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NOTICE

VOL. X, PART I. NO. 21.

PROCEEDINGS

NOVEMBER 16, 1923

THE SOCIETY AND ITS RELATION TO RATEMAKING ASSOCIATIONS

PRESIDENTIAL ADDRESS, HARWOOD E. RYAN

Organized at the outset of the World War the Society in another year will celebrate its tenth anniversary. In the field of casualty insurance this period has been an exceedingly important one. Legislation has profoundly affected this branch of insurance generally and has substantially altered its actuarial aspects. Workmen's compensation laws, directly or indirectly, have contributed to these changes and the exercise of control over competition has become the established governmental policy of many states. In New York the regulation of rates has extended to nearly all lines of casualty insurance as well as to fire insurance and associated lines. Toward the extension of corporate powers of stock companies little progress has been made, due chiefly to the inertia of prevailing state policy. Mutual casualty companies have succeeded in putting themselves squarely before the public and in some states have enjoyed considerable broadening of their underwriting scope. Several companies of the mixed or stock-participating type have come into the field as have a number of reciprocal interinsurers, and there are also, of course, the state funds.

In these nine years there have been few legislative changes affecting standards of solvency. An exception, however, occurs in workmen's compensation and liability insurance where the valuation requirements have been stiffened and for certain classes of carriers the method of computing loss reserves has been established upon an actuarial basis. As some of the states now provide benefits to widows and dependent minors—some of these involving complicated contingencies of survivorship and remarriage—a field of principles and practice usually occupied by the

life insurance actuary has unfolded to the casualty actuary and statistician.

It is chiefly in relation to rate determination, however, that the casualty actuary has thus far found his largest opportunity. For during this period the processes of ratemaking have evolved from a system of underwriters' judgments to one of elaborate statistical procedure of which the main superstructure and at least a part of the foundation are scientifically built.

When the Society was organized the casualty insurance business, and more particularly the liability branch, was endeavoring to pass from a condition of haphazard, to one of orderly, ratemaking procedure. The ratemaking body at that time consisted of a small and partisan group of companies which itself was undergoing important reconstructive changes. In the spring of 1914 a controversy arose over the determination of rates for coverage under the New York workmen's compensation law. Out of this controversy may be said to have grown the movement that resulted in the Society's formation.

Had the rating organizations of today then existed it may be doubted whether the Society would have been called into being. But whether or no, its formation and subsequent growth during the past nine years have afforded the most appropriate forum for the exposition of casualty actuarial technique while serving to develop new and higher standards of training for actuarial work in the casualty field. By gradual stages the standards for admission by examination have been elevated and it is now regarded as no easy accomplishment to gain the Fellowship by the examination route. So while the work that is being done by the various ratemaking organizations has in a certain sense supplanted the sort of activity which brought the Society into existence, yet the educational program which has been evolved place it rather peculiarly in position to continue the work it has commenced. Moreover, the field of the Society is broader than that of any existing rating organization and legitimately embraces such theoretical consideration of many subjects as would be inappropriate to any other type of association. In short there seems to be reason for asserting that the Society has already served a useful purpose to casualty insurance carriers of all classes and to the public and that this usefulness has been demonstrated by its record of performance.

I believe this Society should be utilized for conducting certain kinds of actuarial investigations. Compilations of combined experience are needed in many directions. Among these may be mentioned remarriage experience under American workmen's compensation laws; mortality rates among lives permanently and totally disabled by accident; authentic wage distributions and analyses of disability claims according to their duration, nature and severity. Such fundamental data as scientific investigations of this kind would develop would go far toward satisfying official curiosity and dispelling public misinformation in respect of the supposed mysteries of the private insurance system. The various rating organizations are maintained for certain specific purposes all of which have to do with the production of definite rates for use at a definite time and the nature of the demands upon them seems to preclude any considerable proportion of their activities being devoted to purely scientific research. But if the casualty insurance business is to earn a reputation for the adoption of scientific business methods it must furnish tangible evidence of search for fundamental actuarial truths. The business is still influenced by various fallacies, prejudices and suppositions while the supervisory authorities are expected to accept the assertion that the rates are being scientifically constructed because in their preparation a considerable degree of mathematical skill has been applied. We are somewhat too prone to be governed by the so-called practicalities rather than by the actualities of the situation. This Society can be mobilized for action of the most positive kind by the formulation of a working program of inquiry along useful scientific lines and the appointment of suitable committees to carry out the details. I submit this thought as a recommendation to the membership with the hope that it will be translated into action by the incoming administration.

If we are to hold the interest of our out-of-town membership we must get away from New York occasionally and meet in other centers of insurance activity,—Baltimore, Chicago, Hartford, Boston, Philadelphia. To do this the Society must pursue activities of such controlling importance that it will command the support of the organizations whose actuaries form its membership. The Society's policy has been wisely opposed to accepting financial assistance from the companies. On the other hand,

if more of the companies would recognize in their periodic revisions of remuneration the efforts of their actuarial students who successfully pass the examinations, their interest in the work of the Society would find legitimate expression and the Society's growth would thus be substantially stimulated.

Finally we should begin to look forward to the time when the rates for fire insurance will be statistically determined. This is not a new question but it has received a fresh impulse from renewed interest in the problem of fire insurance rating on the part of the National Convention of Insurance Commissioners. Almost since the organization in 1866 of the National Board of Fire Underwriters this problem has been pressing for solution and the attitude of state supervision during the past few years indicates that the supervisory authorities will eventually bring about a procedure for the determination of fire rates from classified experience statistics which will create new lines of thought and activity for the trained insurance statistician. How soon this may come about it would be impossible to predict. But whenever the situation crystallizes this Society should be in position to broaden its scope for the application to fire insurance of the established analytical methods of casualty actuarial science.

ALLOCATION OF EXPENSES

BY

JAMES D. CRAIG

Under date of October 4th, 1923, the Insurance Department of the State of New York addressed a letter to various insurance companies enclosing a preliminary draft of an exhibit which all stock and mutual companies transacting casualty and surety business in that State will be required to furnish as of December 31st, 1923. The second paragraph of this letter reads:

"The analysis of expenses required by this exhibit is more detailed than at present provided for in the Annual Statement blank. Companies that have not already made such detailed analysis will find it advisable to at once review the expenditures of the current year and allocate them to the various divisions of expense and lines of business in accordance with the best data available. A statement of the methods employed in allocating expenses is to be submitted with the return."

Much has been written relative to apportioning expenses as to various items and specific minor subdivisions of a particular line, but the broader question of allocating among the various lines themselves has not been satisfactorily answered and is the one upon which the New York Insurance Department requires detailed information. Mr. Claude E. Scattergood's article on "Cost Accounting in Casualty Insurance" in Vol. II of the Proceedings of this Society relates to the subject, but as Mr. Elston in his paper "Expense Investigations" published in the Transactions of the Actuarial Society of America says,

"Cost accounting need not raise unnecessary barriers. Without 'Cost Accounting' you can have, and companies do have, systems of at least very satisfactorily apportioning their expenses."

Mr. Elston then goes on to state that separate ledgers should be kept for the different classes of business, unless any class is too small to warrant it. His general survey is then so complete,

so important and so much in harmony with the general practice of most companies that a review of the subject would be incomplete were it not reiterated. The following excerpt is therefore taken from his paper:

"Of course, the first principle to be observed is to directly apportion all expense items that can be charged without too great expense. This generally includes medical and inspection fees, most taxes and most of the home office salaries. Some items as commissions, legal expenses and loss expenses should be separated even if the expense of doing so is high, just as premiums and claims should be accurately determined. This is essential because they are the fundamental items in each line of business.

"Resort may be had to various devices to help keep the analysis correct—for instance, different colored salary checks may be used for different departments. Home Office traveling expenses may be apportioned to the same department as the salary of the person traveling. In the case of the higher officials a division of salary is necessary, based best, it would seem to me, on the individual's estimate of the best ratio of division. Rent may be figured very accurately on the basis of actual space occupied and apportionment factors used for a whole year unless unequal growth and rearrangement of departments make a change in the factors advisable.

"The various other expenses except the investment can be apportioned in different ways. Some, like postage, telegraph, telephone and express, it may be possible to charge directly. One troublesome item is furniture and fixtures, because there is likely to be so much transfer between departments. An apportionment of this and items like heat, light and maintenance of offices, etc., may be made according to rent (assuming the latter carefully figured) with more reason than at first appears. Of course, the space in the different departments occupied by clerks' desks and stenographers' typewriters is in general proportion to the rent. But more expensive furniture for an officer as well as special furniture or machines occupy additional space somewhat comparable with their greater value. It should be borne in mind, however, that as such items must be charged off in the annual statement, as expense in the year of purchase, their assignment should be rather according to the rate of expansion, that is proportionate to the increase in rent rather than to rent itself. If there is considerable inequality between departments in the amount of work done on sorting and tabulating machines, they ought to be treated separately.

"Again the main fact to be borne in mind is not to make such a great subdivision of these miscellaneous expenses that the accounting expense itself becomes prohibitive. Of course, the latter may in many cases be materially reduced by making the original entries without apportionment and making the proper division of expense and consequent adjustment entries once for all at the end of each month, applying the factors to the month's appropriate totals.

"Another great saving may be effected by dividing the comparatively small but troublesome residue of expenses not otherwise assigned in the same proportion as the assigned expenses, if no better method suggests itself.

"The most consoling fact to one inclined to be too conscientious is the small comparative error in the total, if the apportionment of small expense items, as for instance advertising, is not on the best basis possible. It is surprising what a small proportionate error in the Life expenses is made, even if a known error in the individual item is used. And, of course, if the work is done as free as possible from bias, there is at least the hope that errors in one direction will be counterbalanced by errors in the opposite direction, particularly where the methods used are the consensus of opinion (probably a compromise) of several individuals."

The company with which I am connected conducts several classes of business, to wit,

Industrial insurance, with premiums payable weekly,
Ordinary insurance in all its various subdivisions,
Group Accident and Health insurance,
Personal Accident and Health insurance.

Included in the Ordinary business are certain assumed companies, such as the Pittsburgh Life, where separate accounts are definitely agreed to, and which are, therefore, in the nature of separate classes. The satisfactory allocation of expenses among these different classes presents the same problems which are presented with different lines of casualty business, and it might be of interest to the Society, and aid in the general discussion of the problems if certain studies recently made were examined.

In order to have the proper background, it must first be understood that for years most careful and minute scrutiny has been given to each and every item of disbursement, in order that it

may be properly charged, either in total to the class of business incurring such expense, or to different classes in proportion to their responsibility for it.

The New York Insurance Department as a result of the examination to ascertain the condition of the company as of December 31, 1915, stated as follows:

"A fair conclusion then, it seems to me, is that the present bases of apportionment are substantially accurate as a means of determining the respective share of each department in the general expenses of the company. Apparently the endeavor on the part of the company is to prevent discrimination between departments and provide for each that it shall bear its proper share of expenses."

It has generally been assumed, as Mr. Elston states, that any errors would be small and in the long run tend to offset one another, but an attempt was made to determine independently certain totals of expense not readily apportionable.

Listing the items of expense, as appearing in the Annual Statement, into those which must be, those which can be, and those which offer difficulty in being charged directly, the following schedule was prepared from the 1922 Annual Statement of the Metropolitan Life Insurance Company.

Items which Must be Charged Directly	Items	Life Statement	Items	Miscellaneous Statement
Commissions	20–22	$45,058,190.03	28	$ 95,563.09
Legal Expense	29	40,309.82		
Health and Welfare	39	4,762,970.59	45	2,909.83
			51	6,176.12
Loss Expense	16	72,828.08	22	2,819.50
Total		$49,934,298.52		$107,468.54
Items which Can be Charged Directly				
Medical and Inspection Fees	25	$ 2,371,621.42	31–32	$ 25,531.80
Taxes, Fees, etc.	33–38	4,970,147.33	37–43	9,234.74
Specific Investment Expenses charged against Interest	31–32	2,838,606.00		
	40	24,546.39		
Legislative Expenses	40	13,374.44		
Association Life Ins. Prests.	40	22,636.31		
Total		$10,240,931.89		$ 34,766.54

Items Not Readily Chargeable	Items	Life Statement	Items	Miscellaneous Statement
Salaries	26	$ 9,883,549.07	29	$192,028.93
Rents (less $1,144,198.07 Dist. Office rents)	27	1,969,992.47	33	39,991.87
Advertising, printing and Stationery, postage, etc	28	1,754,087.72	44 45	36,427.27 3,095.07
Furniture, fixtures and safes (less $74,715.27 for D. O.)	30	189,068.27	46	5,339.38
Lunches for H. O. employees	40–43	559,879.52	51	9,077.45
Conservation and Revival of business	40–43	124,545.95		
Company's publications	40–43	285,587.74		
Examinations by Depts. and Public Accts	40–43	25,839.75		
Handling and shipping Field supplies	40–43	137,648.42		
Outlay on unlisted assets	40–43	19,446.39		
Law Library	40–43	2,208.00		
Miscellaneous Office Supplies and furnishings	40–43	80,729.19		
Storage House expenses	40–43	6,583.97		
Typewriters, Calculating Machines, etc	40–43	231,177.37		
Service Medals	40–43	22,982.72		
Pictures and frames	40–43	4,385.29		
Conventions	40–43	90,160.38		
Laundry and Kitchen Improvements, etc		302,519.70		
Home Office Traveling Expenses	40–43	37,669.54	29	15,122.13
Books, Magazines, etc	40–43	7,564.36	46	1,042.80
Medical Division expense	40–43	13,801.59		
Photographic Bureau	40–43	38,674.20		
Expense of assumption of business of reinsured companies	40–43	5,175.23		
Sundry General Expense	40–43	131,670.64	34	10,849.97
		$15,874,947.48		$312,974.87

Total from Life Statement	$15,874,947.48
Total from Miscellaneous Statement	312,974.87
Total	$16,187,922.35

Certain changes might at first be considered advantageous in this grouping, as for instance the inclusion of salaries and rents in the group which could be charged directly. This is true to a certain extent, but it is the salary, rents, etc., of the Executives which presents the difficulty. The salary known to be chargeable directly, together with the clerks to whom payable, offered the means of those more or less independent total allocations which are now presented. It so happens that one division, necessary on account of the size of the Company, is the Personnel Division with general supervision of all employees. This Division is

familiar with the clerks in all sections, knows in general the nature of the work and the number and weekly salary of all clerks engaged thereon. In those sections, relatively few in number, where work connected with different classes is performed the Personnel Division is able to divide the clerks proportionately to the work. From this Division it was ascertained that the total average number of clerks in the Company for the year, excluding Executive and Supervisory officials and heads, numbered 6,829, subdivided with their weekly salary, as follows:

	No. of Clerks	Weekly Salary
Industrial	3,422	$77,121
Ordinary	2,706	68,780
Pittsburgh L. & T.	39	909
Group	299	7,376
Accident & Health	52	1,540
Investment	311	8,612
	6,829	$164,338

With this information was it possible to adopt a simple and practical, yet logical and reasonable formula for making an independent allocation of the $16,187,922 of miscellaneous expense not readily chargeable, and if so what was it? It is not based on Premiums for the reason given by Mr. Elston. It cannot be Policies, as Industrial policies are handled in groups while in the Group Division one policy will cover anywhere from 50 to 50,000 lives. It cannot be Insurance for the same reasons that apply to Policies. The Group policy that insures 50,000 lives is looked after by six clerks. In like manner the Reinsurance Division secures $50,000,000 of insurance in one year which is looked after by very few clerks. The Industrial Department with 24,000,000 policies is conducted with about the same number of clerks as the Ordinary with its 3,500,000 policies, and it would seem logical to predicate the expense upon those who cause the expense—namely, the clerks. Each clerk receives a salary; each clerk requires space and equipment such as furniture, stationery, printing, postage, typewriters, calculating machines, service medals, books, magazines, lunches, and in fact all the items given under the schedule of Home Office Expenses. Supervision is incident to clerks. It also seems logical to assume that the expense of supervision should follow the expense of the supervised, that

on the average each clerk would submit a proportionate number of questions for executive decision and that accordingly the salaries, rents, stationery, etc., for the executives would follow those of the clerks. Certain Divisions may need higher priced help than others which can have their work more systematized and therefore handled in a more routine manner; so salary of clerks as well as number should be considered.

We could think of no more simple formula, therefore, than to take the number of clerks of each Division, together with their weekly salaries, and adjust the Home Office expense pro-rata thereon, i. e., total salaries including the Executives' on the basis of the weekly salaries of the clerks and all other expenses on the number of clerks. Accordingly the two items of salary, $9,833,549.07 appearing on the Life blank, and the $192,028.93 appearing in the Miscellaneous blank, were combined and the total of $10,125,578 was distributed on the basis of the $164,338 of weekly salary, and the balance of the Home Office expenses amounting to $6,062,344 was distributed on the basis of number of clerks.

In making this distribution the clerks engaged in supervising the investments of the Company, including policy loans, were treated as a class by themselves in order that the unallocated investment expenses might be determined. These investment expenses are deductible from interest, and decrease the amount of interest apportioned to each fund.

TABLE SHOWING DISTRIBUTION OF EXPENSES NOT READILY CHARGEABLE

	Clerks	Salary	Expenses Other than Salary	Salary	Total
Industrial	3,422	$77,121	$3,037,829	$4,751,759	$7,789,588
Ord. & Int	2,706	68,780	2,402,212	4,237,835	6,640,047
Pittsburgh Life	39	909	34,622	56,007	90,629
Group	299	7,376	265,433	454,468	719,901
Personal A. & H.	52	1,540	46,162	94,886	141,048
Investments	311	8,612	276,086	530,623	806,709
Total	6,829	$164,338	$6,062,344	$10,125,578	$16,187,922

This distribution compared with the actual distribution as made is as follows:

SCHEDULE SHOWING COMPARISON OF EXPENSES AS DETERMINED ON CLERKS AND SALARY WITH EXPENSES ACTUALLY CHARGED

	Expenses as per Distribution	Expenses Actually Charged	Percent of Expenses Charged
Industrial	$7,789,588	$7,655,224	101.76
Ordinary	6,640,047	6,803,917	97.59
Pittsburgh Life	90,629	91,544	99.00
Group	719,901	724,389	99.38
Personal A. & H.	141,048	167,088	84.42
Investments	806,709	745,760	108.17
	$16,187,922	$16,187,922	

The first three classifications on this list—Industrial, Ordinary and Pittsburgh Life—are relatively old lines. The Group is relatively new, while the Accident and Health business is just beginning. The figures indicate that where business is established an apportionment similar to the above will produce satisfactory results. Where a line of business is just being started the organization expenses are relatively heavy, although very nominal in amount, and in a well established company it is an important problem just how much additional expense should be charged. To take a concrete example. The company in question had more agents than it had Personal Accident and Health policies at the end of 1922. In organizing this branch it was necessary to supply these agents with manuals, rates and literature entirely out of proportion to their initial production. Also many activities are indulged in which would not be undertaken by a company starting only an Accident and Health business. True, certain advantages accrue to the field force in connection with transacting a new line of business for an old established company, but it is a question worthy of serious consideration whether a new branch should not be treated as an integral part of the company, with its expenses prorated in some such method as outlined. As the business develops the two methods should tend to approach each other until with all departments firmly established they should give almost identical results.

A NEW EXPERIENCE EXHIBIT FOR CASUALTY INSURANCE COMPANIES

BY

H. O. VAN TUYL

The "Casualty Experience Exhibit" is a special report form which has recently been drafted by the New York Insurance Department. It is designed to furnish information that will aid the department in connection with the supervision of insurance rates. However, it is to be expected that the data obtained through the use of this exhibit will prove of value to the individual companies and the various ratemaking organizations.

The blank in its present form consists of four parts as follows:

Part 1. An underwriting exhibit by lines of insurance

Part 2. A special report of acquisition and field supervision cost by lines of insurance

Part 3. A report of loss ratio experience on New York State risks

Part 4. A special report covering workmen's compensation loss experience by policy years on New York State risks.

It is impossible to determine from the annual statement of a multiple line company what the underwriting results are in any single line of insurance. This fact points to the desirability of a greater refinement in the data furnished by the companies and has made necessary the preparation of a special form of report which will give such information.

