16454	.99	
32	TOTAL SOUTHERN STATES		49044	8800	.21	317	33420	.80	11954	.28	54174	1.29	
1	GRAND TOTAL		3146461	12654400	.18	12127	2414427	.77	799811	.26	7876843	1.20	

1918 CONVERTED (NEW YORK BASIS) .90

ADOPTED PURE PREMIUM (For value of Prima Commission Only)

STATE	O. P.	ALL.	MECH.	TOTAL
	1.0			
EXCEPTIONS				

NOTE  
 The above is by classification and includes the experience for the following classes (for the code numbers)

similar to that given on page 19 converted experience was presented for each group and for each schedule.

### *Methods of Selection.*

Owing to variations in the volume and dependability of the experience presented the same line of reasoning could not be followed in the selection of basic pure premiums for all classifications. Experience indications were necessarily supplemented by expert judgment. The various methods used in selection have already been described by the Secretary of the Council in a paper read before the Casualty Actuarial and Statistical Society of America. The following examples are taken from this paper.<sup>3</sup>

1. The simplest case is where the experience is reasonably uniform by states and regions and represents a sufficient volume for the entire country to produce a true indication for each pure premium element. A classification of this type is 3632—"Machine Shops—no foundry," the experience of which is reproduced in exhibit IV.<sup>4</sup> For this classification the national indications were adopted without modification and no exceptions were established. The selected pure premiums thus correspond to the indicated pure premiums, namely:

D. & P.T.D.	All Other Indemnity.	Medical.	Total.
\$ .18	\$ .17	\$ .25	\$ 1.20

2. A second case of common occurrence is where there are several classifications so related from the standpoint of hazard that the combined experience of the group is representative. A group of this description may constitute one of the groups of the Manual Classifications Code or it may be made up by associating classifications within a single code group or from several different code groups. In these cases the group experience may be uniform by states and may aggregate a dependable volume for the United States thus enabling the committee to establish the country-wide indications for all states and for all classifications in the group. The group experience is then the basis for rate making, it being used as the experience of a single classification would be used, and the results applied to the individual classifications.

A case in point is group 161 of the Manual Classifications Code which comprises the following classifications:

<sup>3</sup> "The Technique of Rate Making as Illustrated by the 1920 National Revision of Workmen's Compensation Rates," by G. F. Michelbacher, *Proceedings of the Casualty Actuarial and Statistical Society of America*, Vol. VI, Part II.

<sup>4</sup> See page 19.

2501—Clothing Manufacturing.

2502—Fur Goods Manufacturing.

2503—Dressmaking.

2520—Collar and Cuff Manufacturing.

2521—Shirt Manufacturing.

4416—Rubber Garments Manufacturing—no rubber mill.

The regional and country-wide indications for this group are presented in the following table:

Region.	Payroll Exposure.	Indicated Pure Premiums.			
		D. & P. T. D.	A. O.	Medical.	Total.
Eastern .....	\$400,818,500	\$.02	\$.11	\$.05	\$.18
Central .....	40,140,800	.05	.10	.03	.18
Western .....	7,142,300	0	.09	.03	.12
Southern .....	4,583,800	0	.08	.03	.11
U. S. A.....	452,685,400	.02	.11	.05	.18

It will be noted that if account is taken of the limited exposure in the western and southern regions and the fact that no "D. & P. T. D." losses appear in either experience, the indications of the total pure premiums and also of the partial pure premiums are fairly uniform. In this case the national indications were adopted for all states and for the six classifications in the group.

3. The next type includes cases of classification and group experience which have developed unique indications in individual states and territories requiring the establishment of exceptions. Such a case is that of classification 1321—"Oil Producing—operation of oil leases, etc." It is apparent from a consideration of the nature of the operations falling under this classification that a single set of pure premiums for the United States would not measure the varying conditions found in individual states in which this industry is important. This is fully borne out by a review of the experience for the more representative states which is presented in the following table:

Region.	Payroll Exposure.	Indicated Pure Premiums.			
		D. & P. T. D.	A. O.	Medical.	Total.
Pennsylvania ..	\$ 5,127,000	\$1.14	\$1.78	\$.27	\$3.19
California .....	7,709,100	.41	.39	.14	.94
Oklahoma .....	9,298,200	.29	1.07	.29	1.65
Texas .....	4,628,400	1.15	1.23	.44	2.82
U. S. A.....	30,872,500	.81	1.03	.26	2.10

In this case exceptions were established for the states of Pennsylvania, California, Oklahoma and Texas based upon the local experience in each state.

4. There are many cases, however, where the experience of a single classification or even the experience of a homogeneous group is inadequate. These are the cases presenting difficulties. No practical criteria have been developed which may be applied to the payroll or losses for the purpose of measuring the adequacy of experience for rate making purposes. Judgment is still an important factor. It is evident that the losses which occur with the greatest frequency require the least exposure to produce a dependable indication, and that those which occur infrequently cannot be measured except by large volumes of data. In general, losses furnish the most reliable guide to a dependable experience and the volume necessary to provide a reliable rate making basis varies from the "Medical" division, for which the least exposure is required, to the "D. & P. T. D." division, where the experience indication is only conclusive if the exposure is large.

Two cases will illustrate these points. Take, for example, classification 3075—"Coppersmithing—shop only." For this classification the total payroll for the United States was \$1,554,300 and the indicated pure premiums were as follows:

D. & P.T.D.	All Other Indemnity.	Medical.	Total.
0	\$ .48	\$.26	\$.74

The experience obviously was so limited that there was no basis for establishing exceptions for individual states or regions. As a matter of fact the country-wide experience itself was incomplete, as evidenced by the absence of death and permanent total disability losses. In this case the committee accepted the indications of the experience for the "All Other" and "Medical" pure premiums and supplied the "D. & P. T. D." pure premium by adopting \$.12, the indication for a number of related groups in schedule 17.

The second example is that of classification 5103—"Door, Window Frame, or Sash—erection and repair—metal or metal covered." The experience for this classification for the United States on a payroll exposure of \$2,722,100 indicated the following pure premiums:

D. & P.T.D.	All Other Indemnity.	Medical.	Total.
\$1.95	\$1.58	\$.36	\$3.89

The committee, after a careful review, decided that the "D. & P. T. D." indication was abnormal. It was willing, however, to accept the "All Other" and "Medical" indications as correct. The problem was to find a "D. & P. T. D." pure premium which might be used for the classification. The "D. & P. T. D." indication of group 664—"Ornamental and Architectural Metal Work Within Buildings," the group in which classification 5103 falls was selected, the adopted pure premiums being as follows:

D. & P.T.D.	All Other Indemnity.	Medical.	Total.
\$1.23	\$1.58	\$.36	\$3.17



5. Finally, there are cases where there is some experience but it is of such small volume as to be of no value whatever for rate making, or where there is no available experience at all. These will arise where the classification has not been in existence long enough to permit the accumulation of a representative experience, where the classification is newly erected, or where an existing classification is radically amended, thus making it impossible to use the experience accumulated under the old wording for the purpose of establishing pure premiums for the new classification. Such cases are treated in several ways:

(a) They may be found to represent substantially the same hazards as classifications for which experience is available in sufficient volume for rate making purposes, in which event the pure premiums of the analogous classification may be adopted.

(b) They may be compared with some classification for which experience is available and a factor of relationship established which will permit the derivation of pure premiums from those established for the related classification.

(c) The pure premiums may be established entirely upon judgment.

(d) The existing pure premiums may be continued.

Several cases typical of this class may be described as follows:

(a) Prior to the revision there was a single classification in the manual for "Fertilizer Manufacturing." This was classification 4580—"Fertilizer Manufacturing—no phosphate companies." It was found in practice that this classification, which carried a substantial rate, did not properly reflect the hazards of certain concerns, which buy ingredients and manufacture fertilizer by the simple process of mixing these materials by hand and putting them in sacks or other containers. During the revision it was decided to eliminate classification 4580 and to erect two classifications in its place, one of which was particularly designed to fit the type of risk I have described and which was expressed in the following language: "Fertilizer Dry Mixing Plants—excluding the manufacture or handling of acid, bone and rock crushing, and the preparation of tankage—not available for division of payroll."<sup>5</sup> The new classification could not be compared with classification 4580 and the experience for classification 4580 was, therefore, of no value in determining pure premiums for it. This being the case the committee sought some analogy which would enable it to determine pure premiums. The new classification for this purpose was related to classification 4581 Phosphate works—no mining: and the

<sup>5</sup> The "not available for division of payroll" clause means that the classification cannot be used unless it describes the complete operations of the risk. It, therefore, cannot be used to cover the mixing operations of a fertilizer manufacturing risk which manufactures fertilizers from raw materials.

following pure premiums—previously adopted for classification 4581—were established:

D. & P.T.D.	All Other Indemnity.	Medical.	Total.
\$ .51	\$ .56	\$ .25	\$ 1.32

(b) A similar case is that of a new classification described as follows: "Cord and Twine Manufacturing—not from manilla, hemp, sisal or jute—including the manufacture of cotton rope or cord." In the absence of experience this classification was deemed to represent the same hazards as classification 2222—"Cotton Spinning and Weaving" and the pure premiums of classification 2222 were, therefore, adopted.

(c) The next example is the case of classification 4923—"Photographic Supplies Manufacturing." For this classification the national experience was deemed to be entirely out of line and was, therefore, discarded. In the absence of a better indication the old pure premium of \$.48 was continued and arbitrarily divided as follows:

D. & P.T.D.	All Other Indemnity.	Medical.	Total.
\$ .12	\$ .24	\$ .12	\$ .48

(d) During the revision the "steel making" classifications were radically amended. Prior to the revision the classifications had included the steel making processes and had specifically excluded rolling mill and forging operations for which separate classifications and lower rates were provided. It was found that this division of the industry was impracticable and the new classifications, therefore, include rolling mill and forging operations. For example classification 3000—"Steel Work—open hearth, bessemer, and crucible, or open hearth and bessemer, casting ingots, and puddling or blooming mill operations" was eliminated and the following classification erected in its place: "Steel Making—open hearth furnaces including bessemer, with blooming mills or forging and rolling mills—excluding blast furnace operation and coke manufacturing." Naturally the experience of classification 3000 could not be used to obtain pure premiums for the new classification. An investigation was made to determine the relative proportions of "steel making" and "rolling mill" operations which would fall under the new classification and the pure premiums were obtained by using the experience of 3000 as well as the experience of 3018—"Iron and Steel Rolling Mills—n. o. c.—with or without puddling furnaces," a weight of two being assigned to the latter experience as compared with the weight of one to the experience for classification 3000, these being the proportions of payroll for the two operations assumed to be included under the new classification.

*Adjustment of D. and P. T. D. Pure Premiums.*

In the selection of basic pure premiums it had been necessary to make use of judgment to a greater extent in connection with death and permanent total disability than with other types of losses. As the classifications were considered by the committee in the order in which they appeared in the manual classifications code it was possible for inconsistencies to develop in the selection of D. and P. T. D. pure premiums merely because all classifications of similar or related hazard were not necessarily treated at the same time. The D. and P. T. D. pure premiums were carefully reviewed and a proper relativity established between them by the elimination of such inconsistencies as were found to exist.

*Test of Basic Pure Premiums.*

The selection of basic pure premiums is altogether a process of distributing the indicated loss experience equitably among classifications of industry. Aggregate converted losses must be accepted as the most accurate possible guide to probable losses on the basic level. Accordingly the net result of the process of selection should be a set of basic pure premiums which, when applied to payrolls, would reproduce the aggregate converted losses and which would tend to reproduce the losses of individual schedules, groups or classifications to the extent that the experience indications of these divisions were dependable. Total converted losses for the entire payroll considered in the revision amounted to \$116,805,204. Total losses for the same payroll, using basic pure premiums as an index, showed a variation from actual converted losses of only  $\frac{1}{10}$  of 1 per cent. Tests for schedules, groups and classifications also yielded satisfactory results.

## CHAPTER VI.

### TRANSLATION FROM BASIC PURE PREMIUMS TO STATE PURE PREMIUMS.

The basic pure premiums selected by the rating committee are, as has been indicated, representative of the New York 1917 level and of the relative degrees of hazard of the several classifications of industry. The converted experience which was used as a guide to their selection was a combination of the 1916-1917 experience from twenty-five states. The next problem in the rate making process is that of passing back from the basic level to the level of each state in order that rates may be made which will reflect individual state conditions, and which, at the same time, will be based upon the indications of hazard furnished by the entire combined experience.

#### *Translation Factors.*

This process of translating basic pure premiums into state pure premiums calls for the determination of factors which, when applied to the basic pure premiums, will so amend them as to make the results representative of the individual state on the combined 1916 and 1917 policy year basis. For the same reasons that conversion of experience was effected separately for three types of losses and for three groups of classifications, separate translation factors were applied to each of these divisions.

For the D. and P. T. D. loss element a comparison of average values was made. A figure representing average losses for each schedule in the additional state was compared with the average loss figure for the same schedule in the basic state and the ratio adopted as a translation factor. For example, if the average loss figure for schedule 23 for a given state were \$4,000 this would be compared with the New York figure of \$4,400 and the translation factor would be  $\frac{10}{11}$  (.90909). A basic pure premium of 0.22 would produce a state pure premium of \$0.20 for the state in question.

It was decided to adopt as translation factors for the "all other"

and "medical" loss elements the reciprocals of the conversion factors. For example, if state losses were converted to the basic level by multiplying by 2, basic pure premiums would be translated to the state level by multiplying by  $\frac{1}{2}$ . At first this might seem to be a strictly accurate method. But it should be remembered that, in determining each set of conversion factors the experience of only two states was considered, that of the basic state and that of the additional state in question. In translation, however, there is involved the combined experience of all of the states. Tests showed, however, that the use of these reciprocals furnished a sufficiently close approximation, the results of which could easily be trued up by the committee so as to make the translated pure premiums properly representative.

As an example of the translation process a simple hypothetical case may be taken. Suppose the following basic pure premiums have been established for a given classification:

D. and P. T. D. ....	.80
All other indemnity .....	1.00
Medical .....	.50
Total .....	<u>2.30</u>

Suppose, further, that translation factors are calculated as follows:

D. and P. T. D. ....	.50
All other indemnity .....	.75
Medical .....	1.00

The state pure premiums would be

	Basic P.P	Translation Factor,	=	State P.P.
D. and P. T. D. ....	.80	× .50	=	.40
All other indemnity .....	1.00	× .75	=	.75
Medical .....	.50	× 1.00	=	.50
Totals .....	<u>2.30</u>			<u>1.65</u>

Where the state experience for an individual classification was sufficient for rate-making purposes it was, of course, unnecessary to use translation factors, the state pure premiums being indicated by the actual pure premiums.<sup>1</sup>

<sup>1</sup> A sample working sheet used in the translation process is reproduced in Appendix XI. It should be noted that the term "projection" as used on the sheet is equivalent to "translation" as used in the present report.

*Tests of State Pure Premiums.*

As the state pure premiums were a measure of losses under 1916-1917 conditions for each state they should, when applied to the 1916-1917 payrolls, reproduce quite closely the actual losses of that period. They should also reproduce approximately the losses of those schedules and classifications where there was a large exposure. Tests were conducted for each state to compare, for the state as a whole and for each schedule, the actual losses and the losses indicated by the application of the state pure premiums. Similar comparisons were made for selected classifications wherever it seemed advisable.

The results of these tests were presented to the General Rating Committee in order that such changes might be made as seemed necessary to adjust the state pure premiums to the state experience. Thus, when finally adopted these pure premiums could be said to reflect national experience, state experience, and expert adjustment.

*Law Differential Method.*

In certain states for which experience data covering the years 1916-1917 were not available<sup>3</sup> factors were calculated which, when applied to the basic pure premiums, produced state pure premiums on the 1920 level. The calculation of these factors was facilitated by the construction of the American Accident Distribution table,<sup>4</sup> which is a statement of the consequences of 100,000 accidents in terms of degree of disability, of length of disability, and of number and status of dependents in fatal cases, prepared from the latest available statistics of accidents occurring in the United States. There was calculated the cost of compensating these accidents under the terms of the New York 1917 law with a 1917 wage distribution and under the terms of the law for each of the exceptional states with a 1919 wage distribution. The ratio between total costs for the two jurisdictions constituted the factor to be applied in order to pass from basic pure premiums to state pure premiums. These factors were calculated for each division of the pure premium.

The law differential method can be discarded as soon as the states for which it is used develop adequate experience.

<sup>3</sup> Alabama, Idaho, Montana, New Mexico, South Dakota, Tennessee and Virginia. There was some experience available for New Mexico and South Dakota, but it was so meager as to be of little use.

<sup>4</sup> See Appendix XII.

## CHAPTER VII.

### PROJECTION TO 1920 LEVEL.

Thus far there has been explained the process of determining pure premiums or compensation costs for the 1916–1917 period of exposure. But the gross or manual rates for which these pure premiums will serve as a basis are to be charged during the policy-year 1920. The relation of probable 1920 costs to 1916–1917 costs must be ascertained and the latter corrected to bring them to the 1920 level. This correction from a past to a future level is known as “projection.”

#### *Projection to 1919 Level.*

The actuarial work incidental to projection was done during 1920 when the latest calendar year data available were for the year 1919. Consequently, the possibility of projection of pure premiums on an experience basis was limited to that year and, as it was the general policy of the Council to eliminate personal judgment from the calculation of the new rates as far as possible, it was decided first to bring pure premiums to the 1919 level. To this end there was developed the “loss ratio method of projection,” an actuarial device which had not before been used in compensation rate-making.

#### *The Loss Ratio Method.*

The loss ratio of an insurance carrier or of a group of carriers is the percentage of premiums earned which is represented by losses incurred under the policies to which the premiums apply. If a carrier wrote policies for which premiums of \$500,000 were charged during a given policy-year and if losses incurred under these policies amounted to \$300,000 the loss ratio for the year would be 60 per cent. Suppose that during the policy years 1916 and 1917 combined the premiums of all carriers in a given state amounted to \$100,000,000 while losses incurred under policies written during those years amounted to \$52,000,000. Suppose further that with no change in premium rates, premiums for policy-year 1919 amounted to \$110,000,000, losses amounting to \$71,500,000. The

loss ratio for 1916-1917 is 52 per cent. and, for 1919, 65 per cent. Under the assumption premium rates have not changed. Therefore, since the ratio between total losses and total premiums has increased there must have been an increase in the *rate* of loss. The increase in loss ratios amounts to 25 per cent. or, in other words, the 1919 loss ratio amounts to the 1916-1917 loss ratio multiplied by 1.25.

Rates of loss are expressed in terms of pure premiums per \$100 of payroll. An increase in the loss ratio, premium rates remaining the same, is equivalent to an increase in pure premium cost. The factor measuring the increase in loss ratio may be applied to correct 1916-1917 pure premiums to the 1919 level. Following out the example used above a pure premium of \$0.60 for 1916-1917 would be corrected to \$0.75 for 1919 ( $\$0.60 \times 1.25$ ).

This hypothetical example has been presented in order to convey, in the simplest terms, the theory underlying the first and most important step in the projection of rates in the 1920 revision. The actual method employed in each state may now be described.<sup>1</sup>

#### *1919 Loss Ratio.*

The first problem was to calculate a loss ratio for policy-year 1919. For this purpose there were needed the total premiums charged on policies written during 1919, and the total losses incurred under these policies. Ultimate figures of premiums applicable to 1919 policies will not be available until 1921 when the last of these policies will have expired and an audit have been made of the payrolls on which the premiums are based.<sup>2</sup> Investigation disclosed the fact that the "Net Premiums Written,"<sup>3</sup> which are known shortly after the close of each calendar year, bear a fairly stable relationship to the premiums ultimately paid for the corresponding policy-year. By determining this relationship in a given state, and

<sup>1</sup> This description will be in general terms. For purposes of more detailed study there is presented in Appendix XIII, the complete calculation for the state of New York.

<sup>2</sup> In workmen's compensation insurance the premium originally charged to an employer is based on an estimate of his payroll for the period during which the policy is to be in effect. The premium ultimately paid is determined after the policy has expired and after the employer's payroll has been audited.

<sup>3</sup> I.e., the premiums originally charged on estimated payroll, less return premiums and premiums paid for reinsurance.



by applying a factor to the 1919 net premiums written, there was obtained a figure for ultimate premiums on policies of that year. If, for example, it was discovered that ultimate premiums were 50 per cent. more than average net premiums written as reported at the end of the calendar year and if, at the end of 1919, net premiums written were reported as amounting to \$30,000,000, ultimate premiums for *policy-year* 1919 could be estimated to amount to \$45,000,000.

Having a figure for premiums it remains to ascertain the amount of incurred losses. For this purpose a similar calculation was used since it would have been impossible to secure complete statistics for policy year 1919 until all of the contracts written during that year had terminated. In this case a stable relationship was discovered between the losses *paid* during each calendar year on policies issued during that year, as reported at the end of the year, and the ultimate losses *incurred*<sup>4</sup> for the corresponding policy year. This relationship may be expressed in terms of a factor which, when applied to losses paid during calendar year 1919, will produce the probable ultimate incurred losses for policy-year 1919.<sup>5</sup> For example, if, in a given state, the losses paid during the calendar year averaged 16 $\frac{2}{3}$  per cent. of losses incurred for the policy-year, and if losses paid during 1919 on issues of 1919 amounted to \$4,000,000, ultimate incurred losses for policy-year 1919 could be taken at \$24,000,000.

The loss ratio for 1919 would be, under these conditions, 53 per cent., obtained by comparing \$24,000,000 of losses and \$45,000,000 of premiums.

#### *1916-1917 Loss Ratios.*

The next step is to secure a loss ratio for policy years 1916-1917 of which the state pure premiums are representative. This is a simpler matter. Premiums are calculated by applying to the payrolls of 1916-1917 the 1919 manual rates discounted to allow

<sup>4</sup> For an explanation of "paid" and incurred losses see page 12.

<sup>5</sup> It must be understood that a certain degree of judgment is involved in the development of these figures for 1919. Any method of projection requires the use of incomplete experience which must be supplemented by judgment. The present method seems, however, to accomplish the desired result with the least possible use of this element.

for the effect of merit rating.<sup>6</sup> By this application the assumption made in the hypothetical example<sup>7</sup> that premium rates did not change would be satisfied. The actual losses incurred during 1916–1917 are available since they are the fundamental figures for the calculation of basic pure premiums. These actual losses may now be compared with the premiums produced by the application of 1919 rates to 1916–1917 payroll and a loss ratio for 1916–1917 produced.

Suppose that the application of 1919 rates to 1916–1917 payrolls produced \$36,000,000 in premiums and that losses for 1916–1917 amounted to \$20,000,000. The figures produce a loss ratio of 56 per cent. to be compared with a 1919 loss ratio of 53 per cent. Fifty-three per cent. is 94.6 per cent. of 56 per cent., indicating a reduction of 5.4 per cent. in the level of losses between the two periods.

The state pure premiums should, in this case, be discounted by 5.4 per cent. or, in other words, multiplied by 94.6 per cent. to obtain pure premiums on the 1919 level.

So far nothing has been said concerning the causes of changes in pure premium level. In previous revisions such causes were analyzed and an attempt made to measure the effect of each important cause by a factor to be introduced into the calculation of the rate.<sup>8</sup> These factors represented the best judgment of actuaries guided by such statistics as could be obtained. But, since they were primarily based on judgment they were, to a considerable degree, conjectural. It is the purpose of the 1920 method not to determine *causes* of change in rates of loss but to *measure* changes as a whole by means of the actual experience of carriers. The result achieved by the loss ratio method is the net effect of all influences tending toward a reduction or toward an increase in losses, a result resting directly on statistics rather than on judgment.

<sup>6</sup> The use of merit rating plans reduces the premiums actually collected below the level indicated in the manual. Since the 1919 premiums would be thus affected it is necessary to make a proper allowance in calculating 1916–1917 premiums on the 1919 basis.

<sup>7</sup> Page 29.

<sup>8</sup> See Report on Work of the Augmented Standing Committee on Workmen's Compensation Insurance Rates—1917, pp. 75 ff.

*Amendment Factors.*

The committee decided to assume that 1919 conditions with one exception would obtain during 1920. This assumption was made in order to avoid the introduction of conjectural factors such as would be involved in any attempt to predict 1920 conditions affecting the level of cost. The one exception was made where amendments to the law had been passed which would be in effect during 1920 but which had not been reflected in losses paid during 1919. Factors to take account of such amendments were calculated by using the American Accident Distribution, already described on page 28. The additional cost of compensating accidents to which each amendment would give rise was calculated and expressed in terms of factors to be applied to each division of the pure premiums. If in a given case an amendment increased D. & P. T. D. benefits by 25 per cent. while no changes were made in other benefits factors would be applied as follows:

D. and P. T. D. ....	1.25
All other .....	1.00
Medical .....	1.00

Continuing the example given on page 27 and inserting factors for projecting to the 1919 level and for amendments.

	State Pure Pre- miums 1916-1917.		Projection Factor.		Amendment Factors.	=	Pure Premiums 1920 Level.
D. & P. T. D. ....	.40	×	.946	×	1.25	=	.48
All other .....	.75	×	.946	×	1.00	=	.71
Medical .....	.50	×	.946	×	1.00	=	.47
Totals .....	<u>1.65</u>						<u>1.66</u>

*Manual Rates.*

All of the work which has been described has had as its aim the determination, for each classification of industry, of probable loss costs during policy-year 1920. This is the most difficult and most important work of a revision, for loss costs vary between wide limits and on them depend variation in charges between industries.

To produce manual, or gross rates charged to the insured, there must be added to the probable loss cost certain loadings which are explained in the succeeding chapter.

## CHAPTER VIII.

### MANUAL RATES.

Manual rates, as finally charged to the insured are a compound of two elements, losses and expenses. The pure premium brought to the level of the period during which rates are to be charged represents the normal loss cost as indicated by experience. It remains to take account of the effect of merit rating on the rates actually collected, of the abnormal catastrophe loss hazard, and of expenses of carrying on the business of compensation insurance.

#### *Effect of Merit Rating.*

The application of merit rating plans<sup>1</sup> has in general been found to produce an excess of credits over debits, which has had the effect of reducing the premiums actually collected by carriers below the average called for by the manual rate. As this average is intended to be just sufficient to cover losses and expenses any reduction might involve the carrier in a deficit. So far as experience rating is concerned it is expected that this tendency will be eliminated by the new plan now in process. It was considered impractical to make necessary and fundamental revisions in the schedule rating plan to take effect in 1920. Accordingly, the level of manual rates in classifications subject to schedule rating was adjusted so that, after the schedule has been applied, the average rate collected will be a close measure of probable cost. This adjustment was effected by multiplying the final (1920) pure premium by a factor of 1.045 in New York and of 1.06 in most of the remaining states.

#### *Catastrophe Hazard.*

In the selection of basic pure premiums all catastrophe losses not normal in an industry were eliminated from the experience. There is, therefore, no provision in pure premiums for the abnormal

<sup>1</sup> For a brief general statement of the purposes and methods of merit rating see Appendix XIV.

catastrophe hazard, the hazard of unusually large single losses,<sup>2</sup> which is present even in the lowest rated industries but which makes itself felt only sporadically. To create a fund to meet these losses a loading of \$0.01 was included in each manual rate.

### *Expenses.*

Expenses of stock insurance carriers in connection with compensation insurance are expected to amount, in states having normal taxes, to 38 per cent. of the manual rate before the addition of the catastrophe loading. This 38 per cent. is made up of the following items:

Acquisition cost .....	17.5%
Home office administration .....	8.0
Inspection and Accident Prevention .....	2.0
Adjustment of claims .....	7.0
Taxes—state .....	2.0
Taxes—federal and miscellaneous .....	1.5
Total .....	<u>38.0%</u>

In certain states where taxes exceed 2 per cent. of the gross premium sufficient allowance must be made to cover the extra assessment. In Maryland, for instance, there is a levy of 3 per cent.,<sup>3</sup> making the total expense loading for that state 39 per cent.

### *Calculation of Manual Rate.*

All of the elements entering into the final manual rate have now been explained. The example already used which produced a final pure premium of \$1.66<sup>4</sup> may be extended to serve in the calculation of a manual rate. Assuming that the classification involved is subject to schedule rating and applying the factor 1.06

$$1.66 \times 1.06 = 1.76.$$

The following formula indicates the process of obtaining the manual rate.

$$\text{Manual Rate} = \frac{\text{Final Pure Premium (loaded for schedule rating)}}{(1 - \text{expense loading})} + \text{Catastrophe loading.}$$

<sup>2</sup> A catastrophe is defined as an accident involving five or more D. and P. T. D. cases.

<sup>3</sup> Including the levy for maintenance of the Industrial Accident Board.

<sup>4</sup> See pp. 27 and 33.

Substituting

$$\text{Manual Rate} = \frac{1.76}{1 - .38} + 1c.$$

Therefore,                      Manual Rate = \$2.85.

The premium charged to the insured per \$100 of payroll in this hypothetical case would be \$2.85. Actual rates, using New York as an example, vary from \$0.07 to \$28.99.