The Underwriting and Investment Exhibit, which has been a part of the Convention blank for over ten years, provides for an analysis of the gain or loss from underwriting and the gain or loss from investments on the total transactions of a company. The Underwriting Exhibit by Lines is an elaboration of the underwriting section of the present exhibit. It does not take the place of this exhibit which will remain as a part of the Convention blank but is supplemental thereto. A more refined analysis of the underwriting results is provided for in two respects. In the

first place the data is reported separately for each line of insurance and secondly the expenses are subdivided into five groups as follows:

Investigation and adjustment of claims
Acquisition and field supervision expenses
General administration expenses
Inspection and Bureau expenses
Taxes, licenses and fees.

The new exhibit follows along much the same lines as the exhibit contained in the annual statement. Policy fees on accident and health insurance, inasmuch as they represent a portion of the amount paid by the policyholder for his insurance, are included under premiums. Total premiums earned are then determined in the usual manner.

In the determination of losses incurred the amounts for unpaid losses at the beginning and end of the period are required to be reported on the basis of the company's own estimate of these losses rather than on the basis of statutory or formula reserves. This means that in the case of liability, compensation and credit insurance, the amounts to be entered in the exhibit as unpaid losses will differ from the amounts required to be reported in the annual statement as reserves for losses. With this exception the total figures entering into this exhibit should correspond with those reported in the annual statement blank.

The commissions and other items of acquisition and field supervision expense to be reported in this exhibit will correspond with the net disbursements in the annual statement blank, being affected by the commissions received and paid on reinsurance.

Included under general administration expenses will be the greater part of the so-called home office expenses, excluding only the expenses of investigation and adjustment of claims, acquisition and field supervision, inspection and bureau expenses, taxes, licenses and fees and expenses incurred in connection with investments.

The sections referring to inspection and bureau expenses, and taxes, licenses and fees are largely self-explanatory and need no comment. Item 54 under Other Underwriting Items corresponds with the net gain or loss from the so-called "Underwriting Profit and Loss Items" section of the Underwriting Exhibit on page 8 of the Convention blank.

Item 56 is an adjustment item which has been inserted in order to permit a balance of the total gain from underwriting, line 55, with the gain from underwriting as reported in the Underwriting Exhibit of the annual statement. The only difference between the two results should arise because of the use of two separate methods in determining the reserve for unpaid losses for liability, compensation and credit insurance and the difference between these two sets of reserves at the beginning and end of the year should be entered at line 56. As an aid to the audit of this exhibit the amounts of the reserves as carried in the annual statement at the beginning and end of the year are required to be reported as a footnote at the bottom of the page.

It is not believed that serious difficulty will arise in allocating expenses to the various groups. The purpose of the disbursement should determine the classification. Investigation and adjustment of claim expenses, acquisition and field supervision expenses, and inspection and bureau expenses should include the salaries of the claim department, the agency force and the inspection department, respectively, the rent of space occupied by these departments and the miscellaneous office or other expenses in connection with each.

The proper allocation of expenses to the various lines of insurance presents a more intricate problem but one, nevertheless, which is believed to be susceptible of practical solution. The application of cost accounting principles to this problem is quite necessary in order to arrive at satisfactory results. While taxes, for instance, may properly be split in accordance with premiums written, it is generally conceded that the use of this basis throughout in apportioning expenses to lines is incorrect. Each company will be required by the department to furnish a statement giving in detail the method followed in its allocation of expenses.

Part 2 is a special report of acquisition and field supervision cost and is a refinement of that section of the Underwriting Exhibit having reference to these expenses. The net premiums written on the company's "direct" business is determined by eliminating all premiums arising from reinsurance accepted or ceded. In arriving at the commissions paid on the company's direct business the net amount reported in the annual statement is first entered and then the commissions paid on reinsurance accepted from other companies is deducted and the commissions

received on reinsurance premiums ceded is added. The acquisition and field supervision expenses other than commissions are to be similarly determined and the total of these two will represent the aggregate cost for acquisition and field supervision.

The rules in regard to acquisition and field supervision cost which were adopted a year ago by a conference of stock companies and approved by the National Convention of Insurance Commissioners, established certain standards in regard to these expenses. Limitations of two kinds were provided, one of these being a limitation as to the number of agents who might receive more than minimum or producers' commissions and the other a limitation of the total amount that a company should expend for acquisition and field supervision. While there are differences of opinion as to the principle of limitation of agents, there appears to be complete agreement as to the desirability of limiting the total expenditure in connection with the acquirement of business. The data called for in part 2 should furnish accurate information as to what these total costs have actually been for each line of insurance.

Part 3 is a report of losses paid and incurred and of premiums written and earned during each of the last five years on risks located in New York State. An analysis of premium writings by states has always been made by insurance companies because of the necessity of paying taxes to each state based on the premiums written on risks located therein. The annual statement likewise has required a report of net premiums written and losses paid in the state on whose behalf the report is made. It will, therefore, be seen that, as regards net premiums written and losses paid on risks located in New York State, the information is readily available. Certain difficulties are encountered, however, when we come to the items "premiums earned" and "losses incurred." In order to determine premiums earned the unearned portion of New York State premiums in force at the beginning and end of each year must first be ascertained. It has not been customary to keep a separate record of premiums in force in each state. To build up an absolutely accurate record at this time covering the transactions of the last five years would involve an unreasonable amount of labor. It is believed that approximately accurate figures can be obtained in other ways. The premiums in force and the unearned premiums determined therefrom bear a

fairly constant relation to the net premiums written in a particular line of insurance. By determining the ratio of the total net premiums written in a year to the total unearned premium reserve at the end of that year and applying such percentage to the net premiums written in New York State, the approximate amount of unearned premiums for the state can be obtained. Where the variation in premium volume in the state by months differs from that shown by the entire business, the writings of each month both in the state and the country, should be weighted to reflect the greater effect on the unearned premium reserves of the premiums written in the later months of the year. Where abnormal cancellations or reinsurance transactions are known to affect the net writings further adjustments should be made.

The reserve for unpaid claims on New York State risks at the end of each year should be quite readily determined from an examination of lists of unpaid claims where such lists, made up during recent years, have been kept on file.

By means of this exhibit the loss ratio results in each line of insurance during the preceding five year period as well as in each year of that period, will always be available.

Part 4 takes the place of the policy year exhibit previously called for in Schedule "W". The arrangement has been changed somewhat but the essential features of the former report are retained. Instead of providing for a report of developments as they stood at the end of each of the last five years, the developments at the end of the preceding year only are brought forward from the previous report. The developments of the last calendar year are then set forth and the policy year totals brought down to December 31st of that year appear as a final result. The loss ratios to date on New York State compensation policies issued during each of the last five years will be shown as well as loss ratios on the aggregate of all policies issued prior thereto.

It will be seen that the new exhibit is to a large extent a development of reports that have heretofore been in use. Part 1, while patterned after the present underwriting exhibit, will take the place of the expense analysis previously called for in Schedule "W" covering compensation insurance. The ratios determined from the combined returns of all companies should furnish very dependable indications of the cost of each element of the expense. Part 2, furnishing an accurate report of acquisition

and field supervision expenses, becomes necessary as a result of the adoption of the rules affecting these expenses. The first two parts cover the countrywide transactions of the company whereas parts 3 and 4 are confined to a report of experience on New York State risks. A comparison of the loss experience in New York State in each line of insurance with that of the entire country is made possible from the data to be reported in part 3. In making rates for workmen's compensation insurance the loss ratio returns contained in Schedule "W" have in the past been of considerable value and part 4 of the new exhibit provides for a continued report of this policy year experience.

It is expected that the printed blanks in their final form will be ready for distribution by the close of the year. Returns are to be made thereon not later than April 1, 1924. A preliminary draft of the blank to be furnished to stock companies is appended hereto. A similar blank adopted to the mutual company statement is being drafted.

Some of the data called for in this Casualty Experience Exhibit has never before been available. Individual companies may have made such an analysis of their experience but no State department, so far as known, has called on companies generally for so complete an analysis of their operations. It is believed that the cooperation of the technical men in the accounting and statistical departments of the companies can be relied upon in the solution of the various problems involved in the preparation of accurate returns.

CASUALTY EXPERIENCE EXHIBIT

consisting of

Part 1—Underwriting Exhibit by Lines of Insurance.
Part 2—Acquisition and Field Supervision Cost by Lines of Insurance.
Part 3—Loss Ratio Experience on New York State Risks.
Part 4—Workmen's Compensation Loss Experience by Policy Years.

of the

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REPORT TO THE SUPERINTENDENT OF INSURANCE OF THE STATE OF NEW YORK FOR THE YEAR ENDING DECEMBER 31, 1923.

PART 1—UNDERWRITING EXHIBIT BY LINES OF INSURANCE

I. Premiums

1. Net premiums per items 4 to 20, page 2.
2. Policy fees per item 21, page 2.
3. Add unpaid return and reinsurance premiums Dec. 31, 1922 per items 36 and 37, page 5 of 1922 statement.
4. Total.
5. Deduct unpaid return and reinsurance premiums Dec. 31, 1923 per items 36 and 37, page 5.
6. Balance.
7. Add unearned premiums Dec. 31, 1922 per items 25 and 25½, page 5 of 1922 statement.
8. Total.
9. Deduct unearned premiums Dec. 31, 1923 per items 25 and 25½, page 5.
10. Premiums earned.

II. Losses

11. Losses paid per items 1 to 17, page 3.
12. Deduct salvage and reinsurance recoverable Dec. 31, 1923 in non-ledger assets, page 4.
13. Balance.
14. Add salvage and reinsurance recoverable Dec. 31, 1922 in non-ledger assets, page 4.
15. Total.
16. Deduct unpaid losses Dec. 31, 1922 (a)
17. Balance.

18. Add unpaid losses Dec. 31, 1923 (a)
19. Losses incurred during 1923.

III. Investigation and Adjustment of Claims

20. Investigation and adjustment of claims per items 18 to 22, page 3.
21. Add unpaid expenses of investigation and adjustment of claims Dec. 31, 1923 per items 20 to 24, page 5.
22. Total.
23. Deduct unpaid expenses of investigation and adjustment of claims Dec. 31, 1922 per items 20 to 24, page 5 of 1922 statement.
24. Total expenses of investigation and adjustment of claims incurred.

IV. Acquisition and Field Supervision Expenses

25. Commissions per items 24 to 28, page 3.
26. Policy fees retained by agent per item 23, page 3.
27. Add unpaid commissions Dec. 31, 1923, per items 26 to 30, page 5.
28. Total.
29. Deduct unpaid commissions Dec. 31, 1922 per items 26 to 30, page 5 of 1922 statement.
30. Commissions incurred.
31. Acquisition and field supervision expenses, other than commissions (b).
32. Add unpaid acquisition and field supervision expenses Dec. 31, 1923 included in item 31, page 5.
33. Total.
34. Deduct unpaid acquisition and field supervision expenses Dec. 31, 1922 included in item 31, page 5 of 1922 statement.
35. Acquisition and field supervision expenses incurred other than commissions.
36. Total acquisition and field supervision expenses incurred (sum of items 30 and 35 of this exhibit).

V. General Administration Expenses

37. General administration expenses per items 29, 33, 34, 44, 45 and 46, page 3. Also any administration expenses in items 49, 50 and 51, page 3.
38. Add unpaid general administration expenses Dec. 31, 1923 included in item 31, page 5.
39. Total.
40. Deduct unpaid general administration expenses Dec. 31, 1922 included in item 31, page 5, of 1922 statement.
41. Total general administration expenses incurred.

VI. Inspection and Bureau Expenses

42. Maintenance of Boards and Bureaus per item 47, page 3, including $..... for inspection and accident prevention.
43. Inspection and accident prevention expenses not included in item 42 above per item 32, page 3.
44. Medical fees and salaries per item 31, page 3.
45. Add inspection and Bureau expenses unpaid Dec. 31, 1923.
46. Total.
47. Deduct inspection and Bureau expenses unpaid Dec. 31, 1922.
48. Inspection and Bureau expenses incurred.

VII. Taxes, Licenses and Fees

49. Taxes, licenses and fees per items 37 to 43, page 3.
50. Add unpaid taxes Dec. 31, 1923 per item 32, page 5.
51. Total.
52. Deduct unpaid taxes Dec. 31, 1922 per item 32, page 5 of 1922 statement.
53. Taxes, licenses and fees incurred.

VIII. Other Underwriting Items

54. Gain from premiums charged off, disallowed, etc. (c)
55. Total gain from underwriting.
56. Adjustment item. Difference between liability, compensation and credit losses incurred as reported above and as determined on basis of reserves reported as liabilities in the annual statements of 1922 and 1923.
57. Total gain from underwriting as per item 39, page 8.

IX. Ratio of Losses and Expenses to Earned Premiums

58. Losses incurred..... (19 ÷ 10)
59. Investigation and adjustment expenses incurred..... (24 ÷ 10)
60. Acquisition and field supervision expenses incurred..... (36 ÷ 10)
61. General administration expenses incurred..... (41 ÷ 10)
62. Inspection and Bureau expenses incurred..... (48 ÷ 10)
63. Taxes, licenses and fees incurred..... (53 ÷ 10)
64. Total expenses other than loss expenses (sum of items 36, 41, 48 and 53 ÷ 10)
65. Other underwriting items..... (54 ÷ 10)
66. Net gain from underwriting..... (55 ÷ 10)

General Note:—The above references, except where otherwise stated, indicate the items and pages of the annual statement as of December 31, 1923. See "General Instructions" on last page of this exhibit for further directions.

(a) Unpaid losses should be based on individual estimates of outstanding claims and should agree with the amounts reported in column 7, page 5, of the annual statement for each line except liability, compensation and credit. The amounts reported in the annual statements as reserves for unpaid losses under these lines should be entered herewith:—

	Liability	Workmen's Compensation	Credit
December 31, 1922	$.....	$.....	$.....
December 31, 1923	$.....	$.....	$.....

(b) Include in this item all payments to general agents, branch office managers, agents and agency or branch office employees for salaries, allowances, bonuses, prizes, rewards and traveling expenses and all expenditures for rent, heat, light, maintenance of offices, exchange, advertising, postage, telephone, telegraph, express, and all other expenses incidental to the conduct of agencies and branch offices, including the cost of policy-writing and the collection of premiums but excluding expenditures for taxes and governmental impositions or expenditures actually made in good faith for the adjustment of claims, the making of inspections and payroll audits.

(c) Include agents' balances recovered, item 38, page 2, and agents' balances charged off, item 55, page 3, all other items of underwriting income or disbursement not otherwise provided for, and change in not admitted assets, items 46, 47, 48 and 50, page 4 of current and previous years' statements. Where the net result is a *loss*, indicate by minus sign.

PART 2—ACQUISITION AND FIELD SUPERVISION COST BY LINES OF INSURANCE

Premiums

1. Gross premiums written during 1923 per column 1, page 2.
2. Add policy fees received (accident and health) per item 21, page 2.
3. Total gross premiums written.
4. Deduct gross premiums on reinsurance accepted.
5. Gross premiums written on direct business.
6. Deduct return premiums and premiums on policies not taken per columns 3 and 4, page 2.
7. Balance.
8. Add return premiums and premiums on policies not taken on reinsurance accepted.
9. Net premiums written on direct business.

ACQUISITION AND FIELD SUPERVISION COST

10. Net commissions paid per items 24 to 28, page 3.
11. Policy fees retained by agents (accident and health) per item 23, page 3.
12. Total.
13. Deduct net commissions paid on reinsurance accepted.
14. Balance.
15. Add net commissions received on reinsurance premiums ceded.
16. Commissions paid on company's direct business.
17. Add commissions unpaid Dec. 31, 1923 on uncollected premiums (less return premiums) on direct business.
18. Total.
19. Deduct commissions unpaid Dec. 31, 1922 on uncollected premiums (less return premiums) on direct business.
20. Commissions incurred on direct net premiums written.
21. Acquisition and field supervision expenses (other than commissions paid on direct business. (a)
22. Deduct acquisition and field supervision expenses unpaid (other than commissions), on direct business Dec. 31, 1922.
23. Balance.
24. Add acquisition and field supervision expenses unpaid (other than commissions), on direct business Dec. 31, 1923.
25. Acquisition and field supervision expenses incurred (other than commissions).
26. Total of acquisition and field supervision expenses incurred (sum of items 20 and 25).
27. Ratio of acquisition and field supervision expenses incurred to net premiums written (26 ÷ 9).

(a) These amounts should agree with the amounts reported for item 31, part 1 except that expense payments or refunds, if any, arising from reinsurance accepted or ceded should be eliminated.

PART 3—LOSS RATIO EXPERIENCE OF POLICIES ON NEW YORK STATE RISKS BY YEARS AND LINES OF INSURANCE

Calendar Years		Losses and Premiums
	1.	Losses paid during year
	2.	Losses incurred during year
1919	3.	Premiums written during year
	4.	Premiums earned during year
	5.	Loss ratio (line 2 ÷ line 4)
	6.	Losses paid during year
	7.	Losses incurred during year
1920	8.	Premiums written during year
	9.	Premiums earned during year
	10.	Loss ratio (line 7 ÷ line 9)
	11.	Losses paid during year
	12.	Losses incurred during year
1921	13.	Premiums written during year
	14.	Premiums earned during year
	15.	Loss ratio (line 12 ÷ line 14)
	16.	Losses paid during year
	17.	Losses incurred during year
1922	18.	Premiums written during year
	19.	Premiums earned during year
	20.	Loss ratio (line 17 ÷ line 19)
	21.	Losses paid during year
	22.	Losses incurred during year
1923	23.	Premiums written during year
	24.	Premiums earned during year
	25.	Loss ratio (line 22 ÷ line 24)
	26.	Losses paid during five-year period
	27.	Losses incurred during five-year period
Total	28.	Premiums written during five-year period
	29.	Premiums earned during five-year period
	30.	Loss ratio (line 27 ÷ line 29)

STATE OF.....
County of ..... } ss.:

..... President, and .....
secretary of the....., being duly sworn, each for himself deposes and says that they are the above described officers of the said company, and that Part 1 of the foregoing exhibit is a correct analysis of the underwriting gain or loss by lines of insurance for the calendar year ending December 31, 1923, on account of all policies issued by the company; that Part 2 is a correct report of acquisition and field supervision expenses incurred on all policies written during the year 1923; that Part 3 is a correct exhibit of premiums and losses under all policies issued on risks located in New York during the period of five years ending December 31, 1923; and that Part 4 is a correct exhibit of the premiums earned and losses incurred under workmen's compensation policies issued in the State of New York from July 1, 1914 to December 31, 1923, according to the best of their information, knowledge and belief, respectively.

.....
President

.....
Secretary.

Subscribed and sworn to before me
this..... day of....., 1923.

GENERAL INSTRUCTIONS

In Part 1 of this exhibit there should be included under "Investigation and Adjustment of Claim Expenses," "Acquisition and Field Supervision Expenses," "General Administration Expenses" and "Inspection and Bureau Expenses" the entire expenses properly chargeable to each expense group. There should be included in each case, the salaries of officers, agents and employees to the extent they are engaged in such work, the rent of office space and the other expenses chargeable either in whole or in part to each such division of expense. In case the amounts reported as disbursements in the annual statement blank under the caption "Investigation and adjustment of claims," "Salaries, traveling and all other expenses of agents" and "Inspections" do not include all such elements of the expense, the references to

these specific statement items now appearing in the exhibit are not to be considered as limiting the amounts to be reported in this exhibit to those so reported in the annual statement.

There should be submitted with this exhibit a detailed statement of the method followed in apportioning expenses to the various groups and to lines of insurance.

Part 2 is designed to furnish reliable data as to the actual total cost for acquisition and field supervision of the business produced by a company's agents and employees. It represents a refinement of the data appearing in Part 1 in that all transactions arising from reinsurance are to be eliminated.

A company that finds itself unable because of incomplete records to report the exact amount of premiums earned and losses incurred in New York State by lines for each of the last five years will be required to report this data as precisely as conditions permit. In cases where the returns in Part 3 are based on incomplete statistical records there should be furnished a statement as to the extent that the figures are based upon estimated New York premium reserves and claim reserves.

NOTE:—

The blank in its final form will provide sixteen columns for the reporting of all data in Parts 1, 2 and 3 by lines of insurance as follows:

1. Total.
2. Accident.
3. Health.
4. Auto liability.
5. Liability other than auto.
6. Workmen's compensation.
7. Fidelity.
8. Surety.
9. Plate glass.
10. Burglary and theft.
11. Steam boiler.
12. Engine and fly wheel.
13. Auto property damage.
14. Auto collision.
15. Property damage and collision other than auto.
16. Credit, live stock or sprinkler.