## CHAPTER IX.

### CONCLUSION.

In the preceding chapters the work of the National Council in the 1920 revision has been explained in detail. This work represents a distinct advance in compensation insurance rate making. It has involved the improvement of old and the development of new methods. To summarize the results which have been attained:

1. The field from which experience was drawn was extended far beyond that which had contributed to earlier revisions. The experience was larger in volume and more representative in character.

2. Experience was combined on a statistical basis which gave expression to the recorded differences between states.

3. Basic pure premiums were selected in the light of better and wider experience presented in more intelligible form than heretofore. This has resulted in a redistribution of loss costs among classifications which more truly reflects their relative hazards.

4. The gap between pure premiums developed from past experience and probable future loss costs was bridged by a logical process resting on statistical information and involving a minimum of conjecture.

5. Individual state experience was recognized to the extent that it was indicative, particularly in testing out the aggregate results or conclusions in individual cases.

6. Separate treatment was given to different types of compensation benefits through the adoption of the partial pure premium basis for the combination of experience and for the projection of losses.

7. Useless classifications were eliminated, new classifications were erected wherever necessary and the wording of old classifications was revised in the interest of clarity.

8. There was evidenced a greater degree of harmonious cooperation among the different types of carriers and among the various compensation authorities.

9. In all of the details of the work greater reliance was placed on statistics and on the work of actuaries and of statisticians. The introduction of personal judgment was correspondingly lessened.

## THE FUTURE.

One of the principal faults in rate-making as it has been carried on in the past has been the lack of response to changes in conditions affecting losses. The necessity of waiting for experience to mature, the difficulty and expense of revisions and the absence of an effective national body representing all interests have contributed to this condition. The National Council has as its most important problem a more accurate and more prompt response to changes in conditions. This means a development of organized rate-making which will provide for a continuing accumulation of statistics, both of loss experience and of other related facts. There must be, likewise, continuing investigation of methods for the collection and interpretation of such statistics.

While the recognition of every factor affecting compensation costs, whether of losses or of expenses, is to be desired, efforts in this direction sometimes carry with them an unwarranted complication of procedure. Complicated causes often express themselves in relatively simple results which may be measured by equally simple devices. To the extent that it can be achieved without unduly sacrificing accuracy, simplicity in rate-making is a virtue.<sup>1</sup>

<sup>1</sup> For more detailed discussions of the principles and methods of the 1920 revision the reader is referred to "The Technique of Rate-Making as Illustrated by the 1920 National Revision of Workmen's Compensation Insurance Rates" by G. F. Michelbacher, and "The Actuarial Problems of the 1920 National Revision of Workmen's Compensation Rates and the Solutions Developed in the Actuarial Committee of the National Council," papers appearing in the *Proceedings of the Casualty Actuarial and Statistical Society of America*, Vol. VI, Part II.



APPENDICES TO REPORT ON 1920 REVISION OF WORK-  
MEN'S COMPENSATION INSURANCE RATES.

- APPENDIX I. Articles of Organization of the National Reference Committee on Schedule Rating.
- APPENDIX II. Articles of Organization of the National Council on Workmen's Compensation Insurance.
- APPENDIX III. Constitution of the National Council on Workmen's Compensation Insurance.
- APPENDIX IV. Committees of the National Council on Workmen's Compensation Insurance.
- APPENDIX V. Maryland Compensation Rate Sheet.
- APPENDIX VI. Examples of Reports on Schedule "Z."
- APPENDIX VII. Table of Average Values for Converting D. & P. T. D. Losses.
- APPENDIX VIII. Working Sheet for Calculation of the Illinois Conversion Factor for "All Other" Losses, Group I.
- APPENDIX IX. Table of Conversion Factors Used in the 1920 Revision.
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(a) By States.  
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- APPENDIX XI. Working Sheet Illustrating the Translation from Basic Pure Premiums to State Pure Premiums.
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- APPENDIX XIII. Calculation of Projection Factor for New York.
- APPENDIX XIV. Merit Rating.

## APPENDIX I.

### NATIONAL REFERENCE COMMITTEE ON SCHEDULE RATING.

#### ARTICLES OF ORGANIZATION.

##### I. *Name.*

The name of this Committee shall be the National Reference Committee on Schedule Rating.

##### II. *Purposes.*

The purposes of this Committee are:

(a) To secure and maintain uniformity in the application of schedule rating for purposes of workmen's compensation premium computation.

(b) To secure and maintain a proper consistent relationship between the rating schedules in the several states, having due regard for exceptional state conditions.

(c) To secure and maintain uniform rules and procedure governing the application of the rating schedules.

##### III. *Membership and Officers.*

The membership of the Committee shall be composed of six insurance carriers engaged in the business of workmen's compensation insurance as follows:

Three stock insurance companies.

Two mutual insurance companies.

One state insurance fund.

These members shall be chosen by a majority vote of the Managers of Rating Bureaus or Boards subscribing to this agreement. The members shall be elected annually and hold office until December 31st of each year, or until their successors have been duly elected as herein provided. Retiring members of the Committee shall be eligible for re-election. Vacancies in the Committee shall be filled in the same manner as provided for original elections and shall be for the unexpired term.

A State Department having supervision over Workmen's Compensation rates, selected in the manner provided for the election of members of the Committee, shall be invited to preside through its designated representative at all meetings of the Committee. No one such Department shall be invited to act as Chairman of the Committee for more than one successive period of twelve months.

The Committee shall elect one of the subscribing Bureaus or Boards as Secretary to serve during the pleasure of the Committee.

#### IV. *Duties of Officers.*

The Chairman shall preside at all meetings of the Committee but may not vote on the proposals before the Committee. The Secretary shall keep a record of the proceedings of the Committee, transmitting to members and to the Managers of the subscribing bureaus information and agenda as hereinafter provided.

#### V. *Relations with Subscribing Bureaus.*

No subscribing bureau shall put into effect any change until after the proposed change shall have been referred to the Reference Committee, except that in cases of extreme urgency a subscribing Bureau may put into effect a proposed change provided that its rating, safety inspection or other committee having jurisdiction over the Rating Schedule has, after due consideration, determined that such urgency exists. In any such case the Manager of such Bureau shall, nevertheless, advise the Reference Committee of such action in the same manner as hereinafter provided for ordinary proposals, so that the Committee may consider the advisability of a similar change for other jurisdictions.

#### VI. *Procedure.*

1. Whenever the proper committee of a subscribing bureau shall propose to create, abolish or amend any item, rule or standard in the Rating Schedule, the Manager of such bureau shall immediately transmit to the Secretary of the National Reference Committee on Schedule Rating a description of the proposed change including a concise statement of the reasons therefor and a summary of all data upon which the proposal is predicated. The Secretary of the National Reference Committee on Schedule Rating shall immediately upon its receipt place it upon the agenda for the next meeting of the Committee.

2. Not less than ten days before a meeting of the National Reference Committee on Schedule Rating the Secretary shall prepare and transmit to all members of the Committee an agenda showing the matters to be considered at such meeting, and attach to such agenda copies of all statements relating thereto received from the Managers of the Bureaus proposing the changes. Proposals received by the Secretary after date of closing of agenda for a meeting of the Committee shall be placed upon the agenda of the next meeting, except that by unanimous consent of the members of the Committee and Managers of the subscribing Bureaus present at any meeting a subject which has not been listed on the agenda may be acted upon.

3. Meetings of the Committee shall be attended by the designated representative, preferably the chief inspector, of each subscribing bureau whose principal office is located within two hundred and fifty miles of the place of meeting. Subscribing Bureaus or Boards whose principal office may not be located within two hundred and fifty miles of the place of meeting shall be entitled to representation through written proxy. Each member insurance carrier shall file with the Secretary the name of its representative upon the Committee and also the name of an alternate. Invitation to attend all meetings of the Committee may be extended to State Departments and hearings may be granted to other parties interested in the subject of workmen's compensation rate-making.

4. At each meeting of the Committee the Chairman shall call up each subject of the agenda in the order in which it appears, unless by unanimous consent of the members present some other order is deemed desirable. A presentation of the subject shall be made by the designated representative of the Bureau with which the proposal originated. Consideration of any subject on which material information is lacking may be postponed until the next meeting of the Committee. Representatives of State Departments, Managers or designated representatives of subscribing bureaus, or other persons present by invitation of the Committee, shall be permitted to participate in the discussion, but only carrier members shall be entitled to vote. Proposals shall be deemed adopted when assented to by a vote of the majority of the members present and voting. A tie vote shall be declared lost.

5. The Secretary shall within five days after the adjournment of any meeting transmit to the members of the Committee and the subscribing bureaus a copy of the minutes of the meeting. Such minutes shall include a concise statement of the reasons which prompted the conclusions of the Committee.

6. If the Reference Committee disapproves the proposal of a subscribing bureau, the designated representative of the bureau shall present to the proper committee of the bureau the conclusion of the Reference Committee and the Committee shall reconsider the proposal in the light of the Reference Committee's conclusions. The Committee of the proposing bureau shall then have final jurisdiction in the matter without further submission to the Reference Committee, although in the interests of uniformity it is recommended that the proposal be resubmitted to the Reference Committee on Schedule Rating for reconsideration. Proposals originating in other subscribing bureaus and approved by the Reference Committee on second reading, shall be immediately presented to the proper Committee of each subscribing bureau for adoption.

VII. *Meeting of Committee.*

The Committee shall choose its place and time of meeting, but shall meet not more often than once a month except that a meeting may be called at any time upon written request by two or more members of the Committee.

Five members of the Committee shall constitute a quorum.

VIII. *Expenses.*

The expenses of the Committee shall be pro rated among the bureaus subscribing to this agreement in proportion to the net premiums for workmen's compensation insurance written by authorized carriers during the last preceding calendar year in the state or states wherein each such bureau has primary jurisdiction. No traveling expense or compensation for personal service shall be charged to the Committee.

IX. *Effective Date.*

These articles of organization shall become effective when approved by not less than three bureaus or boards. As new bureaus or boards of competent jurisdiction may be organized such bureaus shall be admitted to participation in the work of the Committee upon subscribing to these articles.

X. *Amendments.*

These articles of organization may be amended by a majority vote of the Committee, subject, however, to the assent of a majority of the subscribing bureaus or boards.

## APPENDIX II.

### NATIONAL COUNCIL ON WORKMEN'S COMPENSATION INSURANCE.

#### ARTICLES OF ORGANIZATION.

##### I. *Name.*

This organization, which shall be known as the National Council on Workmen's Compensation Insurance, is maintained by the workmen's compensation rating bureaus and boards subscribing to these articles.

##### II. *Purposes.*

The purposes of this Council are:

(a) To promote uniformity in the making of proper classifications and rating systems for workmen's compensation insurance.

(b) To promote correctness in workmen's compensation insurance rates and a consistent relationship between the rates of different states.

(c) To promote uniformity in the rules and procedure governing the application of classifications, rates and rating systems.

##### III. *Form of Organization.*

The work of this organization shall be carried on through the following committees:

###### 1. *Committee of Managers:*

This Committee shall be composed of managers of the subscribing bureaus or boards.

It shall be the duty of the Committee of Managers to elect members to serve on the National Reference Committee, the Actuarial Committee, the Engineering Committee and other auxiliary committees that may be necessary from time to time, to designate the chairmen of such committees and to assist the Council in an advisory capacity.

###### 2. *The National Reference Committee:*

This Committee shall be composed of six insurance carriers engaged in the business of workmen's compensation insurance as follows:

Three stock insurance companies,  
Two mutual insurance companies,  
One state insurance fund.

It shall be the duty of this Committee to carry out the purposes of this organization as defined in Article II.

3. *Auxiliary Committees:* There shall be two permanent Auxiliary Committees:

(a) An Engineering Committee which shall be composed of six insurance carriers engaged in the business of workmen's compensation insurance as follows:

- Three stock insurance companies,
- Two mutual insurance companies,
- One state insurance fund.

The Engineering Committee shall have authority to act upon all proposals for amendments in the schedule rating system, except that a proposal involving a change in any fundamental principle affecting the general system of rate-making or a general revision of the schedule rating system shall be submitted to the National Reference Committee for final action, and further that the Committee of Managers shall have the right to refer to the National Reference Committee any action of the Engineering Committee.

It shall be the duty of the Engineering Committee to assist the National Reference Committee in all matters relating to the engineering problems involved in the making of rates.

(b) An Actuarial Committee which shall be composed of four insurance carriers engaged in the business of workmen's compensation insurance as follows:

- Two stock insurance companies,
- One mutual insurance company,
- One state insurance fund.

The Actuarial Committee shall have authority to act upon all proposals for amendments in the experience rating system, except that a proposal involving a change in any fundamental principle affecting the general system of rate-making or a general revision of the experience rating system shall be submitted to the National Reference Committee for final action, and further that the Committee of Managers shall have the right to refer to the National Reference Committee any action of the Actuarial Committee.

It shall be the duty of the Actuarial Committee to assist the National Reference Committee in all actuarial and statistical problems relating to the making of rates and rating systems.

#### IV. *Members and Officers of National Reference Committee and Auxiliary Committees.*

1. Members of the National Reference Committee and Auxiliary Committees shall be chosen by a majority vote of the Committee of Managers present at any duly called meeting. The members shall be elected annually and hold office until December 31st of each year, or until their successors have been duly elected as herein

provided. Retiring members of committees shall be eligible for reelection. Vacancies in committees shall be filled in the same manner as provided for original elections and shall be for the unexpired term.

2. A State Department having supervision over workmen's compensation rates, elected in the manner provided for the election of members of committees shall be invited to preside through its designated representative at all meetings of permanent committees, except the Committee of Managers. Chairmen of Committees shall be elected annually and hold office until December 31st of each year.

3. Each permanent committee shall elect one of the subscribing bureaus or boards as secretary to serve during the pleasure of the committee, except that the bureau or board elected to serve as secretary to the National Reference Committee shall also act as secretary to the Committee of Managers.

#### V. *Duties of Officers.*

Chairmen of committees shall preside at all meetings except in case of Committee of Managers but shall not have the right to vote. Secretaries shall keep records of the proceedings, transmitting to members and to Managers of the subscribing bureaus or boards information and agenda as hereinafter provided.

#### VI. *Relations with Subscribing Bureaus.*

1. Whenever the proper committee of a subscribing bureau shall propose to create, abolish or amend any classification, rate, schedule or experience rating plan for workmen's compensation insurance, or the rules governing its application, the Manager of such bureau shall immediately transmit to the Secretary of the proper committee of the Council and to the Managers of other subscribing bureaus a description of the proposed change including a concise statement of the reasons therefor and a summary of all data upon which the proposal is predicated. Every Manager of a subscribing bureau shall immediately upon its receipt submit such information to the proper committee of his bureau, and such committee may, through the Manager, make recommendations to the National Council as to the general adoption of the proposed change.

2. No subscribing bureau shall put into effect any such change until after the proposed change shall have been referred to the National Council, except that in cases of urgency a subscribing bureau may put into effect a proposed change provided that its appropriate committee having jurisdiction has, after due consideration, determined that such urgency exists. In any such case the Manager of such bureau shall, nevertheless, advise the National Council of such action in the same manner as herein provided for



other proposals, so that the Council may consider the advisability of a similar change for other jurisdictions.

### VII. *Meetings of Committees.*

1. The National Reference Committee shall choose its place and time of meeting but shall meet not more often than once in three months except that a meeting may be called at any time by the Committee of Managers.

2. Not less than ten days before a meeting of the National Reference Committee, the Secretary thereof shall prepare and transmit to all members of the Committee an agenda showing the matters to be considered at such meeting and attach to such agenda a statement of the recommendations prepared by the Committee of Managers. Proposals received by the Secretary after date of closing of agenda for meeting of the committee shall be placed upon the agenda of the next meeting, except that by unanimous consent of the members of the committee present at any meeting a subject which has not been listed on the agenda may be acted upon.

3. Meetings of the National Reference Committee shall be attended by the Manager or other designated representative of each subscribing bureau whose principal office is located within two hundred and fifty miles of the place of meeting. Subscribing bureaus or boards whose principal office may not be located within two hundred and fifty miles of the place of meeting shall be entitled to appoint a duly authorized representative. Each member insurance carrier shall file with the Secretary the name of its representative upon the Committee and also the name of an alternate. Invitation to attend all meetings of the Committee may be extended to State Departments and hearings may be granted to other parties interested in the subject of workmen's compensation rate-making.

4. At each meeting of the National Reference Committee the Chairman shall call up the items on the agenda in the order in which they appear, unless by unanimous consent of the members present some other order is deemed desirable. A presentation of each subject shall be made by the Manager or designated representative of the Bureau with which the proposal originated. Consideration of any item on which material information is lacking may be postponed until the next meeting of the Committee. Representatives of State Departments, Managers or designated representatives of subscribing bureaus, and persons present by invitation of the Committee, shall have the right to participate in discussions, but only carrier members shall be entitled to vote. Proposals shall be deemed adopted when assented to by a vote of the majority of the members present and voting. A tie vote shall be declared lost.

5. If the National Reference Committee disapproves the proposal of a subscribing bureau, the Manager thereof shall present to the proper committee of his bureau the conclusions of the Na-

tional Reference Committee, and the committee of the proposing bureau shall reconsider the proposal in the light of the National Reference Committee's conclusions. Proposals approved by the National Reference Committee, shall be immediately presented to the proper committee of each subscribing bureau for adoption.

6. Not less than thirty days before a regular meeting of the National Reference Committee, a meeting of the Committee of Managers shall be held at which meeting the proposals submitted by the subscribing bureaus or boards shall be examined and upon vote placed upon the agenda of the National Reference Committee with suitable recommendations.

7. The Engineering Committee and the Actuarial Committee shall hold meetings as often as may be necessary, subject to call of their respective secretaries.

8. The Secretary of each committee shall within five days after the adjournment of any meeting transmit to the members of the committee and the subscribing bureaus copies of the minutes of the meeting. Such minutes shall include a concise statement of the reasons which prompted the conclusions of the committee.

9. At any meeting of any committee a majority of the members entitled to vote shall constitute a quorum.

#### VIII. *General Rate Revision.*

The Council shall conduct when necessary, general revisions of the manual and rating systems. For the purpose of such revisions, and for this purpose only, the Committee of Managers may in its discretion add temporarily to the membership of the National Reference Committee and Auxiliary Committees.

#### IX. *Expenses.*

The expenses of the Council shall be pro rated among the bureaus and boards subscribing to this agreement in proportion to the net premiums for workmen's compensation insurance written by authorized carriers during the last preceding calendar year in the state or states wherein each such bureau has primary jurisdiction. No traveling expense or compensation for personal service shall be charged to the Council or any of its committees.

#### X. *Confidential Character of Committee Work.*

All proceedings and discussions of the Council and its committees shall be treated as confidential and no competitive use thereof shall be made by any member of any committee. The vote of individual members on any proposal shall not be included in the published record of proceedings.

XI. *Effective Date.*

These Articles of Organization shall become effective when approved by not less than four bureaus or boards. As new bureaus or boards of competent jurisdiction may be organized, such bureaus shall be admitted to participation in the work of the Council upon subscribing to these Articles.

XII. *Amendments.*

These Articles of Organization may be amended by a majority vote of the Committee of Managers present at any meeting, subject, however, to the assent of not less than four of the subscribing bureaus or boards.

## APPENDIX III.

### NATIONAL COUNCIL ON WORKMEN'S COMPENSATION INSURANCE. CONSTITUTION

Adopted New York City, September 5, 1919.

#### ARTICLE I. *Name.*

The name of this organization shall be: National Council on Workmen's Compensation Insurance.

#### ARTICLE II. *Objects.*

The objects of the National Council on Workmen's Compensation Insurance hereinafter called "The Council" shall be: to cooperate with rating organizations and public officials in all states in the determination of equitable premium rates for workmen's compensation insurance, and to promote a true public understanding concerning the establishment of such rates. To this end the Council shall:

1. Collect and compile experience for ratemaking purposes.
2. Establish classifications for ratemaking, and rules and procedure governing the application of same.
3. Establish basic pure premiums and formulate fundamental general principles applicable to all states for translating such pure premiums into rates.
4. Establish rating plans for the purpose of modifying manual rates on individual risks.
5. Assist its members in deciding questions concerning manual rates, rules, classifications and rating plans.
6. Encourage and assist in the organization of non-partisan bureaus for rate regulation for states where the laws require or permit the organization of such bureaus.

#### ARTICLE III. *Membership.*

Boards and bureaus affiliated with the National Council on Workmen's Compensation Insurance, as constituted prior to September 4, 1919, and any other bureau having jurisdiction over workmen's compensation insurance rates or the application thereof, shall be entitled to membership in the Council and to share equally in the benefits derived therefrom upon subscribing to this Constitution. Individual carriers shall not be members as such, but by

virtue of their membership in subscribing boards and bureaus shall have the powers conferred upon them as specified in this Constitution.

#### ARTICLE IV. *Form of Organization.*

To carry on the work of the Council as defined in Article II, the following committees shall be elected in the manner specified herein:

1. *Governing Committee:* At a meeting of insurance carriers at which this Constitution is adopted, a Governing Committee composed of six insurance carriers shall be constituted as follows: the participating carriers and the non-participating carriers, respectively acting separately, shall each elect by ballot three members, one for a term of one year, one for two years, and one for three years. Thereafter upon the expiration of the respective terms, members of the Governing Committee shall be elected in the same manner for a term of three years. "Participating carriers" are defined as stock corporations issuing dividend policies, mutual corporations, state funds, and reciprocal interinsurers. "Non-participating carriers" are defined as stock corporations issuing non-dividend policies.

(a) Vacancies shall be filled in similar manner by the respective remaining members of the Governing Committee. Members elected to fill such vacancies shall serve until the next annual meeting.

(b) The Governing Committee shall appoint a general manager and fix his salary. The affirmative vote of not less than five members shall be necessary for the election of a general manager and the determination of his salary.

(c) The Governing Committee shall have control and supervision over the finances of the Council with authority to determine and approve appropriations for each quarterly budget, and authority to determine and approve the assessments to be levied upon the members of the Council.

2. *Committee of Managers:* The General Manager of the Council and the manager of each board and bureau affiliated with the Council shall be members of this Committee.

(a) The Committee of Managers shall elect its own chairman.

(b) It shall be the duty of this committee to elect members to serve on the General Rating Committee, the Actuarial Committee and the Engineering Committee, and designate the chairman of such committees, assist the Council in an advisory capacity and further to approve or disapprove applications for membership in the Council.

3. *General Rating Committee:* This committee shall be composed of three participating and three non-participating insurance carriers.

(a) It shall be the duty of this committee to prepare a manual

of classifications and rules, establish basic pure premiums and subsequent amendments in such manual and basic pure premium, and approve rating plan determined upon by the Actuarial and Engineering Committees.

(b) The Committee of Managers shall have the right to refer to the General Rating Committee any action of the Actuarial or Engineering Committees.

(c) If deemed expedient the Committee of Managers may, in its discretion, add temporarily to the membership of the General Rating Committee; members thus added shall be equally divided between participating and non-participating carriers.

4. *Actuarial Committee*: This committee shall be composed of three participating and three non-participating insurance carriers.

(a) It shall be the duty of the Actuarial Committee to advise the General Rating Committee on all actuarial and statistical problems relating to the combination of experience, the establishment of basic pure premiums, the formulation of fundamental principles for the conversion of pure premiums into rates and the establishment of rating plans.

(b) This committee shall have authority to act on all proposals for amendments in the experience rating system.

(c) Proposals involving a change in any fundamental principles affecting the general system of ratemaking, or a general revision of the experience rating system, shall be submitted to the General Rating Committee for final action.

5. *Engineering Committee*: This committee shall be composed of three participating and three non-participating insurance carriers.

(a) The Engineering Committee shall have authority to act upon all proposals for amendments in the schedule rating system.

(b) Proposals involving a change in any fundamental principle affecting the general system of ratemaking, or a general revision in the schedule rating system, shall be referred to the General Rating Committee for final action.

#### ARTICLE V. *Members and Officers of General Rating, Actuarial and Engineering Committees.*

1. Members of the General Rating, Actuarial and Engineering Committees shall be elected by a majority vote of the Committee of Managers present at any duly called meeting. Such election, however, shall be subject to the approval of the Governing Committee. The members shall be elected annually and hold office until December 31st of each year or until their successors have been duly elected as herein provided. Retiring members of committees shall be eligible for re-election. Interim vacancies in committees shall be filled in the same manner as provided for original elections, and members elected to fill such vacancies shall serve for the unexpired term.

2. State Departments having supervision over workmen's compensation rates, selected in the manner provided for the election of members of committees, shall be invited to preside, through designated representatives at all meetings of the General Rating, Actuarial and Engineering Committees.

#### ARTICLE VI. *General Manager.*

1. The General Manager shall, under the supervision of the Governing Committee, have general control of all the employees of the Council and of all the affairs of the Council not herein delegated to committees.

2. He shall be a member ex-officio of all committees, preside at the meetings of the Council and the Governing Committee, but shall not have the right to vote except as provided in Article X.

3. He shall be responsible for all property of the Council, receive and carefully keep all moneys of the Council and disburse the same only for the business of the Council, accounting to the Governing Committee for all such disbursements. He shall make no disbursements in excess of an amount to be fixed by the Governing Committee without the written approval of a member of the Governing Committee.

4. He shall have the power to sign and endorse in the name of and on behalf of the Council in the transaction of its business, but not otherwise, checks, drafts, notes and bills of exchange, subject to such counter-signature as the Governing Committee may determine.

5. He shall give a corporate surety bond at the cost of the Council in such sum as the Governing Committee may determine for the faithful and honest discharge of his duties, and for the faithful and honest receipt, custody and disbursement of the funds of the Council.

6. He shall assemble and submit experience and such statistical data as may be required by the General Rating, Actuarial and Engineering Committees of the Council, and conduct such other investigations as may be directed by such committees.

7. He or his nominee shall serve as Secretary to the Council and to all its committees and keep a record of all proceedings. Whenever it is determined that advices of committee proceedings shall be sent to members of committees, such advices shall also be transmitted simultaneously to members and insurance carriers affiliated with the Council.

8. He shall furnish experience upon request to any subscribing board or bureau and to any state department having jurisdiction over workmen's compensation rates in such form and detail as may be prescribed by the Actuarial Committee.

ARTICLE VII. *Relations With Subscribing Bureaus.*

1. Each subscribing board or bureau shall require its members to submit upon call their statistical experience direct to the Council in such detail and form as may be prescribed by the Actuarial Committee.

2. Whenever the proper committee of a subscribing board or bureau shall propose to create any classification or to abolish or amend any classification, schedule or experience rating plan adopted by the Council or the rules governing the application thereof, the Manager of such board or bureau shall immediately transmit to the General Manager of the Council a description of the proposed change including a concise statement of the reasons therefor, and a summary of all data upon which the proposal is predicated.

3. Whenever the proper committee of a subscribing board or bureau shall propose to create or amend the rate for any classification the Manager of such board or bureau shall immediately transmit to the General Manager of the Council a full description of the proposal including a concise statement of the reasons therefor, and a summary of all data upon which the proposal may be predicated.

4. No subscribing board or bureau shall put into effect any proposal until after the same shall have been referred to the Council and a reasonable time allowed within which the Council may give consideration to the proposal.

5. Within a reasonable time the General Manager shall furnish the conclusions of the Council as to the proposal supplemented by such statistical data as the Council may have in its possession or may be able to secure affecting the proposal.

6. If the Council disapproves the proposal of a subscribing board or bureau, the Manager thereof shall present to the proper committee of his board or bureau the conclusions of the Council and the committee of the proposing board or bureau shall reconsider the proposal in the light of the Council's conclusions, provided that thereupon, if the committee of the subscribing board or bureau having jurisdiction over such matters deems it necessary that the change be made, notice prior to its publication shall be promptly filed with the Council.

7. All actions of the Council either approving or disapproving proposals of subscribing boards or bureaus, shall be immediately transmitted to all subscribing boards and bureaus, and all proposals approved by the Council shall be presented to the proper committee of each subscribing board or bureau for adoption.

8. The Council may furnish experience data or other information to insurance carriers not members of any subscribing board or bureau, the charge therefor to be determined by the Governing Committee.



ARTICLE VIII. *Annual and Special Meetings.*

1. The first regular meeting of the Council shall be held in the City of New York on Thursday, September 4, 1919. Thereafter the annual meeting of the Council shall be held at the offices of the Council or at such other place as the Governing Committee may determine on the first Thursday of September. In case the annual meeting for any year shall not be duly called or held, the Governing Committee shall cause a special meeting to be held as soon as may be thereafter, in lieu of and for the purpose of such annual meeting, and all proceedings at such special meeting shall have the same force as if taken at the regular annual meeting.

2. Special meetings of the Council shall be called at any time at the discretion of the General Manager or upon the written request of a majority of the Governing Committee.

3. Notices of annual and special meetings shall be given by the General Manager or, in case of his absence or inability to act, by such person as the Governing Committee shall appoint, by mailing at least fifteen days before the date fixed for such meeting, and addressed to each insurance carrier, to all subscribing boards and bureaus, and state departments entitled to participate in such meetings, a written or printed notice stating the place, day, hour and purpose of such meeting.