PART 4—WORKMEN'S COMPENSATION LOSS EXPERIENCE BY POLICY YEARS

Showing premiums earned and losses incurred under policies issued in the State of New York during the period, July 1, 1914 to December 31, 1923 (a)

			Under policies becoming effective in calendar years						
			1914-18 inclusive	1919	1920	1921	1922	1923	Total
Totals as of Dec. 31, 1922 (b)	1.	Losses paid							
	2.	Losses outstanding							
	3.	Losses incurred							
	4.	Premiums written							
	5.	Premiums unearned							
	6.	Premiums earned							
	7.	Loss ratio (line 3 ÷ line 6)							
Developments During 1923	8.	Losses paid							
	9.	Change in losses outstanding							
	10.	Losses incurred							
	11.	Premiums written							
	12.	Change in premiums unearned							
	13.	Premiums earned							
	14.	Loss ratio (line 10 ÷ line 13)							
Totals as of Dec. 31, 1923	15.	Losses paid							
	16.	Losses outstanding							
	17.	Losses incurred							
	18.	Premiums written							
	19.	Premiums unearned							
	20.	Premiums earned							
	21.	Loss ratio (line 17 ÷ line 20)							

NOTE: All amounts in Part 4 are to be reported in dollars only.

(a) All transactions arising from reinsurance accepted or ceded are to be eliminated in reporting premiums and losses herein.

(b) These totals should correspond with the amounts reported in New York Schedule "W"—1922.

MISCELLANEOUS PROPERTY DAMAGE INSURANCE

BY

S. D. PINNEY

Property Damage insurance, as such, needs no introduction to the insurance world, inasmuch as certain types of this form of coverage have been successfully underwritten in this country for many years. Teams Property Damage insurance and Automobile Property Damage insurance date back for a quarter of a century, or so, and likewise, Elevator Property Damage insurance has been written for the past decade. Moreover, this type of coverage has been provided in the past as an integral part of the coverage under certain forms of insurance, such as Steam Boiler insurance, Engine and Flywheel insurance, Aircraft insurance, and Sprinkler Leakage insurance.

It is only within the past year or two, however, that attention has been directed toward the extension of Property Damage insurance in other fields, to supplement the various forms of Public Liability insurance already existent. A Public Liability policy provides indemnity on account of the legal liability of the assured for bodily injuries sustained by members of the public. However, it often happens that the same accident producing the bodily injuries will also cause considerable property damage for which the assured is equally liable, and yet such damage is not covered under the Public Liability policy. Inasmuch as this condition has often been the cause of dissatisfaction on the part of the policyholder, it was natural that there should have been a growing demand for this additional coverage. In recognition of this demand, therefore, the insurance carriers through the National Bureau of Casualty and Surety Underwriters, set about, in the latter part of 1922, to develop the necessary underwriting rules, policy forms and rates for the so-called miscellaneous lines of Property Damage insurance. These include Manufacturers' and Contractors' Property Damage insurance, Owners', Landlords' and Tenants' Property Damage insurance, Residence, Farm and Private Estate Property Damage insurance, Theatre Property Damage insurance, Owners' or Contractors' Protective Property Damage insurance and a revised form of Elevator Property Damage insurance.

At this point it might be well to call attention to the fact that in the past, Elevator Property Damage insurance, as generally written, has covered not only damage to the property of persons other than the assured but has also included coverage on the elevator itself and the elevator shaftway, in the event of damage due to the collision of the elevator with another object. In other words, the so-called Elevator Property Damage insurance was in reality a combination of Elevator Property Damage and Collision coverage. The desirability of breaking up the coverage formerly offered, into two distinct forms, Elevator Property Damage insurance and Elevator Collision insurance, was appreciated and consequently it is now possible to write straight Elevator Property Damage insurance without including the collision features. The present coverage afforded under an Elevator Property Damage contract is broader than that offered under the other forms of Property Damage insurance since it includes damage to property (other than that of the assured) in the care or custody of the assured or his employees. It should be noted, however, that Elevator Collision insurance may be written only when concurrent Elevator Public Liability insurance and Elevator Property Damage insurance are carried in the same company. Moreover, the Collision insurance does not cover loss of use.

In view of the purpose for which the various lines of Property Damage insurance were designed, it was stipulated at the outset that in all cases where this form of Property Damage insurance was desired it would also be necessary to carry concurrent Public Liability insurance. In this connection it was felt that probably the most satisfactory means of providing Property Damage insurance would be by means of a certificate attached to the Public Liability policy contract. It is interesting to note that the carrying of concurrent Teams Public Liability insurance is a necessary prerequisite to the issuance of a Teams Property Damage contract, and also it is considered good underwriting to usually require that concurrent Automobile Public Liability insurance be carried before Automobile Property Damage insurance will be written.

It was also recognized that this new form of Property Damage insurance should be so developed that it would not conflict with lines of insurance already in existence. The standard form of coverage, therefore, specifically excludes coverage for property

damage if due to causes which are properly the subject of an individual form of Property Damage insurance, such as Elevator Property Damage insurance, Aircraft insurance, Auto Property Damage insurance, Steam Boiler insurance, Engine and Flywheel insurance and Electrical Machinery insurance.

In further respect to the coverage to be afforded it was formulated as a general rule that the standard form of policy would not include coverage for damage to the property of the assured, or to property leased, occupied, used by or in the care or custody of the assured or any of his employees. This standard exception clause is modified in the case of Elevator Property Damage insurance, as already pointed out, in that property in the care or custody of the assured is covered. Under both the Teams and Automobile Property Damage contracts the exclusions are similar to those expressed in the standard clause above.

The standard form of coverage also includes liability for loss of use, but excludes contractual liability for property damage or loss of use. Contractual Property Damage insurance, including loss of use, may be written, however, under a special form of contract.

There was considerable discussion as to the desirability of including coverage on property damage if due to fire. It must be realized that it is only insofar as the legal liability of the assured for damage to the property of the public is concerned that the fire hazard need be taken into consideration. It was felt by some that this constituted a very serious hazard and should not be covered under the Property Damage contract, especially since such inclusion might prove an incentive for fire insurance companies to exercise their subrogation rights more frequently than heretofore, and thus react to the very distinct disadvantage of the casualty companies. On the other hand, it was pointed out that as a matter of fact, in the majority of risks, the hazard due to this source would be negligible and furthermore in the case of those risks which did contain a real fire hazard, the fact would be fully recognized in determining the rate for that class of risks. Moreover, this constituted an insurable hazard for which coverage would be desired by the policyholder in order to provide himself with complete protection. It was finally decided to make no exclusion on account of property damage due to fire, for which the assured might be held legally liable.

In the case of certain classes of risks there is considerable hazard from the standpoint of Property Damage insurance due to the likelihood of an explosion. In other risks, particularly contracting risks, there is often found a very real hazard due to the chance of causing the collapse or undermining of adjoining property. Consequently, it was felt necessary to provide coverage for such risks on two bases,—either complete coverage, including the hazards due to the explosion or building collapse features, or on a limited coverage basis, excluding liability for property damage due to either or both of these causes.

The standard limit of insurance under the Property Damage contract is $1000 for any one accident, and no contract for Property Damage insurance shall be written at a lower limit than this. It is possible to issue insurance at higher limits, however, subject to the provision that the limit of insurance shall not exceed the gross limit of the concurrent Public Liability insurance policy. It is interesting to note that the Property Damage contract provides continuous and complete coverage, subject, of course, to the policy limit for any one accident, throughout the term of insurance, as stated in the contract, regardless of the number of accidents which may occur. In this respect it follows the Public Liability insurance contract rather than the Fire insurance contract, for example.

The question of providing deductible average coverage under the Property Damage contract was also the subject of considerable debate. Inasmuch as Property Damage insurance will be in a more or less experimental stage for some time to come—so far as rates are concerned—it was deemed advisable to provide no definite set of rules or rates for this particular feature for the present. However, in the event that such coverage is desired it will be taken care of by special rate consideration based upon the merits of the individual case. If in the future the demand for deductible average Property Damage insurance becomes considerable, it is contemplated that the necessary rules and rates may then be determined and made a part of the rate manual.

In general, the underwriting rules governing the writing of the various lines of Property Damage insurance, other than Teams and Automobiles, parallel the rules governing the writing of the respective forms of Public Liability insurance. The exceptions to the general rules have been based upon the special features

peculiar to Property Damage insurance, as already mentioned in this paper. The same classifications also are made use of for Property Damage insurance as are used in writing Public Liability insurance.

The establishment of a set of rates for the various classifications was of necessity based largely upon judgment, inasmuch as there were no statistics available, with the exception of Elevator Property Damage insurance, and even for that class of business, the experience was very limited and of little value for the purpose of rate-making.

When the question of rates was first considered it was thought that the rates for Property Damage insurance should be determined by simply taking a fixed percentage of the corresponding rate for Public Liability insurance. It was soon found, however, that such a basis would not produce logical results due to the fact that in certain classifications the Property Damage hazard bore a much higher relationship to the Public Liability hazard than in other classes. Consequently, the method finally followed in determining the rates was to take up each classification individually and assign a rate based upon consideration of the various hazards which might be encountered in each class, the importance of the specific hazards being judged largely on the basis of engineering as well as underwriting experience. It is evident that the hazards found in the Contracting classes differ materially from those to be found in the Manufacturing classes. Likewise the hazards in the Owners', Landlords' and Tenants' group of classifications present another type for consideration. Some of the more important causes of property damage which had to be taken into consideration are as follows:

(1) Projecting nails, screws, pieces of material, etc., causing damage to clothing or personal effects.

(2) Carelessness of workmen, such as painters, paper-hangers, etc.

(3) Falling materials:
   (a) Bricks, lumber, cement, etc., where property damage would be relatively small.
   (b) Structural steel, stone work, machinery, etc., where damage to property might be considerable.

(4) Excavations:
   (a) Open trenches or excavations in the public highway, such as are dug for sewers or gas mains, involving damage to vehicles.
   (b) Excavations for buildings, involving the hazard of undermining or collapse of adjoining property.

(5) Acids, dyes, solutions of grease, etc.
   (a) Causing damage to clothing, etc.
   (b) Causing pollution of water supply.

(6) Gases, fumes, or dust causing damage to vegetation or adjoining property.

(7) Fire.

(8) Explosions:
   (a) Chemical mixtures.
   (b) Dust.
   (c) Blasting.

In addition to these general sources of property damage there are other causes which are unique and peculiar to certain individual classifications only—such as the hazard in connection with restaurants, elevators, signs on buildings, the wrecking of buildings, or the operation of vessels.

Rates were definitely assigned to all classifications within which there might be expected a fairly uniform degree of hazard between risks. In certain classes, it was recognized that there might be considerable variation in the property damage hazard as between risks, due to differences in actual operations, or to the location of the risk with respect to adjoining property. Consequently, definite rates have not been assigned to such classes, inasmuch as it is felt that the individual risks falling in these classes may best be rated after special consideration of the data pertaining to each case, as brought out in the inspection reports. Still another group of classifications are those which were mentioned earlier in this paper, where there is considerable hazard due either to the explosion feature or to the building collapse feature, or both. Rates have been established for these classes, excluding coverage on the two features referred to, and it is possible to provide rates for complete coverage only after consideration of the degree of

hazard involved in each case, as brought out in the inspection reports. The reason for this method of rate treatment was not to prohibit full coverage but simply to provide that in all such cases the full facts should be ascertained by the carrier before assuming the risk.

The basis of premium computation for the Property Damage classes is identical with the basis upon which the premiums for the corresponding Public Liability classes are based—Manufacturers and Contractors Property Damage rates are in general on a payroll basis and are quoted for each $100 of payroll—Owners', Landlords' and Tenants' Property Damage rates are quoted on an area and frontage basis, etc. Since Property Damage insurance may be written only when concurrent Public Liability insurance is carried in the same company, it is evident that there will be no necessity for making an individual audit or inspection to provide the information required for determining the Property Damage premium as such information will be reported in connection with the Public Liability insurance. Of course, in certain instances it will be necessary to make the inspection report more complete than would be the case if Public Liability only were to be covered, but the additional cost due to this fact should be relatively small.

The rates for Property Damage insurance have been pitched at a low level, being lower than the corresponding Public Liability rates for practically every classification. Consideration of this fact makes it necessary that, for the present at least, this form of insurance should be undertaken with a proper degree of caution on the part of the underwriter. Complete inspection reports should be secured on each risk, in order to satisfy the underwriter that there is not being exercised a selection of business to the disadvantage of the carrier. Moreover, there is the question of underwriting Property Damage risks for high policy limits which must be dealt with in a conservative manner. Two tables have been prepared showing the percentages by which the manual rate for a standard limit of $1000 must be increased to provide a rate for the excess insurance. In one of these tables the percentages increase considerably faster than in the other, since it was recognized that in the case of certain risks, the probability of incurring an excessive loss was much greater than in certain other types of risks. The table of smaller percentages is used in

the underwriting of most classes of Property Damage insurance, whereas the table of higher percentages applies to certain special classes such as classifications where there is present the explosive hazard or the hazard of building collapse. It is quite probable that many of the carriers will resort to reinsurance to a large extent in the writing of excess Property Damage insurance.

The future of the miscellaneous lines of Property Damage insurance will be determined largely by the demand on the part of the public for this form of insurance. In view of the low rate level at which most of this insurance is being offered, it seems reasonable to believe that it should not prove a difficult line to sell to those who already are covered for Public Liability insurance. It will be necessary at first to educate the public further with respect to this new form of insurance, but after that has been done there should be a fairly good demand for this coverage which so admirably supplements the coverage provided under the Public Liability contract. Then, as this line of insurance develops it will be necessary to provide a plan for compiling the experience on the various Property Damage classifications, and thus pave the way for scientific rates based upon actual statistics rather than pure judgment.

It is realized that the beginning only has been made with respect to Miscellaneous Property Damage insurance but it is felt that this step has been taken after most careful consideration of the various problems underlying this form of insurance. It fulfills a demand for a type of coverage which did not exist heretofore and should provide a basis on which the Property Damage lines of the future may be safely developed.

ABSTRACT OF THE DISCUSSION OF PAPERS READ AT THE PREVIOUS MEETING

A Procedure for Making Rates for Workmens' Compensation Insurance Based on a Consistent Application of the Theory of Probabilities

A. H. MOWBRAY

VOLUME IX, PAGE 186

WRITTEN DISCUSSION

MR. WILLIAM J. CONSTABLE:

I have been asked to discuss Mr. Mowbray's paper from a mechanical rather than an actuarial standpoint. Whenever changes are proposed in a ratemaking system the mechanics of operating the proposed methods must be considered as well as the theory underlying the method. If the procedure is complicated and cumbersome, the benefits gained by the changes proposed can be much more than offset. This, however, is not true of the changes in the method of ratemaking proposed in Mr. Mowbray's paper.

The proposed method of making Workmen's Compensation Rates has been used as the basis of the present revision of these rates by the National Council on Compensation Insurance with some changes. The method of determining conversion factors and of converting the material has been used almost without change. However, this conversion was made directly to the Basic Level instead of to the state latest level and then to the Basic Level. It was felt that the results did not warrant this extra work. A projection factor was also introduced into the procedure in order to bring the resulting rates to the proper level for conditions as they are expected to be in 1924. As has always been the case in the past, the work of preparing the material for presentation to the proper committees had to be done in the quickest time possible. Mr. Mowbray's proposal contemplated the conversion of material by the use of seven factors, one for payrolls and six for losses—one each for fatal, permanent total, major permanent partial, minor permanent partial, temporary total and medical. The work necessary to accomplish this procedure seemed enormous in view of the short amount of time available and the staff of the Council attempted to find a short cut to reduce the work.

A test was made by using one factor for payrolls and three factors for losses instead of six. The results of this test seemed to indicate that this method would produce nearly as accurate results as the longer method. However, certain objections were raised relative to this shorter method which could not be answered absolutely without exhaustive tests which would have taken as much time as to begin immediately upon the work by the original process.

Knowing that the time was limited, the Council obtained all the assistance possible and began work at once on the conversion of the data by the use of seven factors. The experience used in the 1923 Revision consisted of the Schedule "Z" reports for thirty states for policy years 1918, 1919 and 1920. A comparison of the amount of experience used in the 1923 Revision with the amount used in the 1920 Revision may be of interest.

In the 1920 Revision, the experience of twenty-five states was used in determining pure premiums as compared with thirty states in the 1923 Revision. In the 1920 Revision, the experience of two policy years (1916-1917) was used as compared with three policy years (1918-1919-1920) in the 1923 Revision. In the 1920 Revision, the total payroll exposure on a New York 1917 Level was $11,954,800,000 and the loss exposure on the same level $116,805,205. In the 1923 Revision the total payroll exposure on a New York 1920 Level was $30,300,027,285 and the loss exposure on the same level $232,374,728. These totals being on different bases are not strictly comparable but they indicate that the exposure in the 1923 Revision was considerably greater than that used in the 1920 Revision.

Following each revision of Workmen's Compensation rates in the past, a just criticism has always been made that while a revision of rates was being completed no definite plans looking toward future revisions were ever taken into account. With this criticism in mind, the National Council endeavored in the 1923 Revision to not only complete the Revision but at the same time accomplish something toward a foundation for future revisions. In Appendix "A" is shown the card used for converting the experience to a common Level. The actual Schedule "Z" data is posted for each policy year in the column captioned "Actual" and converted by the use of appropriate factors to the Basic Level and posted in the column captioned "Converted." Sufficient

columns have been put on the card to provide for a second reporting of Schedule "Z" and its conversion or for a change in the Basic Level. The chief accomplishment of the card, however, is the single posting of the actual experience. A summation of three years has been made for the purposes of the 1923 Revision. When 1921 Schedule "Z" becomes available, it will be entered on the cards and converted to the Basic Level and a new summation made consisting of four years experience. If at any time an earlier policy year is to be eliminated, the matter can be taken care of very easily. Four policy years can be posted on each side of the card making it available for use for all policy years from 1918 to 1925 inclusive. At any future revision, the actual experience will have already been posted on the cards and the work will then consist only of converting this experience to the Basic Level to be used. This is a considerable step forward and indicates that future revisions can be taken care of by the National Council very quickly as the actual posting will have already been done.

APPENDIX "A"

STATE CODE NO.

NATIONAL COUNCIL ON COMPENSATION INSURANCE

CLASSIFICATION

	ACTUAL		CONVERTED								
Payroll											1918
Death											
Perm. Total											
Major Perm.											
Minor Perm.											
Temp. Total											
Medical											
TOTAL											
Payroll											1919
Death											
Perm. Total											
Major Perm.											
Minor Perm.											
Temp. Total											
Medical											
TOTAL											
Payroll											1920
Death											
Perm. Total											
Major Perm.											
Minor Perm.											
Temp. Total											
Medical											
TOTAL											
Payroll											1921
Death											
Perm. Total											
Major Perm.											
Minor Perm.											
Temp. Total											
Medical											
TOTAL											

Some Observations on the Development of Manual Rates for Workmen's Compensation Insurance

S. B. PERKINS

VOL. X, PAGE 269

WRITTEN DISCUSSION

MR. S. BRUCE BLACK:

Mr. Perkins calls attention to the most difficult problem in workmen's compensation rate-making. It is relatively easy to obtain a satisfactory degree of accuracy in the relativity of rates between classifications. This relativity does not, except in a few unusual industries, appear to change radically. It seems possible, therefore, to use rather a wide experience over an extended period of years to develop a schedule of relative rates and to use this scale of relativity for a period of five years or perhaps longer.

What is needed, however, is some practical and easily explainable method of adjusting the level of rates to meet changing requirements. It is well known that any line of casualty insurance has its own cycle of high loss ratios and low loss ratios. A part of this is due to the effect of the general business cycle on insurance, and partly to peculiarities of the insurance business.

A period of profit usually results in substantial rate-cutting, the organization of numerous new companies, which in itself means more rate-cutting, until finally the business enters a period of loss, and the period of loss inevitably brings in its train a period of profit with some of the companies left along the wayside.

The general character of workmen's compensation experience tends to make these cycles especially prolonged and acute, for it takes several years for the effect of the changing loss conditions to reflect themselves in the rate level. Other businesses are recognizing the waste due to the business cycles, a waste which ultimately reflects itself in a higher cost to the consumer. They are concentrating their attention on the shortening of the cycle, thus reducing the waste.