4. Every insurance carrier which is a member of a board or bureau affiliated with the Council, every insurance carrier not a member of such a board or bureau which agrees to file on demand experience data and other information required by the Council, managers of boards or bureaus affiliated with the Council and duly authorized representatives of state departments having supervision over workmen's compensation rates shall be entitled to participate in all annual and special meetings of the Council, but only insurance carriers which are members of subscribing boards or bureaus shall have the right to vote at such meetings.

5. At any annual or special meeting of the Council one-third of the insurance carriers entitled to vote shall constitute a quorum.

6. The presiding officer at such meeting shall have the power to cast the deciding vote in case of a tie.

ARTICLE IX. *Meeting of Committees.*

1. Committees of the Council shall meet at the offices of the Council when necessary. At any meeting of any committee a majority of the members entitled to vote shall constitute a quorum. Not less than ten days before a meeting of the General Rating Committee the General Manager shall prepare and transmit to members of the Committee, subscribing boards and bureaus, state departments and insurance carriers affiliated with the Council an agenda showing matters to be considered at such meeting. Proposals re-

ceived by the General Manager after the date of closing of agenda shall be placed upon the agenda for the next meeting, except that a subject not listed on the agenda may be acted upon by unanimous consent of the members of the Committee present at any meeting.

2. An agenda for meetings of other committees shall be prepared and transmitted by the General Manager not less than five days before the appointed date for such meeting.

3. Meetings of committees may be attended by the Manager or other duly authorized representative of each subscribing board or bureau.

4. Each carrier appointed to serve on committees shall file with the General Manager the name of its representative and also the name of an alternate. Invitations to attend all meetings of committees shall be extended to state departments and hearings may be granted to other parties interested in the subject of workmen's compensation insurance rates.

5. Representatives of state departments, managers or duly authorized representatives of subscribing boards or bureaus, and persons present by invitation of the Council, shall have the right to participate in discussions, but only members of committees shall be entitled to vote.

#### ARTICLE X. *Voting Power.*

1. The General Manager shall have the power to cast the deciding vote in case of a tie in the Governing Committee on all matters except those affecting the appointment of a General Manager and the determination of his salary.

2. In the case of a tie vote in the Committee of Managers the Chairman shall cast the deciding vote.

3. In the case of a tie vote in the Actuarial and Engineering Committees, the matter shall be referred for final action to the General Rating Committee.

4. In the case of a tie vote in the General Rating Committee, the item shall go over to the following meeting, and if at such meeting the vote remains tied, the item shall be referred for final action to the item shall be referred for final action to the Committee of Managers.

#### ARTICLE XI.—*Maintenance of Council.*

1. The Governing Committee shall quarterly, as of the first days of January, April, July and October, estimate the expenses of the Council for the respective ensuing quarters and levy the same upon subscribing boards and bureaus in proportion to the workmen's compensation premium writings under the jurisdiction of each during the preceding year converted to a common basic premium level. As soon after December 31st as possible the contributions of each board or bureau for the preceding calendar year shall be ad-

justed according to the completed figures for the year modified in accordance with the foregoing provision. In states where insurance carriers are not members of a subscribing board or bureau the assessment shall be levied directly upon such carriers and paid directly to the Council.

ARTICLE XII. *Withdrawals.*

1. A board or bureau may withdraw from membership by giving not less than ninety days' notice in writing to the General Manager prior to the effective date of withdrawal, but shall continue liable for its share of the expenses which have accrued or thereafter may be determined to have accrued prior to the effective date of such withdrawal.

ARTICLE XIII. *Effective Date.*

1. This Constitution shall become effective as of the date of the general meeting called for the purpose of its adoption.

ARTICLE XIV. *Amendments.*

1. This Constitution may be altered or changed by a majority vote at any annual meeting of the Council or at any special meeting called for the purpose but no amendment shall be acted upon unless fifteen days' written notice of the proposed alteration or change shall have been given to those entitled to participate in such annual or special meeting, and shall not take effect until written notice shall have been received by the General Manager of ratification by a majority of subscribing boards or bureaus.

## APPENDIX IV.

### NATIONAL COUNCIL ON WORKMEN'S COMPENSATION INSURANCE.

#### COMMITTEES

As of September 1, 1920.

#### *Governing Committee.*

Maryland Casualty Co. Michigan Mutual Liability Co. Royal Indemnity Co. State Insurance Fund of N. Y. United States Casualty Co. Utica Mutual Insurance Co.

#### *Committee of Managers—Subscribing Boards and Bureaus.*

#### ALABAMA.

Compensation Rating and Inspection Bureau of Alabama. Montgomery. Mr. W. W. Watkinson, Manager.

#### CALIFORNIA.

California Inspection Rating Bureau. San Francisco. Mr. W. A. Chowen, Manager.

#### DELAWARE.

Delaware Compensation Rating and Inspection Bureau. Philadelphia, Pa. Mr. Gregory C. Kelly, General Manager.

#### MASSACHUSETTS.

Massachusetts Rating and Inspection Bureau. Boston. Mr. W. N. Magoun, General Manager.

#### NEW JERSEY.

Compensation Rating and Inspection Bureau of New Jersey. Newark. Mr. W. W. Greene, Chairman.

#### NEW YORK.

Compensation Inspection Rating Board. New York. Mr. L. S. Senior, Manager.

#### PENNSYLVANIA.

Pennsylvania Compensation Rating and Inspection Bureau Philadelphia. Mr. Gregory C. Kelly, General Manager.

#### TENNESSEE.

Tennessee Compensation Rating and Inspection Bureau. Nashville. Mr. Edward E. Gould, Manager.

VIRGINIA.

Workmen's Compensation Inspection Rating Bureau of Virginia.  
Richmond. Mr. A. R. Lawrence, Manager.

WISCONSIN.

Wisconsin Compensation Rating and Inspection Bureau. Mil-  
waukee. Mr. George F. Haydon, General Manager.

National Association of Mutual Casualty Companies. New York.  
Mr. E. S. Cogswell, General Manager.

National Workmen's Compensation Service Bureau. New York.  
Mr. Albert W. Whitney, General Manager.

*Actuarial Committee.*

Employers Mutual Liability Insurance Co. Globe Indemnity  
Co. Liberty Mutual Insurance Co. Royal Indemnity Co. State  
Insurance Fund of New York. Travelers Insurance Co.

*General Rating Committee.*

American Mutual Liability Insurance Co. \*Casualty Reciprocal  
Exchange. Employers' Liability Assurance Corp., Ltd. \*Liberty  
Mutual Insurance Co. Maryland Casualty Co. Ocean Accident  
and Guarantee Corp., Ltd. Texas Employers' Insurance Associa-  
tion. \*Travelers Insurance Co. \*United States Casualty Co.  
Utica Mutual Insurance Co.

*Engineering Committee.*

Aetna Life Insurance Co. Continental Casualty Co. Fidelity  
and Casualty Co. Integrity Mutual Casualty Co. State Insurance  
Fund of New York. Utilities Mutual Insurance Co.

*Coal Mine Committee.*

American Indemnity Exchange. American Mine Owners Mu-  
tual, Inc. Integrity Mutual Casualty Co. Maryland Casualty  
Co. Ocean Accident and Guarantee Corp., Ltd. Travelers In-  
surance Co.

\* Temporary member.

# APPENDIX V.

## MARYLAND COMPENSATION RATE SHEET.

*Issued June 1, 1920.*

MARYLAND.

RATE SHEET.

THE COMPENSATION RATES and MINIMUM PREMIUMS for this State are shown below opposite the CODE NUMBERS of the various classifications.

Code No.	Rate	Min. Prem.	Code No.	Rate	Min. Prem.	Code No.	Rate	Min. Prem.	Code No.	Rate	Min. Prem.
0004	.46	13.	1602	4.94	57.	2063	1.22	20.	2301	.20	10.
0005	.78	16.	1620	4.94	57.	2065	1.22	20.	2302	.20	10.
0006	1.02	25.	1621	4.94	57.	2067	1.22	20.	2303	.20	10.
0008	.46	13.	1622	4.94	57.	2081	2.18	30.	2320	.56	14.
0050	5.05	59.	1623	4.94	57.	2090	1.12	19.	2348	.80	16.
0100	2.48	33.	1640	3.71	45.	2091	1.12	19.	2349	1.42	22.
0101	2.48	33.	1654	4.94	57.	2092	1.37	22.	2350	.80	16.
0251	1.34	21.	1701	2.66	35.	2101	1.17	20.	2351	.56	14.
0301	1.54	23.	1703	2.35	32.	2102	.92	17.	2361	.20	10.
0302	2.46	33.	1710	4.18	50.	2105	.57	14.	2362	.38	12.
0400	1.62	24.	1741	2.35	32.	2110	1.42	22.	2380	.34	11.
0401	4.36	52.	1742	2.35	32.	2111	1.04	18.	2382	.34	11.
*1004			1743	2.35	32.	2112	.78	16.	2383	.34	11.
*1005			1744	2.35	32.	2113	.87	17.	2384	.34	11.
1102	3.64	44.	1745	.74	15.	2114	.74	15.	2386	.32	11.
1120	6.07	69.	1748	.95	18.	2121	1.62	24.	2387	.34	11.
1121	6.07	69.	1750	2.19	30.	2125	1.53	23.	2388	.32	11.
1154	8.26	91.	1802	1.45	23.	2130	2.28	31.	2390	.34	11.
1164	4.76	56.	1803	1.45	23.	2143	1.43	22.	2402	.66	15.
			1852	1.46	23.	2150	2.57	34.	2410	1.77	26.
1165	4.76	56.	1853	.74	15.	2161	3.13	39.	2413	.98	18.
1200	3.99	48.	1859	.85	17.	2165	1.43	22.	2415	.98	18.
1201	6.38	72.	1860	.93	17.	2173	.48	13.	2416	.62	14.
1208	4.94	57.	1924	2.21	30.	2174	.49	13.	2417	.82	16.
1217	4.90	57.	2000	1.44	22.	2175	.48	13.	2501	.22	10.
1301	1.50	23.	2001	1.44	22.	2176	.15	10.	2502	.22	10.
1321	3.66	45.	2002	3.10	39.	2210	4.35	52.	2503	.21	10.
1410	.87	17.	2014	1.65	25.	2211	1.89	27.	2520	.22	10.
1413	1.62	24.	2015	1.44	22.	2216	3.41	42.	2521	.22	10.
1420	3.99	48.	2016	1.44	22.	2220	.77	16.	2530	.32	11.
1421	5.18	60.	2020	1.26	21.	2222	.56	14.	2531	.20	10.
1438	3.07	39.	2021	1.26	21.	2260	1.68	25.	2532	.19	10.
1439	2.95	38.	2030	2.40	32.	2263	1.34	21.	2533	.23	10.
1452	3.55	44.	2040	1.28	21.	2264	1.32	21.	2534	.20	10.
1463	1.74	25.	2041	.82	16.	2269	3.41	42.	2535	.22	10.
1465	2.19	30.	2042	.82	16.	2280	1.13	19.	2536	.32	11.
*1469			2045	.82	16.	2286	.57	14.	2551	.22	10.
1470	2.28	31.	2054	.58	14.	2288	2.37	32.	2552	.20	10.
1471	2.92	37.	2061	1.22	20.	2291	.57	14.	2553	.22	10.
1472	1.98	28.	2062	1.22	20.	2300	.39	12.	2554	.22	10.

\* See Coal Mining Manual.

*Note:* There are seven rate sheets for Maryland. Only one is reproduced as they are all similar.

APPENDIX VI.

EXAMPLE OF REPORT ON SCHEDULE Z.

PART 1

NEW YORK SCHEDULE Z-1919

POLICY YEAR 1916

CLASSIFICATION EXPERIENCE

3632

(CODE NO.)

(CARD NO.)

Insurer All carriers combined.

Manual classification

Machine Shops - without foundry.

Manual Rate.....

	COVERAGE	EARNED PAYROLL (Dollars only)	EARNED PREMIUM (Dollars only)
A	Excluding medical	1,863,000	16,237
B	Including medical	32,752,000	358,429
C	Total	34,615,000	374,666

LOSS EXHIBIT

	NATURE OF INJURY	NO. OF CLAIMS (1)	PAID (Dollars only) (2)	OUTSTANDING (Dollars only) (3)	TOTAL INCURRED (Dollars only) (4)
D	Death	16			66,907
E	Permanent total disability				
F	Permanent partial disability (Dismemberment, loss of use, etc.)	269			142,703
G	Temporary disability (Total and partial)	1767			99,254
H	Indeterminate				
J	Medical	—			66,477
K	Total	2052			375,341

## APPENDIX VII.

### TABLE OF AVERAGE VALUES FOR CONVERTING "D AND P. T. D." LOSSES.

- I—\$3500.00.—
  - Agriculture.
  - Wood.
  - Contracting, not erection.
  - Care, custody and maintenance.
  - Miscellaneous occupations.
- II—\$3500.00.—
  - Food and tobacco.
  - Textiles.
  - Clothing.
  - Laundries.
  - Leather.
  - Paper goods.
  - Fine machines and instruments.
  - Commercial enterprises.
  - Clerical and professional.
- III—\$4400.00.—
  - Rubber, composition, bone, etc.
  - Paper and pulp.
  - Printing.
  - Metal forming.
  - Machine shops.
  - Vehicles.
  - Stone products.
  - Clay products.
  - Glass and glass products.
  - Chemicals.
  - Miscellaneous manufacturing.
- IV—\$5300.00.—
  - Mining.
  - Metallurgy.
  - Quarrying, stone crushing, etc.
  - Erection—metal.
  - Erection—not metal.
  - Ship building.
  - Railroad Operation.
  - Public utilities—not railroad operation
- V.—\$4400.00.—
  - Garage and trucking.
- VI—\$1900.00.—
  - Vessel operation.
- VIII.—\$2300.00.—
  - Stevedoring and freight handling.



APPENDIX VIII.

WORKING SHEET FOR CALCULATION OF THE ILLINOIS CONVERSION FACTOR FOR "ALL OTHER" LOSSES, GROUP I.