Our immediate problem is to find a means of shortening our cycle. This can be done by making the rate level more responsive

to changing conditions, and this in turn can only be done by finding a means of reasonably accurately measuring current rate requirements upon which to base rates. We should avoid a lag of several years in the reduction of rates when rates are higher than necessary, and in increasing rates when rates are lower than needed.

Rates, as Mr. Perkins aptly points out, which do not fit the business conditions of the particular time, do cause dissatisfaction on the part of the consumer. It is recognized that a changing wage level is one of the factors determining the rate requirement, and this has been measured for the purposes of the rate revision now under way. It has also been the custom to measure changing scales of compensation benefits. It is also recognized that the frequency of accidents, or the accident rate varies rather widely with changing industrial conditions, but there has been hesitancy in introducing a measure of this into rate-making.

It is rather axiomatic that to introduce in the determination of a rate level two of the factors which modify the rate level and leave out the third, which may be of equal importance and possibly operating in an opposite direction, may give a more erroneous answer than if none of the factors were used at all.

The loss ratio projection method has its short-comings, but it at least has the advantage of measuring in some way all the factors which go into the determination of what a rate level should be. Mr. Perkins has suggested a rather practical means of bringing this more nearly up to date than what we have had in the past, by the use of loss ratios for policies terminating in respective months, thus constantly bringing the known loss experience more nearly up to date. Even this, however, will leave a substantial lag between the period for which rates are being made and that period which is represented by the latest experience.

There is objection to the use of conjectural factors. This objection is based largely upon the assumption that they are pure conjecture. If, however, it is established as a matter of fact that accident frequency does vary with industrial conditions; if it can be established just how much accident frequency has changed; if it can be established, as it has been established, that wage rates do affect the rate level and changing wage rates can be measured; and so on with the other factors; it can well be said that we are not using conjectural factors, but are using known

factors, the influence of which has been demonstrated and the value of which is measured by statistics which can be brought up to the current period.

Factors are not conjecture only because they have not already been translated into a finally determined loss rate. Knowledge of the factors which affect loss ratios and current measurement of those factors, removes them from the realm of conjecture.

It is timely also to suggest that the presumed objection to so-called conjectural factors may, after all, be much less serious from a public standpoint than the effect of having rates which are tremendously out of line with the requirements of the current period, and that we might well risk a little conjecture if, by so doing, we reduce some of the evils in the long period of "lag" which we have had in the past.

Mr. Perkins makes a second suggestion that perhaps there is a very wide variation in experience developed by groups of risks of different sizes. He suggests that the organization of large risks is of a decidedly different character than the organization of small risks and that, therefore, the resultant rate needed for the larger risk may be less than for the smaller risk. He suggests that this should be measured.

Mr. Perkins' suggestion for study has been well made. It is an indication that we are beginning to find out new things about compensation experience. It makes us realize how little we really know about the fundamental things affecting compensation experience. When we have a more complete knowledge of the fundamentals, we can make rates which will more nearly fit current conditions.

It is presumed that Mr. Perkins has discovered some evidence that the experience of different sized risks varies. We have never seen experience which indicated any consistent differences by sizes of risks. We have seen isolated collections of experience which would show either that small risks were better than large risks, or large risks better than small risks, or that by and large there is no discernible difference.

We have observed, however, that wage changes do affect loss ratios. We have observed that the frequency of accidents varies with industrial conditions, decreasing when business slumps and increasing rapidly when business resumes activity.

We have also observed that fluctuation in the amount of em-

ployment and the amount of activity in large risks is very much greater than in small risks. We have also observed that wage rates fluctuate less violently in small risks than in large risks, and that the so-called labor turnover is much smaller in small risks than in large risks.

Inasmuch as these are all factors affecting accident frequency, and inasmuch as changing industrial conditions apparently affect different sizes of risks differently, it is a reasonable conclusion that whether large risks appear to be better than small risks, or small risks better than large risks, depends entirely upon the particular point in the cycle of business changes that we happen to take for our test.

If our reasoning is sound, we would assume, therefore, that in the present period of increased industrial activity and high accident frequency, that the small risk would not have been affected by this change to the same degree that large risks have and consequently their experience would be much better.

During and after the war period when wages were unusually high and there was a consequent low loss ratio experience throughout the country, it might well be said that because of this very condition, the larger risks would have produced a better loss ratio proportionately than small risks which had not been affected to the same degree by the boom conditions.

These are some of the fundamentals of rate-making. Any investigation of experience which would throw light on the changing costs by different sizes of risks should prove valuable, but we should be cautious in accepting any evidence as conclusive unless it covers a substantial period of time under differing conditions of industry and does prove that there is over the entire cycle a real difference in the experience of risks by size. No such evidence has ever been collected—what evidence we have points to entirely different conclusions, depending on the time and place which the experience represents.

REVIEWS OF PUBLICATIONS

RALPH H. BLANCHARD, BOOK REVIEW EDITOR

Employment, Hours and Earnings in Prosperity and Depression, United States, 1920-1922. Willford Isbell King. National Bureau of Economic Research, Inc., New York, 1923. Pp. 147.

This is an important contribution to statistical literature dealing with unemployment, hours of work, and earnings, with emphasis on the first. It undertakes to throw light upon what happens to employment conditions during the course of a "business cycle" by showing what actually occurred "between the peak of the boom in 1920 and the trough of the depression in the next year."

The report, for so it may very properly be designated, sets forth the results of an investigation conducted by the National Bureau of Economic Research with the assistance of the Bureau of Markets and Crop Estimates and the Bureau of the Census and undertaken at the instance of the President's Conference on Unemployment in 1921. That Conference, which was seeking means to reduce unemployment, found itself confronted at the very outset with such a lack of information concerning actual employment conditions as to make it clear that the first necessary step toward improvement of conditions was to secure better information as to the facts. Thence came this investigation and report.

There is no better way to indicate the scope and contents of this report as to subject matter than to quote the following summary thereof from the author's preface:

(1) It shows the relative responsiveness of different industries to the forces giving rise to the business cycle.
(2) It indicates the comparative ability of large and small scale businesses to resist such forces.
(3) It analyzes the shifts of population from one industrial field to another.
(4) It traces the variations in hours and earnings of employees that accompany the change from boom to depression.
(5) It presents the first approximately complete record of the seasonal changes occurring in the conditions of agricultural labor.

(6) It gives the first picture of the distribution of farm employees according to hours and earnings.
(7) It measures the importance of part-time employment in the chief industrial fields.
(8) It enables us for the first time to estimate the approximate total reduction in employment brought about by the depression of 1921.

While this statement serves well to indicate what the report is about and what it is intended to demonstrate, the present reviewer is inclined to think that it conveys a stronger impression of fullness and finality of data than the contents of the report actually warrant. It unquestionably throws much light on all the points indicated but light, after all, that is considerably limited by the kind and amount of data from which it comes. Consideration of the method of the investigation will make this evident.

The work was financed by contributions of private organizations, chiefly the Carnegie Foundation. Necessary limitations upon expenses, as well as the impossibility of a census method when the entire United States was being studied, forced the use of the sampling method for the investigation. Also because of expense, the collection of data was by means of questionnaires rather than by the more accurate method of field enumerators.

Not by way of adverse criticism but only to make clear the nature of the data on which the results and conclusions of the report are based, it is to be noted that the number of complete questionnaires secured was 9,289, covering a total of 3,146,682 employees in August, 1920. The report estimates that the number of employees actually working in the United States on that date was 29,180,000. By this it appears that the investigation secured reports from employers who had nearly 11 per cent. of the employees in the country. But as a matter of fact, outside of transportation, the sample was nowhere nearly as adequate as this. Through the Bureau of Railway Economics almost complete data for railways was secured so that 2,301,636 of the employees covered were in the transportation industries alone (over 67 per cent. of the total in those industries in the country). Leaving transportation out of account, therefore, the complete reports secured covered only 845,046 out of an estimated total of 25,760,000 employees in the country, which is only a 3.3 per cent. sample for all other industries. Far more limited than this would indicate were the samples for some important branches of indus-

try, the most extreme case being one of less than one-tenth of one per cent. for so important a field as building and construction work.

In respect of the questionnaire method which had to be used, it may be pointed out as bearing on the quality of the data secured that employers were called upon for figures in much detail covering more than two years preceding the time of reporting. Furthermore, it was not required that the schedules should be made out from actual records. On the contrary they contained in their directions to informants the fairly startling (for a scientific inquiry) instruction that "It is not expected that you will be able to fill out the following tables with exactness" and that "Approximate answers based upon the best recollection of the informant will answer our needs."

Now, of course, very limited samples and approximate figures may be very enlightening when carefully used with due regard for their limitations, and the present writer hastens to note that in the analysis of the data and statement of conclusions the report is characterized throughout by frank recognition of, and honest effort to keep within, the limitations imposed by the nature of the data used. Furthermore, skill is displayed in avoiding the pitfalls which beset the use of such data and in bringing out their legitimate significance notwithstanding their limitations. Only one instance has been observed by the present reviewer in which such a limiting element may have been overlooked. One of the points brought out by the investigation is that employment is more unstable in large than in small establishments. This is based on relatively greater fluctuations in number of employees among the larger as compared with the smaller firms reporting through the period of depression studied. A natural query occurs whether the difference thus shown by groups of employers, all of whom had continued in business throughout the period covered, would not be at least modified were account to be taken also of employers in business at the start but who were forced entirely out of business in the depression, an element which presumably would be of greater effect among small than among the more stable large concerns.

In form and manner of presentation the report is to be highly commended. It is a purely statistical report full of figures but admirably "boiled down" to succinct and clear tabular summaries and text analyses and statements of results that are precise and luminous.

As already indicated, the report is based on original data specially collected for this report. Particularly noteworthy are the data for industries outside of manufacturing to which heretofore employment data have largely been confined. Most notable in this respect are the returns for farm labor which were secured so successfully that because of previous paucity of such data they are presented in the report in more extended fashion than is done for other industries.

It is repeated that here is a valuable report for all those interested in the facts as to unemployment. It is a substantial contribution to the subject. More is the pity that it is, after all, only a detached record of one episode, the latest depression, in the course of employment conditions. Thus history repeats itself. This is by no means the first time that a period of widespread unemployment has aroused interest and caused momentary investigation. Such awakenings and contributions are, of course, a gain and help toward progress. But is it not perfectly self-evident that an adequate foundation for developing programs and dealing effectively in a practical way with unemployment, which is in its nature not an episode, but a continuous course of things, will require continuous observation and recording of data concerning all its important phases? And is not the sole means to such continuous adequate data the development of continuous statistical records by appropriate government agencies? The social value of such information certainly justifies the hope that the time may be hastened when the excellent efforts of private agencies, like that here reviewed, will be supplemented by such permanently continuous recording of the course of employment or unemployment through both good and bad times.

L. W. HATCH

Risk, Uncertainty and Profit. Frank H. Knight. Houghton Mifflin Company, Boston, 1921. Pp. xiv, 381.

Risk and Risk-Bearing. Charles O. Hardy, University of Chicago Press, Chicago, 1923. Pp. xix, 400.

Some years ago, Dr. Frederick L. Hoffman wrote: "Insurance as a branch of economics has also been much neglected by writers on political and social economy, but during very recent years there has been an awakening of interest in the economic theory of risk and insurance, which seems to indicate a more extended and quali-

fied consideration of the subject in the future"* Up to the time Dr. Hoffman published his collection of essays only one important American study had been issued,—"The Economic Theory of Risk and Insurance," by Dr. A. H. Willett. The appearance of the works by Knight and Hardy is a favorable indication that the theory of risk is now receiving the attention it deserves from teaching economists.

Professor Knight discusses successively the place of profit and uncertainty in economic theory. His distinction between risk, *measurable* uncertainty, and "uncertainty" of nonquantitative type should lead insurance men to classify the specific instances of hazard which offer possible opportunities for the application of the insurance principle. In how many of the existing coverage facilities was the initiative taken by *insurance* men, and in how many has the coverage facility resulted from repeated insistence by the "consumer?" Insurance thinkers should systematically inventory existing facilities, test the adequacy of contemporary insurance service and then penetrate the field of neglected opportunity.

In succeeding chapters, Dr. Knight discusses theories of profit and of choice and exchange, and the meaning of risk and uncertainty. In Chapter VIII he treats of existing structures and methods of meeting uncertainty, considering insurance a mechanism for the reduction of measurable risk by consolidation. Speculation, a device for specializing risk, he deems to be fully as important a consolidating agency as insurance. Chapters VII and VIII will bear careful reading by forward-looking insurance students. After all, there is no ground for smug satisfaction with what insurance institutions have done during the past forty years. The most important question now facing the business is what insurance should do in the near future to grasp its opportunities and to meet its responsibilities for public service. No organized activity can be said to have achieved standing until it has determined the size of its real job and measured its performance in accordance with reasonable standards. This naturally leads to the suggestion that departments of insurance in our schools of business administration should encourage cooperation with progressive insurance executives in the organization of research into the service elements of the business. Such inquiry

*"Insurance Science and Economics". The Spectator Company. New York. 1911.

would discover new fields for the application of the insurance principle; it would detect under-development and inadequacy of outstanding coverage and develop new ideas for reducing insurance costs. Possibly, it would anticipate the problems of the immediate future.

Professor Hardy's book treats the subject in a more objective manner and for that reason it will appeal to the insurance student. In the first chapter business risks are classified under five headings: (1) Risks of destruction of property through the physical hazards of nature; (2) risks in the productive process; (3) social hazards due to deviations in individual conduct; (4) risks due to individual ignorance and (5) market risks. Elimination of risk is next discussed, and this chapter (page 10) will be of value and interest because of the reasonably consecutive treatment of the subject. Elimination of risk, in Professor Hardy's opinion, is one of three ways of dealing with risk as we meet it in economic society. The other two categories are *assumption* (by owner-managers, investors and speculators, and laborers) and *transfer* (to entrepreneurs, by contracting, hedging, insurance and guaranty or suretyship). Under "elimination," Professor Hardy recognized five sub-agencies: Risk prevention, forecasting or research to remove measurable uncertainty, risk combination, accumulation of reserves and "compensation" or off-setting.

Chapter V, deals with uncertainty and the business cycle. Insurance men have begun to think constructively on the costs of the amazing inefficiency of an industrial and commercial organization that permits its machine to strike dead-center every few years. The volume of unemployment, the impairment of capital values, decreased profits, all characteristic of the depression phase of the cycle have been suggested as objects for insurance coverage. Instead of transferring risk of loss through insurance, would it not be well to eliminate or materially reduce the risk? Some inquiry in this field is now under way. An enterprising university department of economics or insurance would contribute materially to the discussion of industrial stabilization if it were to initiate inquiry into the investment income and cancellation losses sustained by insurance organizations by reason of the up and down swings of the business cycle.

Then take the subject of business forecasting which Professor Hardy presents in Chapter VI. Does not the insurance adminis-

trator require reasonable forecasts of general business conditions and of special internal factors affecting the business? Elimination of risk in the administration of the business would seem to call for forecasting technique applied to insurance facts. Forecasting is not crystal-gazing but, if properly conducted and controlled, is justified by the magnitude of the interests involved and the ends to be served. Efficient insurance administration of the future will lean heavily upon budgeting of performance and the checking of results against forecasts which take into account prospective swings of the business cycle. The known facts of insurance administration show that, so far, no comprehensive and qualified budgeting plan has ever been marked out for any insurance organization.

Since life insurance is intimately a part of general investment banking, Chapter VII of Professor Hardy's book should suggest inquiries into fixed-rate security investment as a specializing agency in risk-bearing. Such inquiry will also bring out a statement of losses and appreciation in yield on fixed-rate securities by reason of fluctuations in the demand for money in the field of commercial banking. Does insurance need a Gilbert, Jevons or Bagehot to state the principles of investment banking as applied to our business?

Chapter XIII deals with life insurance and is a satisfactory elementary discussion of the subject. This is followed successively by discussions of fire insurance, miscellaneous property insurance and guaranty and suretyship.

The risks of labor are categorically and clearly set forth in Chapter XVII. Unemployment is represented as a "market" risk, as failure to market the laborer's stock in trade, something that must be sold at a given time, or not at all. With respect to unemployment insurance, Professor Hardy concludes: "It does not seem probable that the risk of unemployment can be removed by voluntary insurance, paid for by the workers, either through the trade union or through a commercial insurance company. There remain the possibilities of insurance at the cost of the state, of the employer, or of some combination of these with one another or with insurance at the cost of the worker."

Professor Hardy closes his book with a chapter on the social usefulness of certain institutions dealing with the transfer and reduction of risk.

E. W. KOPF

Lectures on Insurance (Intermediate Course). (Insurance Society of New York). Weekly Underwriter, New York, 1923. Pp. 161.

It is a pleasure to be able again to direct the attention of readers to the important educational work of the Insurance Society of New York. In the November, 1922 issue of the Proceedings the writer reviewed the first-year lectures and the Intermediate Course here discussed is an even more valuable supplement to the existing literature. There are three outstanding points of superiority for the average student—a more judicious assignment of space to the various topics, a more intelligent use of sub-headings, a more extensive treatment of that perennially interesting phase of insurance, methods of ratemaking. The writers have succeeded very well in reducing the respective complicated ratemaking structures to a readable outline of ratemaking factors.

The first three lectures are excellent descriptions of the scope of coverage and ratemaking methods in plate glass, steam boiler and sprinkler leakage insurance. Lectures 4 to 6 are historical and legal in character, showing the development and legal basis of employers' liability for injuries to employees. The compensation system is well covered but compensation *insurance* practices receive no attention. Possibly these are reserved for the third series of lectures. Lectures 7 and 8 follow up the contents of the first series by a discussion of some particular underwriting problems of burglary and theft insurance. Lectures 13 and 14, in similar fashion, supplement the first series on accident and health insurance. The new subjects in the volume are fidelity and surety bonding in Lectures 9 to 12 and public liability insurance in Lectures 15 to 17. In the former group is adopted the probably wise policy of treating separately various types of bonds, describing the coverage afforded and the underwriting problems connected therewith. Under public liability a very valuable lecture is contributed upon the 1921 revision of public liability rates, a subject upon which printed material is not plentiful, and Lectures 16 and 17 very satisfactorily describe the various types of policies and the adjustment of losses.

Persons interested in these branches of insurance can not obtain the same amount of practical information with as little effort anywhere else, even at many times the price. With the publica-

tion of the third series of lectures there will be available to students what virtually amounts to a textbook on casualty insurance by those eminent in the business at a very moderate price, and it is certain that the time and effort which the contributors have expended will be heartily appreciated by those whom the lectures reach.

ROBERT RIEGEL

Mental Causes of Accidents. Boyd Fisher, Houghton Mifflin Company, Boston, 1922. Pp. xii, 315.

Mr. Fisher's book opens up a new field of research in the prevention of industrial accidents. Our customary analyses of accidents have been limited to various classifications of causes as they have been observed by eye witnesses or by the victim himself. This has resulted in tabulations which for the most part attribute accidents to physical conditions; the underlying mental factors have not been apparent and consequently have not been recorded. A man slips while descending a flight of stairs and falls headlong; the accident is charged to falls on stairs. An operator permits his hand to be caught in a machine on which he is working; the accident is charged to the point of operation of the machine. A laborer steps in front of a crane load of material and is knocked senseless by it; the accident is charged to the crane. And so we might proceed indefinitely to enumerate the results of our standardized statistical method of accident classification.

This method produces a valuable index to the things, places, and physical conditions which are involved in the production of accidents. It does not, however, get to the root of the problem for, as Mr. Fisher points out, there are fundamental causes of accidents which are intangible but which are, nevertheless, extremely important. These are for the most part mental. They are the influences which cause workers to react or fail to react to a certain situation or to certain stimuli, or voluntarily or involuntarily to take some action which sets in motion the chain of circumstances which culminates in the accident. Our statistical analyses record the immediate cause of accident—the occurrence which produces the injury. Mr. Fisher suggests an analysis which is more searching and which involves an examination of the worker himself to determine whether the real cause of his injury did not originate in a "mental error" on his part. For example, reverting

to the illustrations already used, the man who falls downstairs may have misjudged the width of the treads. The operator who is injured at his machine may have been rehearsing the last waltz of the dance which he attended on the previous evening or he may have been thoroughly fatigued or ill. The laborer who is hit by the crane sling may have ventured into danger because of ignorance or downright stupidity. It is these facts which Mr. Fisher seeks to discover and classify.

That studies of this character will enlarge the scope of activities of those who are responsible for the prevention of accidents goes without saying. Coupled with his knowledge of mechanics, electricity and chemistry, the safety expert must master at least the rudiments of psychology. At the point where the possibilities of "accident prevention" which "takes men as they are and treats everyone alike" are exhausted, "accident hygiene" which deals with the individual's fitness to perform work under certain conditions would take up the burden of bringing workers into industry under circumstances which best promote efficiency and at the same time conserve human life and limb.

Mr. Fisher very aptly says:

> It is time that we took a hint from the progress which has been made in dealing with other forms of social difficulty, and treated accidents, not as delinquencies, but as forms of mental error. The mental factors in accidents may be made known, and, where they can be corrected and are not counteracted by mental safeguards, at least part of the blame for accidents which they cause should be assumed by the employer. Merely to say that a workman "failed to use the proper safety device" does not sufficiently analyze the situation. If possible, we must get at and correct the state of mind which produced this error.

Mr. Fisher classifies mental causes of accident into fifteen major causes which he groups under five heads: ignorance, predisposition, inattention, preoccupation and depression. His definitions of the five important classifications are presented in his own words as follows:

> Ignorance, by derivation, means simply not knowing. As a source of accidents, ignorance means lack of necessary information or of capacity to understand information about dangerous processes. A workman may not know because of not having been told, or of not understanding the English language, or of not having the mental faculty for comprehending what he is told. When a workman's wits are puzzled, safety is accidental.

Predisposition is a more active condition directly opposed to safe practice. It might be set down as a wrong bent, a state of mind, which, however innocent of blame, leads one to getting into the way of trouble. This mental attitude is more difficult to deal with than ignorance, because it's knowing what "ain't so." Or it may be just a lifetime accumulation of ideas and habits which shut the door on new and valuable information. A man who cannot trust his own senses, or whose ideas and habits stand in the way of his intelligence, is an unintentional accident risk.

Inattention . . . is simply the state of being otherwise engaged—"nobody home"—a condition in which a normal, healthy mind and a normal, healthy body, with no predisposing faculty for getting hurt are engaged in other business when the test comes.

Preoccupation means the surrender of the mind to claims of feeling or mental habits which are stronger in their influence than anything in the present situation. It is an emotional hang-over from some situation or physical condition which continues to excite the mind, even after the crisis has passed. It interests us with relation to accidents because so often the worker imports into the plant with him part of the drama of his life outside, reenacting his own difficulties at a time when he ought to be putting his mind on his work. It may be only an emotional strain or it may be out-and-out insanity, but whatever the degree of preoccupation, a mind which is not "to let," so to speak, for new mental tenants, not ready to meet the situations that come up currently, is a mind predisposed to accidents.

Depression is a medical term for what is sometimes also called psychomotor retardation, and for which the plain English is sluggishness or torpor. This is a physical or mental state in which one's functions are inactive, his reactions laggard, his understanding blurred, and his responses tardy. Temporarily he is depressed to a lower state than normal. He is predisposed to accident for the time being.

In the several chapters of his book, Mr. Fisher expands these definitions, citing numerous cases, most of them from actual experience, others obviously hypothetical, to illustrate his points as he goes along. This greatly increases the interest of the book to the reader, many of the cases providing reading which is as fascinating as the plot of a novel. Take, for example, the following quotation from the chapter dealing with "The Troubled Mind."

Let us now place ourselves at the head of the stairs going down to the girls' locker and restroom. Millie Jones is on her way here. She is looking at nothing around her. Her thoughts are fixed on what happened last night. She is living, again, that moment in the dark, as her lover tells her that it isn't his fault what has happened. "You must have been going with some other man," he says. He pulls himself away from her grasp and leaves her alone on the bench in the park. The agonizing loneliness of this moment has fixed itself in Millie's mind, and all morning she has aimlessly fumbled over her work as an inspector till it is discovered that she is not stopping the bad ones. The forelady has just told her to go downstairs and rest up.

As the girl approaches us, we can see that she is "ready to scream." Indeed, as she reaches the top of the stairs she becomes hysterical and takes a bad tumble. She will draw compensation for the fall, but the company will drop her from the pay-roll for having hysterics.

In the foundry division across the street we hunt up Millie's lover, Bob Mitchell, a timekeeper. As we come up to him, he seems to be sorting time tickets, and multiplying and extending figures. But his mind isn't on his work. A seething torment of fear and confusion has made a mess of his thoughts. He sees no easy way out of the situation which Millie put up to him last night. Last week he got himself engaged to another girl. Last night he tried to "break it off" with Millie and was told that there was an important obstacle. Today he is trying to decide whether it is best to hasten or to postpone his marriage, whether to throw up his job, quit the whole situation, and to go to another city, or what to do. Bob isn't on a kind of work in which there is an accident hazard, but his emotional situation is such that if he were in a dangerous job, in a short while he would very likely have something to take his mind off his troubles.

The personal factors described by Mr. Fisher are undoubtedly an essential element of the problem of preventing industrial injuries. They constitute a phase of the subject which is calling for increasing attention by those who are responsible for the formulation of methods for producing safety. Mr. Fisher's contribution to the subject, therefore, comes at an appropriate time. It will, without question, stimulate further research along lines which must be productive of results because they strike at accident causes which safety engineering cannot reach. The book is heartily recommended to those who are interested in reducing the tremendous waste arising out of industrial accidents.

G. F. MICHELBACHER

Statistics of Industrial Accidents in the United States. (Bulletin of the United States Bureau of Labor Statistics, No. 339). Lucian W. Chaney. Government Printing Office, Washington, 1923. Pp. 60.

This publication contains numerous statistical exhibits and other data, little of which, however, is of much value from the standpoint of compensation ratemaking. This, as the author states, is due to the shortcomings of the data as originally reported.

First, the author presents a table showing the nature of the

information obtained from the several states, and also the source of the data. This table reveals that special calls had to be made for data from fourteen of the states, and that these states then reported only the number of fatal and non-fatal accidents, giving no information as to the industry in which they occurred, the cause, nature or location of the injury, nor the frequency or severity rates. None of the forty-two states shown in this table reported complete information subdivided into all the divisions given above, but at least two states reported in each division.

The next table presented shows the number of fatal and non-fatal accidents reported by states and by years, 1917 to 1921 inclusive. The scope of the data varies widely, however, some states reporting by calendar year, some by fiscal year, some reporting only mine accidents and some reporting all "tabulatable" accidents. Hardly any two of the states reported accidents upon the same basis and for the same periods. It is obvious that very little reliance can be placed upon the totals of the accident data in this table. Certainly it is of no value until adjusted to as nearly comparable a basis as possible.

Following this are presented accident data for the year 1920, by states and industrial groups. These vary widely in extent and completeness, some states reporting merely fatal and non-fatal accidents, others giving accidents resulting in death, permanent disability and temporary disability separately, and a few states, notably Pennsylvania, giving much more complete information.

The author next presents the totals of the data described in the preceding paragraph, which are of little value for the reasons stated above. When the statistics are used separately by states, some of them are of considerable interest, but when the unadjusted state statistics are added into a national total, the result is a conglomeration of uncomparable and misleading data.

Detailed statistics of considerable interest are presented in connection with steam railways, the iron and steel industry, and mines and metallurgical plants. These were compiled by the Interstate Commerce Commission, the Bureau of Labor Statistics, and the U. S. Bureau of Mines, respectively, those for the iron and steel industry being the result of a special investigation. Some interesting, though scanty, data is also presented for miscellaneous industries.

CHARLES M. GRAHAM

Proceedings of the Ninth Annual Meeting of the International Association of Industrial Accident Boards and Commissions. (Bulletin of the United States Bureau of Labor Statistics, No. 333). Government Printing Office, Washington, 1923. Pp. viii, 336.

The Ninth Annual Meeting of the International Association of Industrial Accident Boards and Commissions was held in Baltimore, Maryland, on October 9-13, 1923. The Proceedings of the meeting are of much interest to anyone engaged actively in workmen's compensation problems and, from the point of view of the members of the Casualty Actuarial Society, are peculiarly interesting in presenting the attitude of the various members of industrial commissions with regard to certain vital questions which arise daily in the work of a compensation actuary. The industrial accident boards administer the compensation laws of the various states. The interpretation of the law by the members of the accident board of a particular state is the interpretation which must be taken into account in the valuation of the cost of that particular law.

One session of the meeting was devoted to the presentation of papers by eminent physicians on medical problems and the proper compensation for injuries. A very interesting discussion is recorded relative to the compensation for injuries to the eye. These cases appear to be a "bone of contention" for quite a few industrial commissions and the methods of determining the per cent. of impairment and resulting compensation are at considerable variance.

A report was presented by a committee dealing with a Standard Permanent Disability Schedule. After reviewing the benefit provisions in the present laws relative to permanent disability a tentative Standard Schedule of benefits was presented to the meeting. Considerable discussion followed the presentation of this interesting and instructive report which reflects the attitude of members of industrial boards toward these types of benefits. No action was taken on the report as the committee wished further time to study the problem.

The Virginia Industrial Commission presented to the meeting a plan for the dissemination of workmen's compensation information through the public schools. The method consists of questions

and answers which, while very simple, cover the subject in such a way that much has been done to show the people of Virginia their rights and privileges under the compensation law. Some very worth-while discussion, both pro and con, took place on this plan and the matter was finally referred to a committee to report back at the next meeting.

Besides the above mentioned subjects, parts of the meeting were devoted to the reading of papers on Standard Forms and Procedure and Accident Prevention as well as Administration Problems, all of which will make very instructive and interesting reading for anyone dealing with compensation problems.

WILLIAM J. CONSTABLE

National Health Insurance in Great Britain, 1911 to 1921. (Bulletin of the United States Bureau of Labor Statistics, No. 312). Henry J. Harris. Government Printing Office, Washington, 1923. Pp. iv, 103.

In this number we have a valuable review of National Health Insurance in Great Britain covering ten years. It is a system of protection based upon the wide use of voluntary insurance before it was introduced.

At first the benefits were confined to small amounts, but recently they have been increased to the following:

The medical benefit consists of treatment provided by the physician preferred by the assured.

Temporary disability benefits, for disability lasting only six months.

Invalidity benefits, being for a term from six months on.

Accidental injuries are not included where there is no legal liability to pay compensation.

Maternity benefit to the wife of the insured, 40 shillings, and if she is also insured, 40 shillings more. She must abstain from remunerative employment for four weeks.

Section 37 of the 1911 Act provides that where an actuarial valuation shows a surplus over liabilities, a society may provide for its members and their dependents certain additional benefits, the same being increases of original benefits or additional benefits. Such addition to benefits does not include a funeral benefit.

The contributions are as follows: For men 10 pence a week and for women 9 pence a week, payable as follows: 5 pence for both men and women by the employer and 5 pence by men and 4 pence by women.

Arrears due to sickness or disablement, and in case of women members, due to maternity, are cancelled in the next year; so that the members in arrears make a fresh start each year.

The administration of the insurance system is in the Ministry of Health.

The most important work carried on by the Joint Committee, composed of the Minister of Health as chairman, the secretary for Scotland, the chief secretary for Ireland, and one other person appointed by the minister to represent the Welsh insurance system, is that relating to the actuarial feature of the insurance.

Insurance is mainly placed in "approved" societies, but there is a "Compulsory Depositors' Fund" composed of a limited number of members. When the system was installed, it was expected that there would be a large number thus included, but it was found that the majority came in when the plan was offered. They are not insured; mostly they are insurable on the government plan at the younger ages.

The medical benefit is supplied by physicians with a maximum of 3,000 to each physician. On January 1, 1921, 34% had less than 600 persons; 30% had between 600 and 1,200; about 22% had between 1,200 and 2,000 and only 14% had above 2,000. The number of practitioners with 3,000 was 300. About 60% apply for treatment each year.

They are entitled to drugs and appliances and must be provided certificates as follows:

> The first certificate when patient becomes incapacitated.
>
> The second certificate after eight days of incapacity have passed, with renewals each week during incapacity.
>
> The third certificate when the patient is able to resume work.

A sanatorium benefit was included in the original plan, but did not grow as rapidly as it might have grown, owing no doubt to the war; and in the 1921 act it was transferred to the administration of a special act and is to be a co-operative service jointly with local authorities.

There was an advance in the rates of benefit and contributions introduced by the act of 1920 amounting to about 50%, and in the payments of 2 pence for employers and 1 penny for the workmen or women.

There are additional grants by the Government which add two-ninths to the contribution paid by the insured person, in addition to a number of special appropriations, such as about 3,100,000 pounds in 1919 for medical benefits; about 280,000 pounds for the women's equalization fund, and 150,000 pounds for abnormal rates of sickness.

The actuarial basis of the system is the Manchester Unity Table; there is a flat rate for all persons. This would have been sufficient had it been adopted for all persons in one society, but because they were permitted and in fact encouraged to segregate themselves into societies, small in numbers and which did not contain a variety of risks, a number of the societies were insolvent. This is provided against as follows:

1. The age distribution of the membership; this is cared for by the system of "reserve values."
2. The probability of an excess of liabilities, or deficiency on valuation, of a society due to expenditures for benefit being in excess of the expected; this is provided for by the contingencies fund.
3. The probability of a deficiency on valuation caused by abnormal sickness; this is provided for by the central fund.
4. The fact that women, especially married women, have a high rate of disability; this is cared for by the women's equalization fund.

The age at which a person can become insured is 16. All applications for insurance received at the higher rate are charged as if they brought with them a reserve equivalent to the difference in ratings.

It was early expected that the reserve values would be made good by 1932, but later this date was postponed to about 1955.

A valuation was made, using a mortality table, a sickness table, a probable issue table and a probable marriage table, and on this there was reported on December 31, 1918, a total of 4,878 societies with 2,704,371 members and with a surplus of 3,609,248 pounds and 155 societies with 47,539 members and 15,974 pounds

deficiency, and 3 with 390 members with an exact balance of assets and liabilities. About 40% of the insurance is included.

A government actuary states that these conditions, which have prevailed during the war, have resulted as follows:

(a) Claims for sickness, disablement and maternity benefits have been considerably below the provision made for expenditure under these heads as the financial basis of the acts.

(b) Interest realized on investments has been appreciably in excess of the valuation rate of 3%.

(c) Receipts from contributions in many cases have exceeded the expectations.

(d) Lower "mortality" in the case of men has added greatly to surplus.

While much of the favorable sickness and disablement experience of societies has been due to war conditions, the actuary also ascribed part of it to favorable environment and the nature of the occupations of many of the insured persons.

Under the insurance acts, a society may submit a plan for the distribution of the surplus, provided the actuary certifies the surplus to be disposed of. In a majority of cases, 2,171,576 pounds may be abated. It is not known how the same will be distributed.

MILES MENANDER DAWSON.

ACTUARIAL AND STATISTICAL NOTES

THE USES AND ABUSES OF SCHEDULE Z*

To discuss the uses of Schedule Z is to expound the trite and demonstrate the obvious. Every statistician's clerk knows the uses of Schedule Z—knows, at least, that Schedule Z is somehow related to classification rates, though the relationship is not always apparent in the finished manual.

Schedule Z meant originally an analysis of compensation experience supplementary to the Annual Statements of Insurance Carriers. More broadly, the term has come to signify compensation insurance experience at large, as compiled from the official or semi-official reports of compensation insurers. It is in this wider sense that the subject is herein considered.

Primarily, no doubt, Schedule Z was designed to develop classification pure premiums. But gross payrolls and losses, without further analysis, throw very little light upon the propriety of a classification rate. Every insurance rate is in the nature of a prediction, and the validity of the prediction depends upon the probable consonance of past with future experience. The events which compensation insurers undertake to forecast are industrial injuries by accident and disease. The precise prediction made is a certain compensation cost per unit of payroll; which, in turn, resolves itself into a prophecy of a certain number of accidents, of given degrees of severity, per unit of exposure—so many deaths, so many permanents, and so many temporary disabilities per thousand men per annum. Such a prediction is evidently worthless unless derived from a large and stable statistical series. Schedule Z is the raw material out of which such a series is to be built up and the usefulness of Schedule Z will depend altogether upon the volume, the stability and the intelligent analysis of the statistics derived therefrom.

There are at least four criteria which must be satisfied by any statistical experience which is to serve as an adequate basis of rate making.

*This paper, written by Dr. Downey in March, 1920, and previously issued by the National Council on Compensation Insurance, is now out of print and therefore reprinted here particularly for the benefit of students preparing for the examinations of the Society.

First: The experience must cover a considerable duration of time. There can be no test, and consequently no evidence, of the stability of a series unless it extends over a term of years. The experience of a single year tells us very little of the probable experience of a future year, unless we are able to compare the given year with those that preceded and followed. Economic life, moreover, moves in cycles—depression alternating with prosperity, rising with falling prices, and high loss ratios, in insurance experience, with low loss ratios. The experience of a single year, just because it represents a single phase in an ever-moving cycle, is an utterly unsure basis of prediction for any other year. No man can say whether 1921, in the United States, will be a year of abnormal industrial activity or of widespread unemployment—will most resemble 1914, 1917 or 1918. To project rates upon the basis of 1917 alone or—what comes to the same thing—to convert 1916 experience to the hypothetical level of 1917, is to narrow the exposure, broaden the margin of error, and impair the credibility of the resultant rates. The attempt to make rates in advance which will precisely reflect the conditions of a given year—say 1921—is necessarily futile. The most practical procedure is to base rates always upon a period sufficiently long to test the stability of experience and to comprise the several phases of an economic cycle. If rates were annually reviewed upon the basis of the last five years' experience, it is probable that the average rate level, over each five-year period, would be reasonably stable and approximately accurate. It is certain that neither stability nor equity can be predicated of rates projected upon the basis adopted by the National Council in the general revision of 1920, though it may well be true that no better basis is at present available.

Second: The experience must comprise a large number of reasonably similar risks. The experience of a single large risk is never a proper criterion for a classification rate which is to apply to many risks. The A. B. Co., e. g.—a large anthracite operator—developed a pure premium of $1.80 upon an exposure of $50,000,000 payroll in four years' time. Some forty smaller anthracite operators, during the same period and with the same aggregate payroll, developed a pure premium of $2.80. The experience of the A. B. Co. in this instance has no bearing upon a proper rate for the independent operators, and *vice versa* the experience of the

latter has no bearing upon the proper rate for the A. B. Co. The example may be extreme, but the principle is of wide application. Always it is essential to make a statistical test of homogeneity and to exclude from the classification experience any single risk which constitutes a large proportion of the total and which departs widely from the classification mean.

Third: Accident rates, and consequently pure premiums, are utterly unreliable unless the exposure is large in volume. Reference is here had to the number of persons exposed to injury, which is conveniently, though crudely, measured by insured payroll—conveniently, because no other measure is available to insurers; crudely, because the payroll per thousand man-hours varies enormously from time to time, from place to place and from industry to industry. The minimum exposure necessary to constitute a dependable experience may be taken at ten thousand man years—roughly $10,000,000 of payroll. In low hazard industries the minimum adequate exposure is, of course, much larger.

Fourth: Lastly, a dependable experience must comprise a large number of compensable injuries. It has been customary, but is unsound, to measure exposure in this sense by magnitude of monetary loss. Given 100 compensable injuries, of which 20 are deaths, 1 is a permanent total and 10 are major permanents, with an exposed payroll of $10,000,000 and total losses of $100,000, the credibility of the resultant pure premiums is highly problematical. It is known that the proportion of deaths to compensable accidents, with a waiting period of two weeks, ranges from one in ten to one in a hundred, that the ratio of major permanents to fatals may be as high as two to one or as low as one to four, that the number of dependents per fatal accident varies from less than one to two and one-half, and that the average cost of deaths in different industries, under the same Act and within the same experience period, ranges from $1,500 to $3,000. It is precisely this distribution of accidents by severity of injury, and this dependency distribution of deaths, which go to determine pure premiums. But 100 compensable injuries are all too few to give a dependable severity distribution and twenty deaths are too few to establish an average ratio of dependency, an average age of dependents, an average wage level, or an average cost of deaths.