CLASSIFICATION CODE NO.	ACTUAL EXPERIENCE LOSSES				CALCULATION OF FACTOR				TEST OF FACTOR			
	PAY ROLLS		LOSSES		CONVERTED ILLINOIS LOSSES	COMBINED LOSSES	PURE PREMIUM	EXPECTED NEW YORK LOSSES	CONVERTED LOSSES	COMBINED LOSSES	PURE PREMIUM	EXPECTED NEW YORK LOSSES
	NEW YORK 1917	ILLINOIS 1916 & 1917	NEW YORK 1917	ILLINOIS 1916 & 1917	(1838) x (4)	(6) x (7)	(8) x (4)	(6) x (2)	(1814) x (4)	(9) x (10)	(12) x (4)	(18) x (1)
5643	61,020	97,765	158,785	52,318	57,529	105,738	158,056	67,995	60,716	104,358	156,676	60,227
5642	32,190	60,029	92,219	42,613	53,680	98,664	141,277	1,532	49,315	97,376	139,989	48,864
5602	63,210	57,527	120,737	51,391	27,060	49,736	101,127	638	52,970	49,087	100,478	52,591
5022	51,120	32,835	85,955	98,900	27,180	49,957	148,857	1,773	90,656	49,305	148,205	90,227
5204	19,240	31,365	50,605	57,121	29,011	51,484	108,606	2,146	41,289	50,812	107,933	41,039
3724	41,020	27,488	68,508	25,591	16,047	29,494	55,085	604	32,980	29,109	54,700	32,734
5401	49,750	25,614	75,344	135,366	51,610	94,859	230,225	3,056	151,975	93,621	228,987	151,129
5502	20,050	22,054	42,104	12,206	7,718	14,186	26,392	627	12,571	14,000	26,206	12,471
6042	62,460	18,692	81,152	76,552	9,079	16,687	93,339	1,150	71,829	16,469	93,121	71,642
5500	9,780	15,614	25,394	13,260	8,119	14,923	28,183	1,110	10,856	14,728	27,988	10,778
5209	15,560	15,574	31,134	11,556	6,912	12,704	24,260	779	12,121	12,538	24,094	12,043
6300	9,740	7,378	17,118	18,739	6,519	11,982	30,721	1,795	17,483	11,825	30,564	17,386
5545	7,660	6,710	14,370	32,327	6,865	12,618	44,945	3,128	23,960	12,453	44,780	23,869
7531	58,320	5,371	43,691	32,669	5,390	9,907	42,576	974	37,324	9,777	42,446	37,247
6041	17,690	5,123	22,813	14,178	1,538	2,827	17,005	745	13,179	2,790	16,968	13,161
6227	8,160	4,231	12,381	6,996	2,046	3,761	10,757	669	7,082	3,711	10,707	7,050
6280	6,880	3,709	10,539	10,997	5,371	9,872	20,869	1,960	13,523	9,743	20,740	13,441
6321	5,640	2,450	8,090	8,117	1,238	2,275	10,392	1,285	7,247	2,246	10,363	7,225
5641	580	3,865	4,445	4,735	6,268	11,521	16,256	3,657	2,121	11,370	16,105	3,623
6005	8,260	1,652	9,912	15,652	2,363	4,380	20,032	2,021	16,693	4,323	19,975	16,644
TOTAL	528,250	445,046	973,596	721,384	330,563	607,575	1,328,959		725,869	599,641	1,321,025	721,869

(721,384)

1.838-.006

725,869

1.006

1.838-.006

721,384

721,869

## APPENDIX IX.

TABLE OF CONVERSION FACTORS USED IN THE 1920 REVISION.

State.	Group I.		Group II.		Group III.	
	All Other.	Med.	All Other.	Med.	All Other.	Med.
California....	.835	.360	1.355	.549	1.433	.477
Colorado.....	2.837	1.593	3.300	1.090	3.300	1.090
Connecticut..	2.902	.780	2.919	.904	1.928	.588
Illinois.....	1.814	.760	1.712	.855	2.040	.723
Indiana.....	1.682	.944	1.754	1.075	1.767	1.039
Iowa.....	2.334	1.156	1.873	.995	2.692	.983
Kansas.....	1.294	1.479	1.337	1.700	1.337	1.700
Kentucky....	1.210	.841	1.541	.796	1.836	.761
Louisiana....	1.652	.726	1.939	.774	2.539	.770
Maine.....	3.326	1.460	2.527	1.173	2.113	1.552
Maryland....	3.493	1.302	3.042	1.273	3.522	1.214
Massachusetts	1.503	.964	1.850	1.090	1.665	.984
Michigan.....	2.204	1.158	2.193	1.143	2.783	1.116
Minnesota....	1.442	.740	1.605	.844	1.846	.756
Montana.....	3.675	1.322	3.675	1.322	3.675	1.322
Nebraska....	1.744	.795	1.589	.651	1.589	.651
New Jersey...	2.525	1.742	2.543	1.639	2.089	1.465
New Mexico...	.....	.....	.....	.....	.....	.....
New York....	1.022	.827	1.254	.936	1.302	.866
Oklahoma....	2.514	1.136	2.098	.708	2.098	.708
Pennsylvania.	3.714	2.148	3.372	1.663	3.019	1.715
Rhode Island.	2.894	1.043	2.894	1.043	2.894	1.043
South Dakota	.....	.....	.....	.....	.....	.....
Texas.....	2.047	1.124	1.255	.746	1.768	.783
Utah.....	3.222	1.002	3.222	1.002	3.222	1.002
Vermont.....	2.718	1.438	2.718	1.438	2.718	1.438
Wisconsin....	1.535	.589	1.799	.819	1.806	.704

# APPENDIX X.

## AGGREGATE EXPERIENCE USED IN 1920 REVISION—BY STATES.

### GRAND SUMMARY - BY STATES

NATIONAL COUNCIL ON WORKMEN'S COMPENSATION INSURANCE  
WORKMEN'S COMPENSATION EXPERIENCE  
COMPILED IN 1919

STATE	POLICY YEAR	PAYROLL (in thousands)	CONVERTED LOSSES (NEW YORK 1917 BASIS)										TOTAL	
			DEATH & FERM TOTAL		ALL OTHER				MEDICAL				AMOUNT	P. P.
			NO CASES	AMOUNT	P. P.	NO CASES	AMOUNT	P. P.	AMOUNT	P. P.	AMOUNT	P. P.		
1 NEW YORK 1917	720	2929200	.19	37669	7667941	.49	1953439	.12	12550680	.80	12550680	.80		
2 NEW YORK 1918	871	3600700	.25	43473	6999727	.50	1774727	.12	12375154	.87	12375154	.87		
3 CONNECTICUT 1916-17	196	821500	.21	11869	2049766	.53	530269	.14	3401535	.88	3401535	.88		
4 MAINE 1916-17	96	389400	.24	984558	.62	256021	.16	1629979	1.02	1629979	1.02			
5 MARYLAND 1916-17	131	645500	.32	4851	1276151	.74	286322	.17	2107983	1.23	2107983	1.23		
6 MASS. 1916-17	818	3459400	.21	808817	.50	2066249	.13	135554466	.84	135554466	.84			
7 NEW JERSEY 1916-17	431	1833700	.24	17874	4485139	.59	1181704	.15	7505543	.95	7505543	.95		
8 PENN. 1916-17	2,266	387,816	.31	59530	13822484	.61	3493450	.15	24346334	1.07	24346334	1.07		
9 RHODE ISLAND 1916-17	51	203000	.16	2911	650837	.52	170995	.14	1024732	.82	1024732	.82		
10 VERMONT 1916-17	51	216300	.50	1731	351310	.81	94238	.22	661848	1.53	661848	1.53		
<b>TOTAL EASTERN STATES</b>	<b>8,158,852.9</b>	<b>4982,210,842.00</b>	<b>.25</b>	<b>179908</b>	<b>46316730</b>	<b>.54</b>	<b>11,807,324</b>	<b>.14</b>	<b>79,158,254</b>	<b>.93</b>	<b>79,158,254</b>	<b>.93</b>		
12 ILLINOIS 1916-17	743,715.6	435,183,850.00	.25	34661	4254287	.57	1,038,764	.14	7,121,551	.96	7,121,551	.96		
13 INDIANA 1916-17	273,031.4	175,780,800	.29	10866	1533826	.56	423401	.16	2,738,027	1.01	2,738,027	1.01		
14 IOWA 1916-17	142,291.7	127,530,000	.37	4044	829549	.58	202323	.14	1,561,872	1.09	1,561,872	1.09		
15 KANSAS 1916-17	37,354.6	52,250,400	.67	2122	384244	1.03	73116	.20	707,760	1.90	707,760	1.90		
16 MICHIGAN 1916-17	398,758.5	264,114,710.00	.29	13049	2664706	.67	659109	.17	4,470,915	1.13	4,470,915	1.13		
17 MINNESOTA 1916-17	212,898.5	182,817,000	.38	7642	1183662	.56	271358	.13	2,272,020	1.07	2,272,020	1.07		
18 NEBRASKA 1916-17	58,320.6	57,231,000	.40	2055	290708	.50	70271	.12	591,979	1.02	591,979	1.02		
19 SD DAKOTA 1917	-	-	-	-	-	-	-	-	-	-	-	-		
20 WISCONSIN 1916-17	305,560.9	249,103,400	.34	18276	2131638	.70	541494	.18	3,707,532	1.22	3,707,532	1.22		
<b>TOTAL CENTRAL STATES</b>	<b>2,171,931.8</b>	<b>1,541,662,920.00</b>	<b>.31</b>	<b>92775</b>	<b>13,272,620</b>	<b>.61</b>	<b>3,279,836</b>	<b>.15</b>	<b>23,181,656</b>	<b>1.07</b>	<b>23,181,656</b>	<b>1.07</b>		
22 CALIFORNIA 1916-17	726,378.9	501,208,560.00	.29	3656030	.50	947662	.13	6,689,292	.92	6,689,292	.92			
23 COLORADO 1916-17	100,488.6	131,622,300	.62	2296	757333	.75	165836	.17	1,545,469	1.54	1,545,469	1.54		
24 MONTANA 1916-17	32,512.4	19,809,000	.25	327	294716	.91	46754	.14	422,370	1.30	422,370	1.30		
25 NEW MEXICO 1917	-	-	-	-	-	-	-	-	-	-	-	-		
26 UTAH 1917	30,482.4	26,118,900	.39	941	241525	.79	40866	.13	401,291	1.21	401,291	1.21		
<b>TOTAL WESTERN STATES</b>	<b>889,863.3</b>	<b>677,290,770.00</b>	<b>.33</b>	<b>4064</b>	<b>494,9604</b>	<b>.56</b>	<b>1,201,118</b>	<b>.13</b>	<b>9,086,422</b>	<b>1.02</b>	<b>9,086,422</b>	<b>1.02</b>		
28 KENTUCKY 1916-17	75,025.7	78,328,600	.44	3196	429082	.57	105307	.14	862,989	1.15	862,989	1.15		
29 LOUISIANA 1916-17	55,355.0	91,338,400	.61	4366	405984	.73	96238	.17	840,622	1.51	840,622	1.51		
30 OKLAHOMA 1916-17	78,458.1	108,496,800	.63	2753	791,274	1.01	188154	.24	1,476,228	1.58	1,476,228	1.58		
31 TEXAS 1916-17	165,312.2	164,702,900	.43	12927	1,235,118	.75	289015	.17	2,227,033	1.26	2,227,033	1.26		
<b>TOTAL SOUTHERN STATES</b>	<b>374,151.0</b>	<b>436,186,670.00</b>	<b>.50</b>	<b>23552</b>	<b>2,861,458</b>	<b>.76</b>	<b>678,714</b>	<b>.18</b>	<b>5,406,872</b>	<b>1.44</b>	<b>5,406,872</b>	<b>1.44</b>		
<b>33 GRAND TOTAL</b>	<b>11,954,800.0</b>	<b>7,637,324,378.00</b>	<b>.27</b>	<b>299,999</b>	<b>67,400,412</b>	<b>.57</b>	<b>1,936,6992</b>	<b>.14</b>	<b>11,680,6204</b>	<b>.98</b>	<b>11,680,6204</b>	<b>.98</b>		

APPENDIX X-B.

AGGREGATE EXPERIENCE USED IN 1920 REVISION—BY SCHEDULES.

SCHEDULE	PATROLL (4 MONTHS)	CONVERTED LOSSES (NEW YORK 1917 BASIS)									
		DEATHS & PERM-TOTAL		ALL OTHER		MEDICARE		TOTAL			
		NO CASES	AMOUNT	NO CASES	AMOUNT	NO CASES	AMOUNT	NO CASES	AMOUNT		
1 Agriculture	100,477,8	388500	.39	1995	765614	.75	172993	.17	1317907	1.31	
2 Mining	82,369,3	1754300	2.13	3429	1121256	1.36	218923	.27	3094379	3.76	
3 Metallurgy	67,260,1	768500	1.14	3630	776812	1.15	194419	.25	1739731	2.58	
4 Quarrying	59,586,2	1097100	1.84	3314	1090793	1.83	216940	.36	2404833	4.03	
5 Food	503,725,6	1088500	.22	15022	3061044	.61	839535	.17	4989079	1.00	
6 Textiles	857,477,1	714000	.08	8402	2847202	.33	737140	.09	42298342	.50	
7 Clothing	606,890,2	1750000	.03	5839	7686568	.12	303194	.05	1236752	.20	
8 Laundries	58,795,0	17,59500	.10	1324	396348	.67	80145	.14	535593	.91	
9 Leather	342,164,5	280000	.08	3931	1246127	.36	331366	.10	1867393	.54	
10 Rubber	101,618,8	189200	.19	2239	721842	.71	191406	.19	1102448	1.09	
11 Paper & Pulp	88,561,9	413500	.47	3601	799876	.90	230695	.26	1443171	1.63	
12 Paper Goods	87,861,8	115600	.13	2830	540009	.61	166674	.19	822183	.93	
13 Printing	266,948,4	193600	.07	3459	900171	.34	222679	.08	1316450	.49	
14 Wood	416,254,3	1494500	.36	27455	4964772	1.19	1061560	.26	7520832	1.81	
17 Metal Forming	777,796,7	1702800	.22	35520	7023644	.90	2044430	.26	10769874	1.38	
18 Machine Shops	688,801,2	1086800	.16	24504	5174554	.74	1687111	.24	7948465	1.14	
19 Fine Machines	208,517,7	115600	.06	3084	690694	.83	216903	.10	1023097	.49	
20 Vehicles	210,208,1	308000	.15	6828	1441559	.65	441343	.21	2190302	1.05	
21 Stone Products	33,286,7	281600	.34	2811	678406	.81	143162	.17	1103168	1.32	
22 Clay Products	54,958,9	189200	.34	1690	351545	.64	72035	.13	612780	1.11	
23 Glass	106,663,2	92400	.09	2853	485412	.46	145962	.16	743774	.71	
24 Chemicals	207,579,4	1302400	.63	7425	1713397	.83	444521	.21	3460418	1.67	
25 Misc. Mfg.*	60,489,0	83600	.14	1358	231482	.38	70005	.12	385087	.64	
26 Contracting	287,796,0	2219000	.77	13067	3763017	1.31	810761	.28	6792778	2.36	
27 Erection	768,349,1	6714700	.87	35032	10413497	1.36	2020765	.26	19148962	2.49	
28 Shipbuilding	63,349,7	466400	.74	2491	7471119	1.18	169511	.27	1383030	2.19	
29 Vessel Operation	28,252,5	245100	.87	1078	233625	.84	44332	.16	627858	1.87	
30 Stevedoring	46,658,4	273700	.58	11008	1715616	3.68	228783	.49	2218099	4.75	
31 R.R. Operation	60,992,3	1,116,130	1.16	1240	512654	.84	124393	.20	1341947	2.20	
32 Trucking	443,285,7	2899500	.65	20113	3920223	.89	987724	.23	7807547	1.75	
33 Public Util.	78,300,6	1065300	1.36	2429	618656	.79	183327	.22	1867463	2.38	
34 Commercial	1,288,659,9	2240000	.17	29816	5220226	.41	1486011	.12	6946237	.70	
35 Clerical	352,710,3	402500	.02	2852	736292	.03	216518	.01	1356310	.06	
36 Care, Custody	2,473,888,1	1092000	.23	7078	1530336	.32	398323	.08	3020559	.63	
37 Miscellaneous	38,245,5	220500	.58	852	214233	.56	43603	.11	478336	1.25	
Total	11,954,800,0	7637,524,37800	.27	299999	67400412	.57	16966992	.14	116805204	.98	

\*Not erection

APPENDIX XI.