By the same token, the above exposure, though comprising a substantial payroll and substantial total losses, is altogether too small to establish a dependable pure premium.

It must never be forgotten that compensation insurance deals with compensable accidents, nor that compensation insurance rates are predicated upon accident severity rates. Unless the experience comprises at least 1,000 compensable accidents, the accident severity rate, the severity distribution of injuries and the pure premium must remain uncertain. Altogether too much dependence has been placed upon monetary losses to the neglect of the more fundamental and more informing facts—the number and severity of accidents per unit of exposure. To make rates upon pure premiums alone, without reference to accident severity rates, is neither intelligent nor safe. Yet it is only recently, and only in a few states, that the number of compensable accidents and their severity distribution have been ascertained.

To sum up this stage of the argument: a minimum adequate exposure for classification rate making will comprise at least five consecutive years, at least 100 separate risks, at least $10,000,000 of payroll and at least 1,000 compensable accidents, costing not less than $100,000. It will often be necessary to make rates upon a smaller exposure, but it should never be blinked nor denied that rates so established rest upon an inadequate statistical foundation.

The uses of statistical experience are not confined to classification rates. Experience and schedule rating are integral parts of rate making and both depend for their validity upon statistical analysis. The plans at present in use fail at precisely this point. No analysis has ever been made to determine whether the balance of credits in favor of experience rated risks is earned or unearned, whether the experience of these risks is consistent or inconsistent from year to year, or whether the so-called credibility factors are sufficient or insufficient. Schedule rating is, if possible, in still worse case. The item values which go to make up rate differentials between risks are wholly conjectural and many of them are contradicted by known facts. Thus the schedule gives a credit of ten percent of total rate for individual motor drive which can at most eliminate some five percent of total hazard, it lays greater stress upon elevators than upon cranes which produce double the number of fatal and serious injuries, and it gives greater weight

to the general guarding of machines than to points of operation which are five times as important from an accident standpoint. The fault for this state of affairs lies partly with insurance carriers, which have manifested all too little interest in the scientific solution of rating problems, and partly with Insurance Departments, which have lacked the courage to insist upon such statistical analysis as is indispensible to a proper discharge of their public duties. The remedy may be read by him that runs. No sound plan of experience rating will be evolved until individual risk experience is submitted to searching analysis, and no sound plan of schedule rating will be constructed in advance of a thorough study of accident causes.

Schedule Z, in its present form, does not supply the information pertinent to Schedule and Experience Rating. For the latter, experience must be studied by individual risks; for the former, by individual accidents. Individual reporting of deaths and permanents is well enough, so far as it goes, but deaths and major permanents cover barely half the compensation cost of manufacturing industries. Nothing short of individual reporting of all compensable accidents will serve the turn. This is the inevitable next step in Schedule Z; it only remains to devise the most practical ways and means.

Turning, now, to the abuses of Schedule Z, the first and great abuse consists in the impossible attempt to establish rates for a multiplicity of overlapping classifications. Compensation experience is collected under some 3,000 manual code numbers, representing some 1,500 manual classifications, whereas the very census-takers are unable to find 300 distinguishable industries which employ so many as 10,000 persons in the whole United States. Four-fifths of the Basic Manual classifications answer only to petty subdivisions or alternative names of the major industries—purely subsidiary operations, ordinarily incident to the governing classification, though sometimes carried on as a separate enterprise; specialty risks which do not differ essentially in materials, equipment, processes, products or presumptive hazards from the industries to which they appertain; horizontal, vertical and oblique sub-divisions of the building trades; endless distinctions, not recognized nor recognizable in industrial or business organization. The whole system of classification is fundamentally irrational and its results are statistical confusion,

inadequate exposures, fluctuating pure premiums, and unjustifiable rate discriminations.

The evil does not end with insufficient exposures for the vast majority of manual classifications. The maintenance of hundreds of classifications which run at cross purposes with each other makes it difficult often, indeed, impossible—to obtain dependable experience even for the major industries. Given, on the same stevedore's policy, separate classifications and rates for "Stevedoring, General Merchandise," "Stevedoring, by Hand Trucks exclusively," "Stevedoring, Hand Work only," "Freighthandlers," "Tallymen" and "Weighters and Samplers of Merchandise"—given this underwriting, the distribution of payroll among these several classes is wholly a matter of broker's choice and the assignment of losses is a statistician's nightmare. Given, on the same policy and for the same job, the classifications "Concrete Bridge Construction," "Concrete Construction, Piers and Abutments," "Structural Iron Erecting," "Railroad Construction," "Carpentry N. O. C.," and "Drivers and Helpers"—it is bootless to provide that the Piers and Abutments Classification shall not include Bridge Construction, that Concrete work shall include setting up and taking down forms, or that the several construction classifications shall include drivers, chauffeurs and their helpers. No payroll auditor can tell when the pier stopped and the bridge began nor how much of the carpentry payroll represented the putting up and taking down of concrete forms. The carpentry classification is on the policy, the payroll of the carpenter's gang is kept as a total, and the auditor can only cuss or compromise. Manual rules to the contrary notwithstanding, code number 7,205, Drivers and Helpers, is on the printed declaration and 7,205 gets into the audit slip.

Whence it happened that the contractor who built the Pennsylvania Railway bridge over the Susquehanna at Harrisburg—a double track, concrete arch structure—developed a larger payroll under "Piers and Abutments" than under "Bridge Construction;" that a carpenter on the same job, permanently disabled by the collapse of a truss while taking down forms was assigned to "Carpentry, N. O. C.;" that $250,000 of brewery drivers' payroll, with two deaths and three permanents, crept from code No. 7,215 to 7,205, because the latter number appeared in the printed declaration; that half a dozen fatalities charged to the driver's

classification occurred in railroad construction, land grading and cellar digging, which specifically prohibit the division of drivers' payroll; that two fatalities which occurred in new construction and thereby belonged to "Additions and Alterations" were charged to the paper mill classifications; and that the classification, "Oil Well Operation—no drilling of wells, no erection or dismantling of derricks," produced two deaths and three permanents from the operation of drills.

To the same root cause is attributable the petty payrolls in a vast number of manual classifications. When, of $45,200,000 payroll in carpentry construction, three classifications comprise $44,200,000 and the remaining $1,000,000 is distributed among sixteen separate classifications, it must be obvious to the meanest intelligence that these sixteen classifications serve no legitimate end. This conclusion is only strengthened by reference to the reports of the several carriers, Schedule Z, Part II, Payrolls of $135 for "Sheet Metal Work, Shop," $18 for "Blasting," $14 for "Silo Erection, metal," $31 for "Water Tower Erection," $21 for "Windmill Erection," $210 for "Window Frame Installation," $1,100 for "Rolling Mills, bars only," $100 for "Bridge Building, Wood," $363 for "Scaffold Installation," $127 for "Steamship Agencies," $715 for "Coal Dock Operation," $504 for "Stevedoring by hand exclusively," $291 for "Stairbuilding"—such payrolls, all reported under oath, can mean nothing but fictitious payroll divisions.

For misreporting of this sort neither statisticians nor payroll auditors can be justly blamed. The fault lies, rather, with the manual classifications themselves. Until our classifications conform to the actual organization of industry neither correct audits nor correct assignment of losses can be attained. Therefore, the beginning of wisdom in compiling Schedule Z experience is to combine as a single total the dozen or more classifications which cover each distinguishable industry. To give an independent status to such classifications as Stairbuilding, Chimney Construction, Wood-turning, Coppersmithing, Freight-handlers or Printing Machinery Mfg. is worse than absurd. The exposure for the specialty manufacturing classifications is derived, more often than not, from misclassified risks, and the payrolls for the nonexistent occupational subdivisions are turned up by auditors upon classifications which appeared in the policy with the qualification

"if any." The losses in the latter case have unavailably been assigned to the governing classification of the risk, so that the bastard classifications, by and large, show incredibly low pure premiums.

The common practice is to ignore the payrolls and losses reported under these misbegotten classifications, and to make the rate for the entire group upon the experience reported for the leading classification. This practice results in an unwarranted loading up of the rate level, such as has uniformly occurred in general revisions of the manual; *vice versa* to make a lower rate for a subsidiary operation or an alternative name than for the industry to which it appertains is to open the door to competitive misclassification of risks. The only appropriate treatment for the 1,200 superfluous classifications in the present manual is the axe.

For a second category of misreporting the underwriting departments are primarily responsible. The assignment of a Cast Iron Pipe manufacturer to "Iron Foundries, 3,081," of a Blast Furnace, Open Hearth and Rolling Mill, a steel Foundry, two boiler works and one bridge shop to "Machine Shops, with Foundry, 3,631;" of a quartz rock quarry for glass sand to "Sand and Gravel Digging," of $2,000,000 of quarry stripping payroll to "Grading Land for Agricultural Purposes"—these and the like competitive misclassifications of risks which abounded in Pennsylvania at the outset of workmen's compensation are beyond the competence of any statistician to correct. Such instances go to show the need of Bureau inspection and rating and the importance of auditing Schedule Z returns.

There is another class of bone head plays which could be avoided by greater care and intelligence in the statistical departments of the companies. In a single year of Pennsylvania Schedule Z, nineteen anthracite fatalities were assigned to bituminous mining; four deaths and two major permanents in beehive coke burning were assigned to coal mining; two fatals and one permanent total in stripping operations were assigned to underground mining; four deaths and three major permanents in clay mines were charged to brick manufacturing; two deaths and three permanents in stone quarrying went into brick manufacturing; three blast furnace fatalities were charged to rolling mills, bars only; and two major permanents in an open hearth plant were assigned to a rolling mill operated by the same assured at a different location.

The statistician can not be expected to have a first hand knowledge of every industrial process or a minute acquaintance with every risk insured by his company, but he can reasonably be held to know that bituminous coal is not mined in Luzerne County, Penn., that steam shovels are not used underground, that larries and ovens are not coal mining equipment, that a fall of slate from the roof of the mine does not occur in a brick plant, that the quarrying of gannister rock is not properly described as "Clay or Shale Digging," that the sledging of boulders is not characteristic of gravel pits, that ingots are stripped from the moulds in the open hearth department and that a hot blast pipe is not found in a rolling mill. For the company statistician, though not a technologist himself, has at command the wide practical experience and the exact industrial knowledge of the engineering department. His usefulness to his company depends in great measure upon close co-operation with the engineers in the study of accidents and the lack of such co-operation bespeaks a fundamental weakness in company organization.

Schedule Z sins also by omission as well as commission. Of 4,800 individual accident reports on Pennsylvania Schedule Z about one-third were deficient in one or more particulars—age of injured or of widow, nature of injury or cause of accident. More than 200 of the death benefits were incorrectly calculated and nearly 800 accidents were assigned to the wrong Manual classification. Insurance carriers annually assert, on Schedule W, that some six per cent. of total compensation premiums is expended for "the investigation and adjustment of claims." Surely the expenditure of $1,000,000 annually for the investigation of 40,000 compensable accidents should disclose the pertinent facts for at least the fatal and permanent injuries. Care in making up the reports, to see that every question is answered fully, that the nature, extent and location of injury is clearly stated, that the cause of accident is given in detail, that the age, wage and occupation of injured and the ages of dependents in case of death are correctly recorded, and that the cause of accident is compatible with the manual classification to which it is assigned, will vastly improve the quality of Schedule Z, save much embarrassing correspondence and facilitate the work of audit.

These comments are offered in no spirit of fault-finding. Company statisticians are as anxious as Insurance Departments to

obtain correct results; as a body they are able, conscientious and well-informed. Their task has been made difficult by an impossible scheme of industry classifications, by inadequate appropriations for statistical work, cheap labor, and a faulty system of reporting which makes Schedule Z a seasonable job.

The purpose in so dwelling upon the errors and discrepancies revealed by the audit of Pennsylvania Schedule Z is wholly constructive; to point the need of more careful reporting and to emphasize the vital importance of departmental audit. That species of audit which consists in checking additions and verifying the correspondence of premiums with payrolls—well enough in its way—scarcely scratches the surface of Schedule Z. The correct classification of accidents in respect to injury, cause and industry is the very foundation of useful statistics. Audit in this sense is a tedious and costly task, requiring constant reference to the risk files of the Rating Bureau and to the accident files of the Compensation Board. The errors and omissions cited in this paper were brought to light by the examination of hundreds of folders, to ascertain the proper classification of the risk, the payrolls and losses reported for experience rating and the details of the specific accident. This sort of audit obviously cannot be undertaken by a central organization, such as the National Council, yet without it the value of Schedule Z returns is very gravely impaired.

E. H. DOWNEY.

CURRENT NOTES

The Editor wishes to gratefully acknowledge the cooperation of Messrs. Acker, Carr, Stellwagen and Sterling, in the preparation of these notes.

Burglary Insurance Rating

The rates for Burglary Insurance were promulgated by three organizations during the year of 1923. Until April 1st, the Burglary Insurance Underwriters Association, promulgated the rates. On April 1st, the Independent Rating Bureau took over the rating end of the business, and continued until November 1st, on which date the Burglary Department of the National Bureau of Casualty and Surety Underwriters was organized and assumed jurisdiction for its thirty-four company members.

An article in Current Notes of Proceedings No. 20 describes the rating situation on Mercantile Open Stock Insurance during the early part of 1923. This situation continued until December 1st, when a new schedule of open stock rates and rules was adopted by the Burglary Department of the National Bureau of Casualty and Surety Underwriters. This new schedule provides for the dividing of the country into four territories instead of two, while the 80% co-insurance percentage formerly used in both territories now ranges from 80% to 40%, depending on the territory. The effect of the new rates was a reduction in certain classifications and an increase in others. The policy form has been revised, the principal change being the elimination of coverage for the so-called show window losses of furs. This protection can, however, be obtained by the payment of an additional premium. The discounts for extra watchmen have been increased and the discounts for burglary alarm systems revised, the general tendency being upward.

In January 1923, a new form of residence policy was placed on the market, making three residence forms altogether. This new form is known as Residence Form 3, has a limit of $100.00 on single articles of jewelry and fur, and is intended for the man of small means. The policy is sold at a reduced rate.

No changes of any importance have been made in the rates or manner of writing Paymaster Robbery, Bank and Mercantile

Safe Burglary, with the exception of a slight increase in the discounts for certain alarm systems on Bank and Mercantile Safe risks.

It is interesting to note the growth of this line of insurance which, twenty years ago produced a premium volume of $1,000,000. Four years ago this had grown to $4,000,000 and at the present time has reached an approximate volume of $24,000,000.

Plate Glass Insurance

The World War taught Plate Glass Insurance companies a lesson in rate-making. They learned, by a very costly experience, that scientific rating is as important in a side line as in a major line. They entered an era of extraordinary conditions in 1917 wholly unprepared as respects an adequate rating system, and came out of it in 1921, after writing a vast underwriting loss into the history of this business, with a near-scientific method.

Industrial changes consequent upon the war caused an upheaval in the plate glass industry, as in many others. The increased price of labor and of raw materials, together with that of coal and freight rates and the creation of a new foreign market, played havoc with what had been, for a number of years, a fairly stable market price. In 1917 they had reached a state of mind bordering on panic. By 1920 the insurance companies were paying exactly five times the price they had been charged in 1914. Surpluses were "going the way of all flesh." A conference of company executives was called, and out of the meeting came the organization of the present Rating Service that, during the trying years to follow, was the salvation of the companies.

When the newly appointed Rate Maker, Mr. W. F. Moore, took hold of the situation the manual then in use was the subject of varying discounts. A risk written at the manual rate was a rarity; a discount of fifty per cent., a common occurrence. Some of the rara avis of the underwriting profession were even cutting the manual rate sixty-five per cent. Chaos fittingly describes the situation that existed.

To establish a rate that would adequately stand the strain of the loss cost produced by the market price of glass would have meant an increase in renewal premiums of from one hundred to one hundred fifty per cent. In 1917 the consumer of commodities

had not yet become subservient to the profiteer and still showed signs of resistance and rebellion. To have charged the necessary premium for Plate Glass Insurance would have caused a buying strike, and eventually companies and underwriters would have had nothing left but epitaphs.

To avoid giving undue space to this preliminary historical sketch, it may be stated that the market price of glass increased at such frequent intervals that the notification of increase in rate would hardly be in the hands of the agents before another increase became necessary. The rates always trailed far behind the market price, with the result that in 1920, as above stated, when the peak market was attained by the manufacturers, a vast underwriting loss had accumulated.

A recession set in in 1921. Glass prices began to drop, and for the first time in four years premium rates trailed market prices. Following a wise policy, the Rate Maker in reducing rates left a differential in the rate composition that might be accurately described as a factor of safety. This was provided to take care of catastrophe losses, such as explosions, floods, and tornadoes, and an unexpected upward change in the price of glass.

The opportunity had never been afforded for an offset against the catastrophe hazard. Within two years over $800,000 worth of glass had been broken in this country by dynamite explosions. Two or three floods had destroyed large areas of glass. It became possible, in reducing the premium rate following reduction of the glass price, to withhold part of the concession in the interest of this catastrophe hazard. It also became possible to take care of the matter of subsequent changes, upward, of the cost of glass.

The plate glass market has been a sensitive organization these past five years. Industrial changes, foreign competition, and unusual consumption are the three factors that enter into changing price conditions in the plate glass industry.

The manufacturer may be confronted with unexpected demands of the labor union for an upward revision of the wage scale. Foreign manufacturers may divert their exports, as at present from the United States to Japan, making for a greater demand upon the domestic plants. The automobile manufacturers may unexpectedly increase their production of closed cars, or the furniture manufacturers may greatly increase their production of furniture requiring glass, and with the foreign market supply

being reduced those manufacturers are forced into the domestic market.

The Plate Glass Insurance company is an all-year consumer. It must pay the prevailing price of glass for replacements. If a loss occurs when the market is high it cannot defer replacement until a recession of price sets in, except, perhaps, in the case of a minor breakage which does not impair the window display.

In order to describe this element in the composition of the plate glass rate that has been called the factor of safety it is necessary to bring into the foreground a fact very little understood, namely, that the Plate Glass Policy follows change in property values with one hundred per cent. cover at all times.

For the purpose of illustration, let it be assumed that a property owner installs a plate glass frontage that on January 1 cost him $3,000. Many large dry goods stores have a greater amount invested in their plate glass display windows. He takes out Plate Glass Insurance. On March 1 a twenty-five per cent. increase takes place in the market price of glass. Immediately that store front takes on a value of $3,750. Again, on July 1 the plate glass dealers raise the price twenty-five per cent. That glass then takes a value of $4,687.50. Suppose that one of the red powder-wagons frequently seen on our city streets loaded with a high explosive should in some way explode, or some mysterious explosion, such as took place in Wall Street a few years ago, occurred and demolished this glass. The plate glass insurance company would have to pay just $1,687.50 more than the glass was worth when the policy was written, and not a cent of additional premium had been collected in the meantime to pay the company for its increased liability.

Assuming the same situation with respect to fire insurance. Suppose the owner bought $3,000 direct fire insurance on his glass on January 1 and the value of the glass had increased, as in the foregoing example, to $4,687.50 by July 1, and on that day the entire glass frontage was destroyed by fire. What would the owner recover? Surely, not $4,687.50, as in the case of the explosion just recited. His policy states the sum insured as $3,000, and that would be the amount paid by the fire insurance company —provided there was no coinsurance clause attached, in which case a less recovery would, of course, be had. If the assured followed the changing prices of glass he might probably have

bought $1,687.50 more fire insurance by July 1—BUT *he would have had to pay an additional premium.*

To summarize the foregoing, the plate glass insurer covers the property for one hundred per cent. of its actual value at all times, while the insurer against loss by fire requires the owner to provide additional insurance to bring about one hundred per cent. cover.

It seems an entirely logical proceeding to take some measure of protection against this "market hazard." That this element in the rate is necessary was demonstrated early in 1923. The market had been fairly quiet for eighteen months, when without intimation by factory, jobber, or dealer, the companies were advised, in January of that year, of an increase in price, which was followed by other increases, until on April 1 the price was fifty per cent. higher than in December, 1922. That meant that for the remaining eight months the existing liability was automatically increased just fifty per cent. Every loss to be paid in those eight months on the total volume of business in force would have cost the companies fifty per cent. more than the rate charged was calculated to bear if the element under discussion had not been included. That rate was pitched to sustain a loss ratio of forty-two-and-one-half per cent. As it happened, it became necessary in May to promulgate an increase of twelve-and-one-half per cent. of the then existing rate. Statements for the year available at this writing indicate that the average loss ratio will be about forty-one per cent.

The principal advantage of this protective element in the composition of the rate is that it produces, in part, that additional premium to which the companies are properly entitled when the increase in property value takes place. Space might be taken for a more analytical explanation of the operation of this factor, but such as has been made may give an idea of its place and propriety in the rating scheme employed in Plate Glass Insurance.

Compulsory Automobile Insurance

The growth of the compulsory Automobile insurance idea is evident from the many bills now before many of the state legislatures. It is altogether possible that the year 1924 will see the adoption of a compulsory Automobile insurance law in certain states requiring all automobile owners to take out insurance.

The state laws and local ordinances which have been passed to date apply only to automobiles which carry passengers or property for hire. Such laws are already on the statute books of fourteen states and more than one hundred cities. In general, these laws provide that truckmen and operators of taxicabs, jitneys and buses, carry insurance in varying amounts for Public Liability and Property Damage. In addition, truckmen are required to carry Cargo insurance to cover the contents of their trucks.

Unfortunately, the idea of compulsory Automobile insurance has been associated with the idea of monopolistic state funds for the writing of that insurance, and there can be no doubt but that the association of the two is wrong in principle. The proponents of monopolistic state Automobile insurance justify the necessity for state funds on the grounds that the private insurance companies cannot insure all risks, including the reckless and criminal drivers. That undoubtedly is true, but it ought not to be inferred on that account that the state ought to provide insurance for these undesirables. On the contrary the inability of certain automobile operators to get insurance ought to be sufficient proof of their inability to operate automobiles safely, and it would appear that the solution to the problem consists in denying licenses to the criminal and reckless drivers rather than enabling them to provide financial assistance to the victims of their improper driving.

Some of the bills recently introduced show a most surprising lack of knowledge of insurance practice. Legislation has been proposed in Massachusetts and in New Jersey, which would compel all car owners in the respective states to pay a flat premium amount into the state fund. The injustice of the flat premium idea is apparent. The cost of Automobile insurance in the large congested cities is sometimes two and even three times the cost of insurance in the rural communities, and it is not fair to ask the farmer, let us say, to pay part of the losses which are properly chargeable to automobiles operated in the large population centers. A bill has been proposed in Massachusetts which would indemnify the victims of automobile accidents on the basis of the benefits outlined in the Workmen's Compensation law of that state. There is little doubt but that a measure of this sort would meet with scant approval by the residents of Massachusetts.

The insurance companies have not committed themselves in regard to compulsory Automobile insurance, except where monopo-

listic state insurance is linked up with the compulsory insurance idea. However, if the law-makers in their judgment think that compulsory Automobile insurance is necessary, the insurance companies stand ready to provide the coverage required.

Making of Public Liability and Property Damage Rates for Private Passenger Automobiles—with Special Reference to the 1923-24 Revision

The revision of Automobile insurance rates completed January 1st, 1924, by the National Bureau of Casualty and Surety Underwriters was in many respects more satisfactory than the revisions of previous years. For the first time it was found possible to establish rates for the various territorial divisions and for all underwriting classifications on the basis of the statistical evidence without resort to conjecture. The rate making Committee had the benefit of a large volume of detailed experience which the companies began compiling in 1921, and by virtue of these data, the Committee was successful in developing a scientific method of establishing rates. The very complexity of the data reported required the development of a definite technique which was found to be very satisfactory in its application.

Experience was reported for one hundred eighty-one distinct territorial divisions of the country, each territory being divided into four symbol groups, and each symbol group further subdivided into the three use and driver classifications. These data were reported for the policy years 1921 and 1922, both brought down to December 31st, 1922. The 1921 policy year was fully earned, and the 1922 policy year was converted to an earned basis by applying a factor of .55 to the written exposures and premiums. This factor was developed by applying the so-called one-twenty-fourth method to the actual monthly writings. A consideration of the experience for the past six or seven years showed that an earned factor calculated on this basis was entirely safe, so long as claim costs are stationary or on the decline. It is not quite safe when costs are ascending. The peak in Liability costs under Automobile insurance was probably reached soon after the war, and since then there has been an evident decline in at least one element of the loss cost—namely, claim frequency. It is

very fortunate that the experience for the latest policy year can be used for Automobile rate making. Automobile insurance is comparatively new in the Casualty field, and conditions are changing violently from year to year. On that account it is essential that the latest trend in the experience be analyzed in establishing rates for the future.

The statistical elements reported were—number of cars, premiums, losses paid, losses outstanding, and number of claims, thereby making it possible to calculate pure premiums, loss ratios, claim frequencies, and average claim costs. All these data were reported separately for Public Liability and Property Damage. However, the same processes were followed in the revision of both sets of rates, so the two will be considered together.

After the experience had been tabulated, it was discovered that the volume of data for certain classifications and territories was too small to be indicative. It was therefore necessary to establish a criterion for a dependable volume of experience, and it was decided to use an annual exposure of 4,000 earned cars and/or $75,000 in losses as evidence of a dependable spread. The figure for exposure was established from Mr. Mowbray's formula as developed from the theory of mathematical probability with special reference to the law of error, and the $75,000 loss figure was established empirically. (Note: These figures are for Public Liability; the Property Damage criterion would be lower.)

The first step in the analysis of the experience was concerned with the use and driver classifications. Did the statistical evidence justify the retention of the 8% discount for cars operated for private purposes only, and the 20% discount for cars driven for private purposes by their owners only? In order to answer that question, the one hundred eighty-one territorial divisions were contracted into ten, each of which was composed of cities alike in density of traffic and population. Each of these ten territorial divisions was of course sub-divided into twelve classifications; that is, four symbols by three "use and driver" classifications. The application of the established criterion to these one hundred twenty divisions showed that a number of them could not be regarded for rating purposes. It was therefore necessary to further reduce the ten territorial groupings to three, the first composed of the large cities, the second of the middle sized cities and smaller cities and villages of the congested East, and the

third composed of the rural districts and smaller villages of the West and South. It was then possible to compare the loss costs or pure premiums for each of the discounted coverages with the pure premiums for the basic coverage for cars of similar make in each of the three territorial divisions. It was found in nearly all cases that neither the 8% nor 20% discounts were justified. As a matter of fact, for certain symbol groups the pure premiums for the discounted coverages were higher than the pure premiums for the basic coverage.

Having reached the conclusion that there was no essential difference in hazard under the three use and driver classifications, the data for all three were combined so as to form a basis for studying the differentials by symbol. Generally speaking, the experience substantiated the existing differential between W, X, Y and Z rates. The 1922 data, however, showed that the pure premiums for the W and Z cars were closer together in the big cities and farther apart in the rural communities. This tendency was not especially marked, however, and was based on the indications for only one policy year, and it was therefore decided to continue the principle of only one set of differentials for all territories. The following set of differentials was adopted for Public Liability:

Symbol	Differential
W	.863
X	1.025
Y	1 240
Z	1.511
Average	1.000

These differentials are so pitched in their absolute value as to produce unity when applied to the percentage distribution of cars by symbol groups. The experience showed that in each territory with the exception of New York City there were 44.9% of the total cars in the W group, 37.6% in X, 13.8% in Y, and 3.7% in Z.

It should be observed in passing that data on claim frequencies and average costs of claims were found to be especially valuable. Unfortunately, this information was available for the 1922 policy year only, and it was thus impossible to make comparisons be-

tween 1922 and previous years. However, the 1922 data demonstrated very conclusively that the average cost per claim varied little if at all from one territory to another. Thus the average Liability claim in New York City is about the same as it is in the smaller cities and even rural communities of the country. In other words, the experience showed that the relativity in rates between territories was due primarily to the difference in claim frequency rather than to differences in claim cost. That fact should be especially important in future revisions, because the loss cost for a given community can be established by multiplying its claim frequency by the average claim cost for the country. Claim frequency ought to prove a very stable and accurate index of a city's hazard, whereas pure premiums are bound to vary from one year to another because of the occasional unfortunate occurrence of a few very severe losses.

On the other hand, the claim frequency data demonstrated that the difference in premiums by make of car—that is, between symbol groups—was caused by a difference in claim cost, and not by a difference in claim frequency. Claim frequency on cars in the Ford and Chevrolet group was about the same as the claim frequency on cars in the Cadillac and Pierce Arrow groups, but the average claim costs of the latter were considerably above the claim costs of the smaller and less powerful cars.

The next and most important step in the rate making procedure was to establish rates for individual territories. As was pointed out before, data were reported for one hundred eighty-one distinct territorial divisions. Individual experience was reported for each city of 100,000 population and over, a group experience was reported for all cities of 25,000 to 100,000 in each state, and a group experience was reported for each state for all territory outside of cities of 25,000 population and over. In order to get as large a spread as possible for individual cities, the data for all symbol groups were combined. This combination did not affect the relativity between different cities because it was found that the distribution of cars by symbol groups was constant from one city to another.

In addition to the data for the policy years 1921 and 1922, there was also available territory experience for the policy years 1919 and 1920. The following steps outline the processes followed in establishing rates for the individual territories.

1. A weighted average pure premium was established for the four policy years 1919-1922 inclusive, for each territory.
2. Selected pure premiums were established by adjusting the average pure premiums with regard to increasing or decreasing trends and with regard to local conditions.
3. The selected pure premiums were reduced to the 1922 loss level.
4. Indicated rates were established by the application of the proper overhead expense factors. These overhead factors were 43% for Public Liability and 44% for Property Damage, and the indicated rates were obtained by dividing the pure premiums by the complements of these percentages.
5. The indicated rates were compared with the existing Manual rates and the actual departures between the two determined.
6. Credibility factors were determined for the different territories on the basis of their exposures.
7. The credibility factors were applied to the actual departures to get the allowable departures.
8. The allowable departures were either added to or subtracted from the existing average Manual rates in order to produce new average rates.
9. The new average rates for all territories were adjusted to the actual experience level. The credibility factor has a tendency to either raise or lower the whole scale of rates depending on conditions. It was necessary to test the new rates and then make a horizontal adjustment to bring them up or down (as the case might be) to the level indicated by the experience.
10. The symbol differentials already established were applied to the new adjusted average rates in order to get final rates for W, X, Y and Z cars.

Items 5 to 10 need further elaboration. A consideration of the pure premiums for a given territory over a number of years shows that they fluctuate very widely. If rates were based squarely on

indications as they develop from one year to another, Automobile rates would vary to such an extent as to completely demoralize the business. A certain rate stability is necessary, and this can be obtained by dampening the fluctuations of the pure premiums from one year to another by applying the principles of experience rating. The existing Manual rate is taken to have a certain standing because of the fact that it is the going rate and because it reflects previous conditions. The rate indicated by the latest experience is also given certain weight because it shows which way the experience is tending. Instead of going the whole distance as indicated by the latest experience, the new rate is fixed somewhere between the existing rate and the indicated rate. This result was accomplished mathematically as follows: It was decided that an exposure of 50,000 cars in any one territory was entitled to 100% credibility. In other words, if a certain city had 50,000 cars exposure, rates for that city could be made squarely on the indications. Actually, the different territorial divisions had exposures quite a bit less than 50,000 cars. Credibility factors were determined for each territorial division on the basis of an assumption that the credibility varies directly as the square root of the number of cars exposure. Thus if a given city had an exposure of seven thousand cars, its credibility factor would be determined in accordance wih the following equation:

$$\frac{X}{1.00} = \frac{\sqrt{7{,}000}}{\sqrt{50{,}000}}$$

From this point on, the rate making procedure may perhaps be best understood by considering the development of rates for a particular city. The city of Pittsburgh will serve. The 1923 average Manual rate for Pittsburgh was $44.05 calculated on an actual distribution of cars in that city by symbol groups. The indicated average rate, according to the actual experience, was $35.07. The actual departure was $44.05 — $35.07, or $8.98. The earned car exposure reported for this city for 1922 was 6830, and substitution of this figure in the foregoing equation produced 37%. This credibility factor applied to the *actual* departure of $8.98 produced an *allowable* departure of $3.32. This amount subtracted from the 1923 average Manual rate produced a new

average rate of $40.73. A test showed that the proposed average rates for all territories produced a premium income countrywide somewhat above the experience indications and it became necessary to reduce them to the experience level. This reduction applied to Pittsburgh's proposed rate brought it down to $38.77. The individual symbol rates were then established as follows:

Symbol	Symbol Differ.		Actual Rates
W	.863		$33
X	1.025	x $38.77 =	40
Y	1.240		48
Z	1.511		59

It will appear from the foregoing that Automobile insurance rate making has reached that point in its development where it compares favorably with the technique that has been developed for other branches of Casualty insurance. A sound statistical basis has been established, which is refined and flexible enough to meet any new developments in the underwriting of the business. There is still much to be done, but it may safely be said that the experimental and developmental stages of Automobile rate making have been passed.

Liability Rate Revisions

The National Bureau of Casualty and Surety Underwriters has been engaged during 1923 in revisions of several of the liability lines over which it maintains jurisdiction. On September 1 new Employers' Liability rules and rates became effective in the six states having no compensation laws—Arkansas, Florida, Mississippi, Missouri, North Carolina and South Carolina—and in the District of Columbia. In general it may be said that Employers' Liability Insurance closely follows Workmen's Compensation Insurance as respects fundamental underwriting rules and also classifications of industry.

In the field of Public Liability Insurance, the year 1924 will be

signalized by complete revisions of rules and rates for the following lines:

Owners', Landlords' and Tenants' Public Liability Insurance.
Residence, Farm and Private Estate Public Liability Insurance.
Theatre Public Liability Insurance.
Elevator Public Liability Insurance.
Teams' Public Liability Insurance.
Teams' Property Damage Insurance.

A complete review of existing underwriting rules and a fundamental study of each line of insurance will be made in an endeavor to develop a new manual consistent with present day conditions, thereby permitting the writing of Public Liability Insurance in a manner which meets with the requirements of both the insuring public and the insurance carriers.

The rates for the public liability lines of insurance will be revised on the basis of the latest experience secured from members of the National Bureau. In connection with the revisions for Elevator and Theatre Public Liability Insurance, an investigation and analysis of accidents by causes will be made, which should yield much interesting and valuable information.

In Greater New York a special method of classifying and rating Apartment and Tenement Public Liability business has been followed for some years. The city has been divided into rate territories, and each territory has been divided into a number of districts for statistical purposes. In the past, the carriers have received a valuable service from the Casualty Insurance Exchange of New York in the rating of this class of business and the assignment of individual risks to their proper rate territories. The jurisdiction of the Exchange extended solely over apartment and tenement house risks in Greater New York. It was recognized that the work performed by the Casualty Insurance Exchange should consistently be handled by the National Bureau, in view of the fact that the Bureau is now the official rating organization for Public Liability business in New York State under the Rating Law, and the further fact that it administers and makes rates for this class of business nationally. As a result, effective January 1, 1924, the Casualty Insurance Exchange was dissolved, and was absorbed by the National Bureau with the retention of a separate office known as the "New York Rating Office." This

office will continue to give rating service on individual risks as previously given by The Casualty Insurance Exchange.

Personal Notes

S. Bruce Black is now President and General Manager of the Liberty Mutual Insurance Co.

C. S. Coates who left the Western States Life Insurance Company to become Actuary in the California Insurance Department has returned to that company as Assistant Actuary.

Edmund S. Cogswell has resigned his position as General Manager of the National Association of Mutual Casualty Companies and has accepted a position as Secretary and Actuary of the Commission on Pensions, Boston, Mass.

Harwood E. Ryan has become associated with Messrs. Woodward and Fondiller, Consulting Actuaries and the firm name is now Woodward, Fondiller & Ryan.

Carl M. Hansen has become Vice-President of the General Re-Insurance Corporation of New York.

A. L. Kirkpatrick is now with the Casualty Information Clearing House, Chicago, Ill.

D. G. Luckett has been elected First Vice-President and General Manager of the United States Casualty Company.

S. D. Pinney is now Assistant Actuary of the Compensation and Liability Department of the Travelers Insurance Company.

W. P. Comstock is Statistician of the London Guarantee and Accident Company, New York.

A. A. Welch has been elected President of the Phoenix Mutual Life Insurance Company.

R. A. Wheeler has been advanced to the position of Vice-President and Actuary of the Liberty Mutual Insurance Company.

Lee K. Frankel has been elected Second Vice-President of the Metropolitan Life Insurance Company.

Louis I. Dublin has been honored by election to the Presidency of the American Statistical Association.

E. O. Dunlap has been appointed Assistant Secretary of the Metropolitan Life Insurance Company.

Henry Moir has become President of the United States Life Insurance Company, New York City.

Victor Montgomery formerly Actuary of the California Insurance Department is now Secretary of the Pacific Employers Insurance Company of Los Angeles.

G. D. Moore has been advanced from Actuary to Assistant Secretary and Actuary of the Royal Indemnity Company.

Ray D. Murphy has become 2nd Vice-President and Associate Actuary of the Equitable Life Assurance Society.

L. D. Cavanaugh has been advanced to Vice-President and Actuary of the Federal Life Insurance Company, Chicago.

Joseph P. Gibson, Jr., is now Actuary of the Security Mutual Casualty Company of Chicago.

William F. Poorman has been advanced to Actuary of the Farmers National Life Insurance Co.

William F. Roeber has accepted a position with the Actuarial Department of the National Council on Compensation Insurance.

Arthur B. Upshur has resigned his position with the Virginia Insurance Department and is now Actuary of the Home Beneficial Association of Richmond, Va.

S. B. Perkins has been advanced to Assistant Secretary of the Travelers Insurance Company.

A. B. Wood has been advanced to Vice-President and Actuary of the Sun Life Assurance Company, Montreal, Canada.

E. E. Cammack, Actuary of the Aetna Life Insurance Company has been made a Vice-President of the company.

John M. Laird, heretofore Actuary of the Connecticut General Life Insurance Company is now Secretary and Actuary of the company.

Lester D. Egbert has been elected to membership on the board of directors of Brown, Crosby & Company Inc.

ABSTRACT FROM THE MINUTES OF THE TENTH ANNUAL MEETING, NOVEMBER 16, 1923.

The tenth annual and twenty-first regular meeting of the Casualty Actuarial Society was held at the Hotel Pennsylvania, New York, on Friday, November 16, 1923.

President Ryan called the meeting to order at 10.30 A.M. The roll was called showing the following thirty-nine Fellows and eighteen Associates present:

FELLOWS

BLANCHARD	HAMMOND	OUTWATER
BUDLONG	JACKSON, C. W.	PERKINS
CAMMACK	KIRKPATRICK	PINNEY
CRAIG, J. D.	LAIRD	RIEGEL
DEKAY	LANDIS	ROEBER
DORWEILER	LESLIE	RUBINOW
DUNLAP	LITTLE	RYAN
FONDILLER	MCMANUS	SENIOR
GOULD	MADDRILL	SMITH, C. G.
GRAHAM, T. B.	MAYCRINK	TARBELL
GRAHAM, W. J.	MELTZER	VAN TUYL
GRANVILLE	MOIR	WOODWARD
GREENE	OTIS	YOUNG, C. N.

ASSOCIATES

ACKERMAN	DAVIS, E. M.	HULL
AULT	EGLI	LINDER
BARBER	FLEMING	MATTHEWS
BLACK, N. C.	GILDEA	MONTGOMERY, J. C.
COMSTOCK	GINSBURGH	PIKE
CONSTABLE	GRAHAM, C. M.	SMITH, A. G.

President Ryan read his presidential address.

The minutes of the meeting held May 25, 1923, were approved as printed in the *Proceedings*.

The Secretary-Treasurer read the report of the Council and upon motion, it was adopted by the Society. Arthur Sawyer had been enrolled as an Associate without examination. Diplomas

had been sent to D. R. McClurg and W. F. Roeber who had been admitted as Fellows under the 1923 examinations.

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

D. R. McCLURG W. F. ROEBER

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

G. E. AULT
A. C. DARKOW (MISS)
E. M. DAVIS (MISS)
L. L. FITZ
F. A. FLEMING
J. F. GILDEA
C. J. HAUGH, JR.
J. LINDER
A. N. MATTHEWS
K. STOKE
D. WETHERALD (MISS)

The reports of the Secretary-Treasurer, the Editor and the Librarian were read and accepted.