WORKING SHEET ILLUSTRATING THE TRANSLATION FROM BASIC PURE PREMIUMS TO STATE PURE PREMIUMS.

CLASSIFICATION		PAYROLL		STATE LOSSES		PROJECTIONS		ADMITTED BASIC P.P.		PROJECTED STATE P.P.		EXPECTED STATE LOSSES		PRESENT RATES		PROPOSED RATES								
CODE NO.	DESCRIPTION	WORTHING (per week mo.)	TOTAL	B.F.P.T.O.	ALL OTHER	MEDICAL	GROUP	B.F.P.T.O.	ALL OTHER	MEDICAL	GROUP	B.F.P.T.O.	ALL OTHER	MEDICAL	GROUP	PRESENT RATE	PROPOSED RATE							
1	Group #161																							
2	2521 Shirts Mfr	4 886 262	4 080	1 044	3 036		III	.02	.11	.05	.18	.01	.03	.04	.08	489	1 466	1 924	3909	25	.22	12213	10748	
3	2502 Fur "	43 196	60	105	60		III	.02	.11	.05	.18	.01	.03	.04	.08	4	13	17	34	25	.22	99	95	
4	2501 Clothing	12 761 240	750	4 957	6 390		III	.02	.11	.05	.18	.01	.03	.04	.08	1 276	3 828	5 104	10208	25	.22	29351	28075	
5	2503 Dressmaking	301 525	29	115	29		III	.02	.11	.05	.18	.01	.03	.04	.08	30	90	121	241	25	.21	693	635	
6	Group #162																							
8	2520 Hats Mfr	18 848	95	60	35		III	.03	.19	.06	.28	.01	.05	.05	.11	2	9	9	20	28	.22	53	60	
9	2551 Straw	1 966 286	692	948	1 841		III	.03	.09	.04	.16	.01	.03	.03	.07	197	590	590	4377	28	.20	5506	2928	
10	2554 Feather	29 713					III	.03	.09	.04	.16	.01	.03	.03	.07	3	9	9	31	28	.20	83	69	
11	2532 Millinery	29 621	44	23	44		III	.03	.09	.04	.16	.01	.03	.03	.07	4	12	12	26	28	.19	111	75	
12	2556 Hair	203 066	570		200		III	.03	.15	.09	.27	.01	.04	.07	.12	20	81	142	243	462	.22	1269	650	
13	Group #164																							
14	Group #164																							
15	2570 Mattress	129 879	76	101	177		II	.17	.81	.19	1.17	.08	.27	.15	.50	106	269	199	664	95	1.48	1263	1967	
16	2571 Quilt	600					II	.13	.17	.08	.38	.06	.06	.06	.18						.96	.49	2	2
17	2572 Feather	12 668					III	.15	.17	.08	.38	.06	.06	.07	.18	8	8	9	25	40	.47	51	60	
18	Group #165																							
19	Group #165																							
20	2561 Glove	300					III	.02	.11	.05	.18	.01	.03	.04	.08						.23	.22	1	1
21	2561 Knit	85 330					III	.02	.11	.05	.18	.01	.03	.04	.08	9	26	24	69	23	.22	196	188	
22	2535 Cap	57 470	10		10		III	.02	.11	.05	.18	.01	.03	.04	.08	6	17	23	46	28	.22	161	127	
23	2553 Furnishing	1 500					III	.02	.11	.05	.18	.01	.03	.04	.08						.23	.22	3	3
24	2550 Suspender	4 393					III	.02	.11	.05	.18	.01	.03	.04	.08						.23	.22	10	10
25	2554 Corset	38 745					III	.02	.11	.05	.18	.01	.03	.04	.08						.23	.22	89	85
26	2560 Umbrella	223 625	32	63	95		III	.02	.11	.05	.18	.01	.03	.04	.08	22	67	89	176	23	.22	514	492	
27	Group #169																							
28	Group #169																							
29	2573 Sall	19 809					III	.17	.38	.13	.68	.08	.11	.11	.20	16	22	22	60	40	.40	.22	79	162
30	2574 Awning	154 257	125	415	540		III	.17	.38	.13	.68	.08	.11	.11	.20	125	170	170	452	66	.22	1018	1265	
31	2575 Bag	106 094	114	118	222		III	.17	.38	.13	.68	.08	.11	.11	.20	65	117	117	319	54	.22	873	870	
32	Group #169																							
33	Group #169																							
34	Total	21 055 445	750	7 540	11 588	19 878										2 404	6 895	8 639	17936					49661
35																								
36																								

## APPENDIX XII.

### AMERICAN ACCIDENT TABLE.

General Distribution:

Fatal .....	776
Permanent Total .....	63
Permanent Partial .....	3,855
Temporary Total .....	95,306
	100,000

Duration of Temporary Total Disability.

Temporary Total.		Permanent Partial.	
Duration.	No. of Cases.	Duration.	No. of Cases.
1 day.....	8,815	1 week or less.....	210
2 days.....	8,079	1-2 weeks.....	174
3 ".....	7,276	2-3 ".....	275
4 ".....	6,009	3-4 ".....	368
5 ".....	5,250	4-5 ".....	387
6 ".....	4,602	5-6 ".....	330
7 ".....	4,813	6-7 ".....	278
8 ".....	3,361	7-8 ".....	228
9 ".....	3,071	8-9 ".....	196
10 ".....	2,790	9-10 ".....	169
11 ".....	2,370	10-11 ".....	143
12 ".....	2,050	11-12 ".....	124
13 ".....	1,866	12-13 ".....	107
14 ".....	2,188	13-14 ".....	93
2 to 3 weeks.....	10,916	14-15 ".....	72
3 " 4 ".....	6,264	15-16 ".....	60
4 " 5 ".....	4,342	16-17 ".....	52
5 " 6 ".....	2,671	17-18 ".....	49
6 " 7 ".....	1,921	18-19 ".....	46
7 " 8 ".....	1,297	19-20 ".....	42
8 " 9 ".....	1,021	20-21 ".....	40
9 " 10 ".....	796	21-22 ".....	38
10 " 11 ".....	549	22-23 ".....	35
11 " 12 ".....	457	23-24 ".....	34
12 " 13 ".....	355	24-25 ".....	32
13 " 14 ".....	302	25-26 ".....	30
14 " 15 ".....	234	6 to 7 months.....	80
15 " 16 ".....	191	7 " 8 ".....	53
16 " 17 ".....	162	8 " 9 ".....	40
17 " 18 ".....	130	9 " 10 ".....	29
18 " 19 ".....	109	10 " 11 ".....	22
19 " 20 ".....	103	11 " 12 ".....	19
20 " 21 ".....	89		
21 " 22 ".....	78		3,855
22 " 23 ".....	69		
23 " 24 ".....	56		
24 " 25 ".....	45		
Over 25 ".....	609		
	95,306		

Permanent Partial Disability .....	3,855
Dismemberment or Loss of Use .....	2,753
Arm .....	62
Hand .....	88
Thumb .....	98
One phalange of thumb .....	154
Index finger .....	306
One phalange index finger .....	265
Second finger .....	150
One phalange second finger .....	175
Third finger .....	106
One phalange third finger .....	91
Fourth finger .....	121
One phalange fourth finger .....	66
Thumb or finger and loss of or injury to other fingers.	542
Leg .....	64
Foot, .....	44
Great toe .....	34
One phalange great toe .....	15
One toe other than great toe .....	22
One phalange of toe, not great toe .....	13
One toe and loss of or injury to other toes .....	36
Hearing, one ear .....	5
Hearing, both ears .....	1
Eye .....	295
Disfigurement .....	51
Other Permanent Partial .....	1,051

In these cases assume average degree of disability equal to 55 per cent. of average disability in dismemberment cases.

Major Permanent Partial .....	942
Minor Permanent Partial .....	2,913

#### Permanent Total.

Average age at time of accident 42 years.

#### Distribution of Fatal Cases.

No dependents .....	177
Widow alone .....	181
Widow and children .....	258
Widow and one child .....	80
Widow and two children .....	69
Widow and three children .....	48
Widow and four children .....	29
Widow and five children .....	17
Widow and six or more <sup>a</sup> children .....	15

<sup>a</sup> Average number 7.

## AMERICAN ACCIDENT TABLE.

Orphans .....	26,
One orphan .....	13
Two orphans .....	6
Three orphans .....	3
Four orphans .....	2
Five or more <sup>b</sup> orphans .....	2
Widow and other dependents .....	4
Widow and one parent .....	1
Widow and children <sup>c</sup> with other dependents .....	3
Parents and—or brothers or sisters .....	127
One parent .....	67
Two parents .....	36
One brother or sister .....	7
Two brothers or sisters .....	2
Three or more <sup>d</sup> brothers or sisters .....	1
One parent and one brother or sister .....	5
One parent and two brothers or sisters .....	3
One parent and 3 or more brothers or sisters .....	2
Two parents and brothers or sisters <sup>e</sup> .....	4
Other dependents <sup>f</sup> .....	3
Total .....	<u>776</u>

## Average ages.

Widow with no children .....	47 years.
Widow with children .....	36 “
Children .....	8 “
Brothers and—or sisters .....	11 “
Parents, with brothers or sisters .....	50 “
Parents, all other cases .....	61 “

<sup>b</sup> Average number 6.

<sup>c</sup> Average number 2.

<sup>d</sup> Average number 4.

<sup>e</sup> Average number 3.

<sup>f</sup> Average number 3.



## APPENDIX XIII.

### CALCULATION OF PROJECTION FACTOR FOR NEW YORK.

The General Rating Committee first selected pure premiums upon the level of 1917 year of issue experience in the state of New York. To the Actuarial Committee was then referred the problem of developing factors for projecting these pure premiums to appropriate pure premiums which would reflect present day conditions. The Actuarial Committee realized that, at this stage of the work, personal judgment would have to enter and believed that it should develop a dependable statistical basis, which could be used in the projection process, in order to limit the extent to which the use of personal judgment would be needed.

The problem required the development of some practical method for passing from state pure premiums based upon 1917 experience to those representing the loss expectation of 1920. Obviously, actual experience for policy year 1919 was not yet available. After experimenting with various methods, the Committee developed a method of projecting the probable ultimate loss ratio for the year of issue 1919 by making use of actual experience data. The Actuarial Committee then proposed and the General Rating Committee approved the following procedure:

1. The calculation of the loss ratio for the year of issue 1919.
2. The determination of a loss ratio for the experience of the 1917 year of issue, using for this purpose
  - (a) the combined payrolls reported in the experience for 1917;
  - (b) the manual rates in effect January 1, 1920;
  - (c) correction for the average effect of schedule and experience rating;
  - (d) the actual losses reported in the experience for year of issue 1917.
3. A comparison of the two loss ratios developed from the foregoing procedure. This is the equivalent of a comparison of average pure premiums and measures the extent to which the 1917 pure premiums require modification in order to serve as a proper basis for rate making at the present time.

The innovation in this proposal is not the comparison of loss ratios, so much as in the determination of the loss ratio for policy year 1919, which is still an open year of account. This was made possible by a special study of experience figures, which indicated a remarkably stable relationship between *paid* losses observed at December 31 of the year of issue and *ultimate incurred* losses of the same year. (See Exhibit B.)

In order to obtain the ultimate earned premiums on the 1919 year of issue, similar calculation is necessary. The Actuarial Committee found that, while the relationship between *written* and *ultimate earned* premiums is not so stable as that of paid to incurred losses, nevertheless, with a restricted exercise of personal judgment, premium factors can be developed which make possible the determination of ultimate earned premiums. Thus, the information required for estimating the policy year 1919 loss ratio becomes available.

There are presented herewith the following exhibits:

*Exhibit A.*—Comparative study of development of New York premiums subsequent to the close of the calendar year in which policies were issued.

*Exhibit B.*—Study of ratio of losses paid to ultimate incurred losses of the same year of issue.

*Exhibit C.*—Study of development factors on the country-wide business . . . taken from returns in Schedule P of annual statement.

*Exhibit D.*—Summary of calculations.

EXHIBIT "A"—COMPARATIVE STUDY OF DEVELOPMENTS OF NET PREMIUMS  
WRITTEN AFTER THE CLOSE OF CALENDAR YEAR IN WHICH  
POLICIES WERE ISSUED.

Compensation Premium Data.

Name of Company.	Year of Issue 1916.				
	Premiums Written to 12/31/16.	Premiums Earned to 12/31/17.	Ratio (2) ÷ (1).	Premiums Earned to 12/31/19.	Ratio (4) ÷ (1).
	(1)	(2)	(3)	(4)	(5)
Aetna.....	852,405	1,463,374	1.717	1,536,921	1.803
Employers.....	797,750	1,678,810	2.104	1,686,996	2.115
Fid. & Cas. Co....	485,483	645,223	1.329	701,686	1.445
Globe.....	365,262	634,609	1.737	636,142	1.742
Hartford.....	212,821	291,226	1.368	289,870	1.362
London.....	322,153	560,569	1.740	562,274	1.745
Maryland.....	295,337	481,458	1.630	486,756	1.648
Ocean.....	286,631	587,259	2.049	622,949	2.173
Royal.....	244,981	378,247	1.544	380,920	1.554
Travelers.....	2,115,758	3,634,729	1.718	3,972,853	1.878
U. S. Cas. Co.....	....	....	....	....	....
Total Stock Companies.....	5,978,581	10,355,504	1.732	10,877,367	1.819
Utica Mut.....	270,360	337,364	1.248	337,274	1.247
Am. Mutual.....	....	....	....	....	....
Grand Total.....	6,248,941	10,692,868	1.711	11,214,641	1.795

Name of Company.	Year of Issue 1917.				
	Premiums Written to 12/31/17.	Premiums Earned to 12/31/18.	Ratio (2) ÷ (1).	Premiums Earned to 12/31/19.	Ratio (4) ÷ (3).
	(1)	(2)	(3)	(4)	(5)
Aetna.....	1,128,320	1,967,715	1.774	2,001,726	1.774
Employers.....	1,008,169	2,007,661	1.991	2,205,491	2.188
Fid. & Cas. Co....	776,035	1,078,145	1.389	1,131,620	1.458
Globe.....	392,264	616,635	1.572	619,545	1.579
Hartford.....	181,727	303,316	1.669	314,945	1.733
London.....	495,155	890,273	1.798	886,803	1.791
Maryland.....	537,667	1,083,804	2.016	1,139,000	2.118
Ocean.....	411,765	775,705	1.884	797,923	1.938
Royal.....	283,529	515,002	1.816	538,038	1.898
Travelers.....	3,538,872	6,594,411	1.863	6,501,924	1.837
U. S. Cas. Co.....	245,540	342,847	1.396	346,060	1.409
Total Stock Companies.....	8,999,043	16,175,514	1.797	16,483,075	1.832
Utica Mut.....	375,161	679,241	1.811	718,290	1.915
Am. Mutual.....	622,735	1,097,662	1.763	1,082,038	1.738
Grand Total.....	9,996,939	17,952,417	1.796	18,283,403	1.829

Name of Company.	Year of Issue 1918-1919.			
	Premiums Written to 12/31/18.	Premiums Earned to 8/31/19.	Ratio (2) ÷ (1).	Premiums to 12/31/19.
	(1)	(2)	(3)	
Aetna.....	1,216,918	2,386,450	1.961	1,211,613
Employers.....	1,697,325	2,604,907	1.535	1,667,154
Fid. & Cas. Co....	800,994	1,118,719	1.397	817,500
Globe.....	545,725	964,329	1.767	674,541
Hartford.....	172,965	285,381	1.650	225,961
London.....	708,603	1,171,773	1.654	718,274
Maryland.....	889,258	1,393,578	1.567	897,609
Ocean.....	561,001	938,067	1.672	551,336
Royal.....	383,737	721,859	1.881	467,932
Travelers.....	3,835,248	6,031,794	1.573	3,245,551
U. S. Cas. Co....	319,001	382,542	1.199	286,562
Total Stock Companies .	11,130,775	17,999,399	1.617	10,764,033
Utica Mut.....	742,311	904,946	1.219	978,769
Am. Mutual.....	901,948	1,511,197	1.675	1,147,468
Grand Total.....	12,775,034	20,415,542	1.598	12,890,270

'16 Issues—Increase '19 reporting over '17—105 per cent.

'17 Issues—Increase '19 reporting over '18—102 per cent.

Average, 103.5 per cent.

74 CALCULATION OF PROJECTION FACTOR FOR NEW YORK.

EXHIBIT "B"—STUDY OF RATIO OF LOSSES PAID\* DURING CALENDAR YEAR  
IN WHICH POLICIES WERE ISSUED TO ULTIMATE INCURRED LOSSES  
OF THE SAME YEAR OF ISSUE.

Compensation Loss Data.

Name of Company.	Year of Issue 1916.			Year of Issue 1917.		
	Paid to 12/31/16.	Incurred as of 12/31/19.	Ratio (1) + (2).	Paid to 12/31/17.	Incurred as of 12/31/19.	Ratio (1) + (2).
	(1)	(2)	(3)	(1)	(2)	(3)
Aetna.....	158,625	1,021,990	.155	159,283	1,032,092	.154
Employers....	147,535	1,223,121	.121	147,802	1,269,928	.116
F. & C.....	72,700	484,005	.150	87,491	617,563	.142
Globe.....	53,388	414,215	.129	46,867	299,070	.157
Hartford.....	19,851	226,021	.088	22,693	155,125	.146
London.....	61,947	452,142	.137	61,705	511,801	.121
Maryland.....	53,755	349,557	.154	81,478	657,336	.124
Ocean.....	50,989	352,090	.145	66,710	372,961	.179
Royal.....	38,130	199,321	.191	28,369	203,004	.140
Travelers.....	383,074	2,803,029	.137	447,356	3,212,870	.139
U. S. Cas.....	26,996	151,893	.178	32,215	133,084	.242
Total Stock Companies..	1,066,990	7,677,390	.139	1,181,969	8,464,834	.140
Utica Mut.....	37,624	264,334	.142	33,148	309,527	.107
Am. Mutual ..	.....	.....	.....	94,599	455,013	.213
Grand Total..	1,104,614	7,941,724	.139	1,309,716	9,219,374	.142

\* Excluding Prohibited Risks.

EXHIBIT "C"—STUDY OF DEVELOPMENT FACTORS ON THE COUNTRYWIDE  
BUSINESS FOR NINE REPRESENTATIVE STOCK COMPANIES AND TWO  
MUTUAL COMPANIES TAKEN FROM RETURNS IN SCHEDULE  
P OF ANNUAL STATEMENT.

Year of Issue.	Ratio of Ultimate Premiums to Net Premiums Written as of December 31st of the Issue Year.	Ratio of Losses Paid* Dur- ing Calendar Year of Is- sue to Ultimate Losses Incurred.
1914 .....	1.29	.178
1915 .....	1.53	.162
1916 .....	1.68	.194
1917 .....	1.73	.181
1918 .....	1.61	.177



## APPENDIX XIV.

### MERIT RATING.

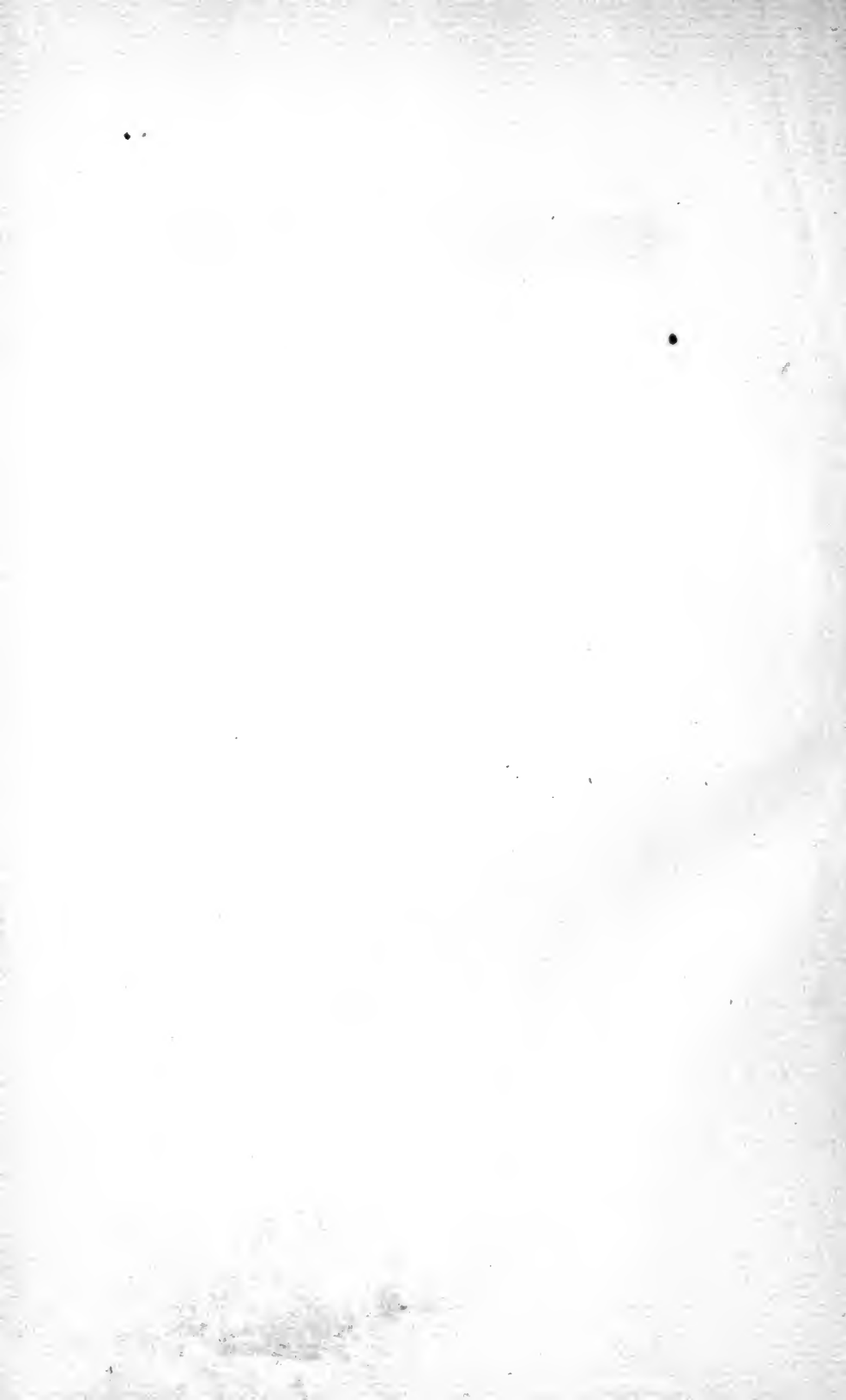
The subject of merit rating has not been treated in the body of the present report since the 1920 revision was directed particularly to the subject of manual rates. But merit rating is an integral part of the compensation rating system and some comprehension of its nature is essential to an appreciation of the function of manual rates.

The manual rate for a classification represents the average rate which must be collected from employers whose enterprises fall within the classification, in order to meet the compensation costs for which such enterprises are responsible. It is obvious that the compensation hazard is not the same for all plants engaged in the same industry and that it is therefore unfair for all to pay the same rate. Merit rating has been developed to measure the extent to which each plant varies from the average and to express this variation in rates higher or lower than manual for those plants which are, respectively, poorer or better than the average. Indications of the variation of a plant from the average are found in the physical condition of the plant and in the record of compensation losses paid to its employees. To measure these indications two types of merit rating have been developed; schedule rating and experience rating.

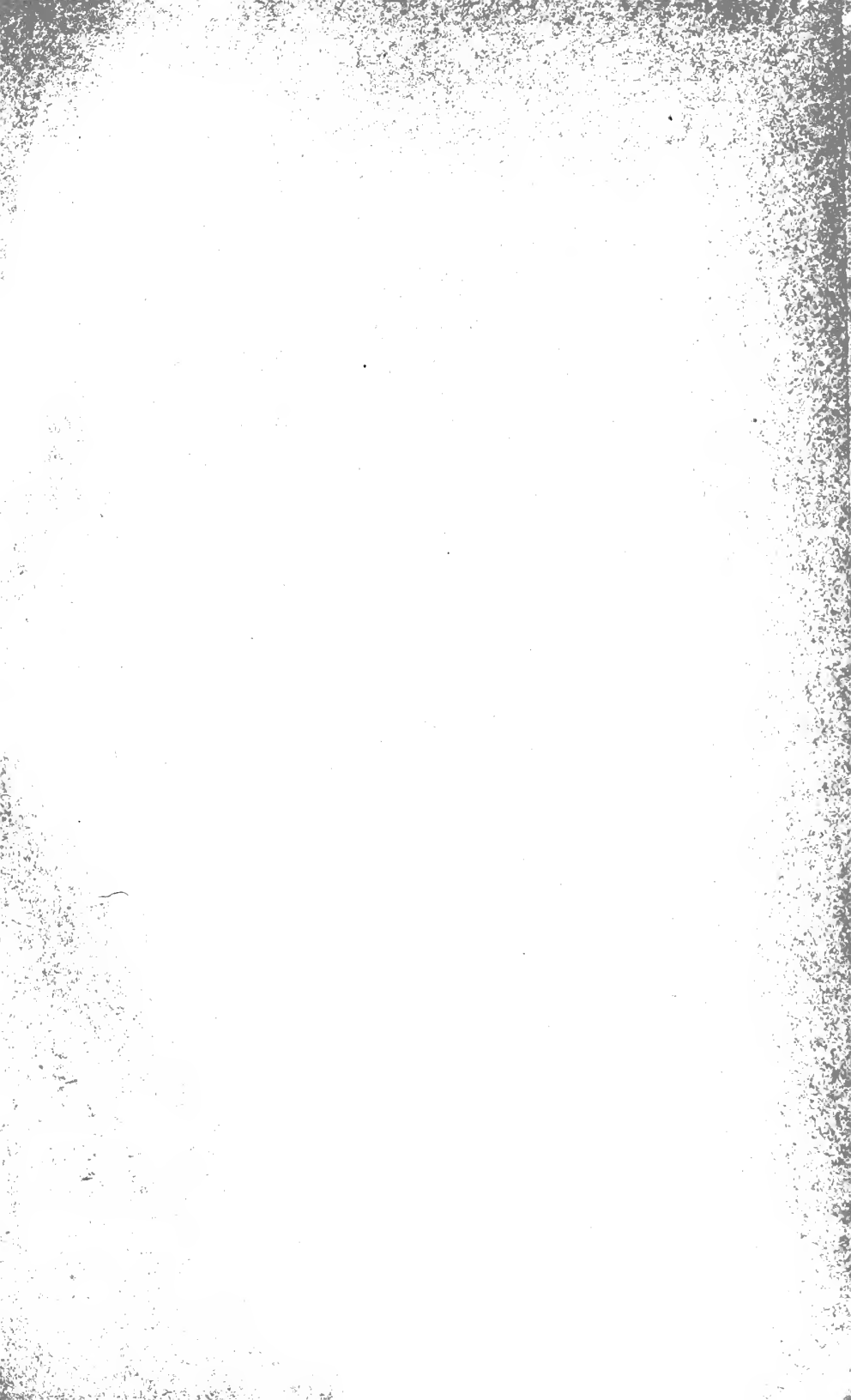
In rating a risk under the schedule rating plan an inspection is made of the physical features, deduction being made from the manual rate for conditions which, from the loss producing point of view, are better than the average for the industry, and additions being made for those which are poorer. The net result of these additions and deductions constitutes a schedule rate. Under the experience rating plan the actual losses of the plant are compared with normal losses for the industry, a charge being made for abnormally large losses and a credit given for unusually small losses.

Thus a risk which qualifies for both schedule and experience rating is charged a rate which reflects the hazard of the industry to which it is devoted and also its individual hazard as disclosed by its physical characteristics and by its loss experience.









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