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

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

1923 EXAMINATIONS—SUCCESSFUL CANDIDATES

The following is a list of those who passed the examinations held by the Society on May 2nd and 3rd, 1923:

ASSOCIATESHIP—PART I

BUGBEE, J. M.
CAMERON, J. L.
DAVIS, E. M. (MISS)
GILDEA, J. F.
HALL, LAWRENCE L.
HAUGH, JR., C. J.
LINDER, J.
MATTHEWS, A. N.
STOKE, K.

ASSOCIATESHIP—PART II

AULT, G. E.
DARKOW, A. C. (MISS)
DAVIS, E. M. (MISS)
FITZ, L. L.
FLEMING, F. A.
HAUGH, JR., C. J.
LINDER, J.
MATTHEWS, A. N.
STOKE, K.
WETHERALD, D. (MISS)

FELLOWSHIP—PART I

McCLURG, D. R.
MICHENER, S. M.
POORMAN, W. F.
POWELL, J. M.
ROEBER, W. F.

FELLOWSHIP—PART II

COMSTOCK, W. P.
McCLURG, D. R.
ROEBER, W. F.

The annual elections were then held and the following officers and members of the Council were declared elected.

President.....WILLIAM LESLIE
Vice-President.....G. F. MICHELBACHER
Vice-President.....EDMUND E. CAMMACK
Secretary-Treasurer.....RICHARD FONDILLER
Editor.....OLIVE E. OUTWATER
Librarian.....EDWARD R. HARDY
Members of Council (terms expire 1926) { RALPH H. BLANCHARD, JAMES D. CRAIG, THOMAS F. TARBELL

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

Upon request of the President, Dr. I. M. Rubinow, the first President of the Society, gave an interesting talk to the members. During the four years he had been in Palestine it had been both his pleasure and his duty to solve many medical and sanitary problems.

Recess was taken until 2 P.M.

By invitation of the President, Dr. W. A. Granville, Educational Director, U. S. National Life and Casualty Company, spoke on "Insurance Education as a Means of Reducing Agency Turnover." Mr. Leslie Vickers, Director of Research, National Industrial Conference Board, spoke on "The Use of Statistical Data in the Solution of Industrial Problems."

The papers printed in this Number were read or presented.

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

Upon motion, the meeting adjourned at 5 P.M.

CASUALTY ACTUARIAL SOCIETY

THE COUNCIL

**Officers:* WILLIAM LESLIE.....*President*
G. F. MICHELBACHER.....*Vice-President*
EDMUND E. CAMMACK.....*Vice-President*
RICHARD FONDILLER.....*Secretary-Treasurer*
OLIVE E. OUTWATER.....*Editor*
EDWARD R. HARDY.....*Librarian*

†Ex-Presidents: BENEDICT D. FLYNN.....1924
ALBERT H. MOWBRAY.....1926
HARWOOD E. RYAN.....1927

†Ex-Vice-Presidents: GEORGE D. MOORE.....1924
LEON S. SENIOR.....1926

†Elected: A. L. KIRKPATRICK.....1924
EVERETT S. FALLOW.....1924
HENRY MOIR.....1924
SANFORD B. PERKINS.....1925
WINFIELD W. GREENE.....1925
JOHN M. LAIRD.....1925
RALPH H. BLANCHARD.....1926
JAMES D. CRAIG.....1926
THOMAS F. TARBELL.....1926

*Terms expire at the annual meeting in November, 1924.
†Terms expire at the annual meeting in November of the year given.

COMMITTEE ON ADMISSIONS

Benedict D. Flynn, *Chairman*

S. Bruce Black — Joseph H. Woodward

AUDITING COMMITTEE

Charles E. Heath, *Chairman*

James Morrison — A. R. Lawrence

EDITORIAL COMMITTEE

Olive E. Outwater, *Chairman, ex-officio*

Associate Editors

Ralph H. Blanchard — William N. Magoun

EDUCATIONAL COMMITTEE

Edwin W. Kopf, *Chairman*

William Breiby — Edmund S. Cogswell
Ralph H. Blanchard — Albert H. Mowbray
Edward R. Hardy — Thomas F. Tarbell
George D. Moore — Robert J. McManus

EXAMINATION COMMITTEE

Paul Dorweiler, *General Chairman*

Associateship

Frank R. Mullaney, *Chairman*
Alan W. Waite
Emma C. Maycrink

Fellowship

James S. Elston, *Chairman*
James D. Maddrill
Charles N. Young

COMMITTEE ON PAPERS

Joseph H. Woodward, *Chairman*

Charles G. Smith — G. F. Michelbacher

Olive E. Outwater, *ex-officio*

COMMITTEE ON PROGRAM

Sanford B. Perkins, *Chairman*

Winfield W. Greene — John M. Laird

VOL. X, PART II. NO. 22.

PROCEEDINGS

MAY 23, 1924

THE PRESENT OUTLOOK FOR CASUALTY ACTUARIAL SCIENCE

PRESIDENTIAL ADDRESS, WILLIAM LESLIE

In this, the tenth year of our organized existence, it may not be amiss to pause a moment and reflect upon the developments which have taken place in casualty actuarial science, particularly to note what those developments indicate as to the future of the casualty actuary. The older members of the Society have often undoubtedly indulged in such reflections and have perhaps at such times been extremely pessimistic about the future. My own thoughts, for what they may be worth, are primarily intended for our younger members—those who have not become case-hardened to the flippant criticism of actuaries and actuarial methods and who may be inclined to let such criticism impair their future usefulness. And let me hasten to add that to my way of thinking the opportunity for men and women properly trained in the fundamentals of casualty actuarial science was never greater than it is today and will be for some time to come.

At the time this Society was organized, compensation insurance was still a novelty in this country. It has been said, and quite properly, that our very existence was due to the necessities imposed by compensation insurance. In the beginning our meetings were devoted almost exclusively to compensation problems and even today the accent is heavier on the compensation end of casualty insurance than on any other. If my remarks, therefore, are directed primarily to this phase of the casualty actuarial field, it must be attributed to the fact that it is in the application of our science to compensation insurance that we have had the most experience and hence from it we can draw the most reliable deductions as to the future.

If we look back through the various issues of our Proceedings and note merely the titles of the papers that have been presented,

we may be inclined to think that little or no progress has been made in our field of endeavor. In the first volume, for example, there appear papers on such topics as "Scientific Methods of Computing Compensation Rates" and "How Extensive a Payroll Exposure is Necessary to Give a Dependable Pure Premium." To some of us who come in daily contact with the subjects described by these titles and who therefore see how far we still are from perfection, it may appear that the problems which were before us ten years ago are no nearer a solution today than they were then. But one has only to read the contents of those early volumes of the Proceedings to appreciate the substantial progress that has been made in the fundamentals of our profession. The story which they tell is an interesting one. We seem to have traveled a road with many forks. From the beginning we have understood our ultimate goal and we are still trying to keep on the main road which leads to it. But we not infrequently get off on one of the many branch roads which necessitates retracing our steps and making a fresh start. But each such start is from a point which is nearer our final destination. Even though it be true that the character of casualty insurance is such that we can never make our science as stable as life actuarial science has become, we can hope at least that the mathematical series which our progress seems to resemble will continue to be as highly convergent in the future as in the past.

It has been sometimes said that the most important function of the actuary is to make a little information go a long way. In other words, by a proper analysis of a very limited volume of data, the actuary should be able to fill in the gaps and produce a representative series which should serve as a reasonable basis for predictions of the future. Certain it is that in the early days of our Society we had but little information and there was plenty of opportunity to demonstrate the utility of actuarial science in accordance with this conception. History records the many valiant struggles that have taken place between actuarial theory on the one hand and underwriting judgment on the other in the development of rates from limited statistical bases. But at an early date, sound plans were laid for the accumulation of adequate data, for at least the most obvious problems. Now there is one thing upon which there seems to be no dispute at the present time and that is that a great many accidents occur under work-

men's compensation policies. In fact too many. In consequence the nature of many of our most important actuarial problems has undergone a complete change. We are now confronted with the task of digesting a large volume of data and determining what relation it has to the expectations of the future. In addition to the ordinary statistical problems that are involved in such an undertaking, we are confronted with all the intricacies and complications that arise out of the terms in which our experience data are recorded. In compensation insurance the exposure is expressed in terms of payroll and, for some purposes, in the even cruder manner of premium; the number of occurrences is given by broad divisions of injury, but the severity within such divisions is expressed as a monetary amount, which reflects the severity in terms only of the benefit provisions of a particular law, applied to the particular case upon a particular weekly rate of wages. When it is realized that rates are made for classifications of industry that contain within themselves elements of wide variability; that accident rates, severity rates and wage levels are themselves variable; that compensation laws are constantly being amended and that medical and hospital costs depend upon the provisions of the law, the nature of the injury, and, most important, the charges of the surgeons and hospitals, there are at least two things that immediately stand out: First, that it is small wonder that greater progress has not been made in putting compensation rate making upon a permanently satisfactory basis. Second, that the actuary is probably more indispensable today than he ever was in the past.

A great many of the problems which occupied our time and consideration in the early days have, as one would expect, been relegated to the role of actuarial routine. We have accepted certain methods as standard and except for occassional refinements in the interest of greater accuracy or for short cuts which are found to produce equally satisfactory results, the procedure remains unchanged. But there are plenty of problems awaiting solution by the actuary. Some of these are of an essentially practical nature, that is, they are definitely involved in our present rate making procedure and their ultimate solution is highly probable because of that very fact. Others are of a more theoretical nature and involve researches that may in the end lead to nothing of practical value. Some of these problems will

undoubtedly be discussed in one of the papers to be delivered this morning and therefore I will not take the time to enumerate them. But there is one that is so appealing to the imagination and that has such potentialities that I cannot refrain from mentioning it, if for no other purpose than emphasis. It is the problem of relating the rise and fall of compensation costs with the standard index numbers for certain economic phenomena, in an effort to construct a barometer of compensation cost. The problem is not a new one. It has been before us for many years. Efforts have been put forth to reach a solution but despite the studies that have been made and the theories that have been tested, it would seem that up to the present it remains on the whole an unsolved problem. The surface appearance of intimate relationship between compensation insurance costs on the one hand and general social and economic conditions on the other, make it seem quite certain that there is some underlying casual relation between them. We already know that variations in wage levels affect compensation cost. There is good reason to believe that both accident rates and severity rates vary with industrial conditions. The problem is therefore mainly one of correlating accident and severity rates with standard index numbers which measure changes in industrial conditions. Anyone sufficiently interested to study the problem in more detail, will readily discover the obstacles which arise to confound him who seeks a solution. But in this we may well demonstrate our fitness to belong to a scientific body by eternally keeping after the thing until the answer is obtained. For the answer is of vital importance to our business. Whether we are exponents of the school that would make each year's rates reflect as nearly as possible the conditions of cost expected to prevail in that year or of the school that would have the rates reproduce an average period of the past, or whether or not we believe that in view of practical considerations such a barometer could be used in fixing future levels of costs, the information which it would furnish would be of tremendous value to every company in the business. Our prime statistical deficiency today is the delay in obtaining dependable information respecting earned premiums and incurred losses. Our best efforts at improving this situation will still leave us quite a way behind the fact. But if we had some hint as to what the developed data would eventually show, based

upon the current trend of certain published economic and business indices, it would be possible for the carriers to immediately take such counteracting measures as they deemed necessary or were within their power.

This general relationship of compensation cost to industrial conditions, in the broadest sense of the term, is well demonstrated by the experience of the companies during and following the period of the war. Taking the five year period covered by policy years 1918 to 1922 inclusive, we find an extremely marked variation in loss ratios even when computed upon the same manual rates, the same law and, as nearly as can be estimated, the same level of wages. The experience of the three earlier years was generally favorable and of the two latter unfavorable, that of 1922 being for most states worse than that of 1921. If a compensation cost barometer had been available it is not at all certain that it would have indicated at the time of the 1920 rate revision the impropriety of the proposed rate level for the conditions experienced under policies issued in 1921, but it would certainly have caused an earlier review to have been made of the rates for many states.

The great difficulty which is experienced in delving into the field of theoretical problems which either cannot be demonstrated in advance to be both definite of solution and of utilitarian value, is that of obtaining the necessary data with which to experiment and the financial support for the undertaking. But this condition is not unique in the casualty actuarial field. It exists in almost every other branch of applied science. And by and large, the casualty companies have contributed rather generously in their support of our endeavors to develop systematic methods of rate making. One hears a certain amount of complaint about the complications of the rate making procedure and from time immemorial the actuary has been criticized for being too theoretical. As sufferers of long standing we have learned to accept with a degree of equanimity both the complaint and criticism. But we should be extremely careful to guard against an attitude of indifference, particularly in the matter of the complaint against complexity in rate making. It should be our constant endeavor to make our results readily comprehensible to company executives and underwriters as well as to the supervising officials and the insuring public. Greater care in this direction will

be beneficial both to the business as a whole and to the actuary himself. To accomplish this end it is not necessary to sacrifice correct rate making procedure upon the altar of simplicity but rather to separate our results from their technical details to the fullest extent possible and to use language and forms of expression that are understood by our audience.

The point of these rather general and certainly rambling observations is simply this: There are tremendous opportunities for new discoveries and developments through the application of statistical and actuarial methods in the compensation field even after ten years of intensive study and investigation and what is true in this field will also apply to a large extent to the other branches of casualty insurance. Whatever the surface criticism of the actuary may be, there is not an intelligent man in the business who, deep down in his heart, does not recognize that the actuary is essential to the successful conduct of the business. The actuary, therefore, may look forward with confidence to the continued support of his work on the part of the companies and may even be spurred on to greater accomplishments through the urge of utter necessity brought on by such conditions as those through which the business is now going.

But in addition to these opportunities in what we usually recognize as the true sphere of casualty actuarial science, there are other prospects for the young man who trains for an actuarial career. When the Society was first organized the life actuaries and casualty statisticians engaged in casualty work were almost without exception untrained in any of the practical underwriting features of the business. On the other hand, the company underwriters were in general equally untrained in the statistical methods pursued by the actuary. Hence the frequent clashes between the two groups. But during the past ten years the gap between the actuaries and the underwriters has narrowed materially. The actuaries have learned much from the underwriters and, let us hope the underwriters have learned much from the actuaries. Despite the fact that there are times when the two groups seem as far apart as ever, they are consciously or unconsciously really growing closer together. If you stop to consider that, divorced from its technical feature, our science is fundamentally nothing more than the application of a scientific method of approach to casualty insurance problems, you must

readily admit that an underwriter who is trained to reason from cause to effect and who understands the casualty business generally will be as well qualified to analyze the meaning of statistical compilations as is the actuary. This is true even though the underwriter might be unable to devise a statistical system or to compute a law differential; even though he might be unable to graduate a disability table or work a problem in calculus or the theory of probabilities. If he has learned to understand and apply the scientific method of reasoning, he will replace guess and hunch by proper analysis and to that extent will tread on common ground with the actuary. On the other hand, the actuary who has come in contact with the practical side of the business and who has been graced with what we call "horse sense", will know where to draw the line between theory and practice. The practical actuary and the logically minded underwriter should have no trouble getting along together but the theoretical actuary and the illogically minded underwriter had better keep away from each other.

Now this tendency for the actuaries and underwriters to grow closer together will be accentuated in the future by the fact that young men in company offices have ambitions to learn as much about the business as they can. Not being burdened with the dignity of a title, even when connected with the underwriting department of the company, they can see the advantages of acquiring the rudiments of casualty actuarial science. Our published proceedings with their articles on all phases of the subject furnish these men with their opportunity. Whether they ever pass the examinations for admission, whether they ever expect to pass them is immaterial. They do acquire a broader concept of the fundamentals of the business and when they reach positions of responsibility in the underwriting departments they will be better able to grasp actuarial matters and to appreciate and accept the so-called scientific method of reasoning.

In addition to these young underwriters who study actuarial science, we must not overlook the actuaries or potential actuaries who become underwriters nor the mathematically trained engineers who become underwriters. In fact it seems to me that in the future the companies will more and more follow the course of taking into their underwriting departments young men who have had some training in statistical methods. I know that two

years ago when I was handling the insurance and statistical work at the University of California, the graduates who desired to enter the insurance business were snapped up by insurance offices, not in the capacity of actuaries but as potential underwriters and executives. The fact that these men had been trained in statistical methods and certain other fundamental subjects required of the actuary made them highly sought after. Here then would seem to be another opening for members of our Society. In fact just because it is called the Casualty Actuarial Society and because we require proficiency in the principles and applications of that science is no reason why we should not hope for the time to come when membership in our Society will be a stepping stone for promotion in the underwriting as well as the actuarial or statistical department of the company.

DETERMINATION OF ACQUISITION AND FIELD SUPERVISION COST BY LINES OF BUSINESS FOR CASUALTY INSURANCE

BY

THOMAS F. TARBELL

The adoption by the leading Stock Casualty Companies of rules regulating Acquisition and Field Supervision Cost which became effective in the early part of 1923*, and the consequent adoption by the Insurance Department of the State of New York of a new exhibit or statement designated as the "New York Casualty Experience Exhibit," has recently emphasized the importance of the subject of this paper.

The requirements of the Casualty Experience Exhibit referred to are familiar to most of the members of this Society, but for the benefit of those whose particular line of endeavor has not brought them in contact with this exhibit, I will state briefly the information called for.

The exhibit contains four parts:

Part I is an exhibit of a Company's Underwriting Results by lines of business on the incurred basis. It is substantially the same as the Underwriting Exhibit contained in the Convention Annual Statement Blank except that it calls for Underwriting Results by lines of business.

Part II is an exhibit of Premiums Earned, Commissions Incurred and Field Supervision Expense Incurred by lines of business. This exhibit is based upon direct business only, all reinsurance transactions either assumed or ceded being eliminated.

Part III is an exhibit of Premiums Earned and Losses Incurred on New York State risks on the Calendar Year basis for the past five years by lines of business.

Part IV is an exhibit of New York Compensation experience for the same period on a Policy Year basis. This last exhibit supersedes New York Schedule W.

NOTE: (*) See paper entitled "Rules Regarding Acquisition and Field Supervision Cost for Casualty Business", by G. F. Michelbacher, *Proceedings*, Vol. IX, Part II, Page 242.

The present paper is limited to a consideration of methods of determining Field Supervision Cost as called for by Part II of the Exhibit. The problem of the proper separation of all expense items entering into the Underwriting Results as required by Part I of the exhibit is of considerable importance but the general question of separation of administrative expense has received a good share of attention in our Proceedings recently and is therefore not treated specifically, although it is obvious that methods suggested as offering a solution to the problems of Part II will, in many instances, apply equally as well to the problems of Part I.

At the outset it should be recognized that the problem is to a considerable degree an individual one with each company. This is so because of differences in organization, operation and functions performed by Branch Offices; also because of different accounting methods. Consequently no set rules can be laid down which will apply without modification to all companies. For companies operating on the General Agency plan, the problem is comparatively simple as the total Production Cost consists, in most instances, of the Commissions paid the General Agent. It is a different proposition, however, in case of companies operating upon the Branch Office plan or the Direct Reporting Agency plan. Concerning the problem of companies operating on the Branch Office plan, it is necessary to give due consideration to the functions of the Branch Office, whether the Branch Office is engaged purely in business getting or performs in addition certain Home Office functions, foreign to Field Supervision, such as Accounting, Claim, Inspection and Payroll Audit.

For the purpose of this paper it is assumed that a company is operating on the Branch Office plan and that the Branch Office embraces both Field Supervision and Home Office functions. Further, it is assumed that the Branch Office, is, or may be divided into departments.

Commissions are not considered as the determination of this portion of Production Cost presents no material difficulties.

At this point it is appropriate to state that in the actual problem of determining Field Supervision Cost by lines of business, it seems essential that each Branch Office should be considered as a unit. This is for the reason that Branch Offices of the same company will vary considerably in certain details of organization and operation.

The departments assumed to be embraced in the Branch Office organizations are:

1. Underwriting
2. Policy Writing
3. Accounting
4. Payroll Audit
5. Claim
6. Inspection
7. Administration
8. General

Underwriting Departments are composed of all employees, other than those assigned to Administrative Department, hereinafter referred to, engaged in the actual production of business and the details of Branch Office underwriting. It is assumed that Underwriting Departments are more or less distinct units, *viz*: Accident and Health; Liability (including Compensation but excluding Automobile Liability); Automobile (all coverages); Burglary; Plate Glass, etc., although this condition will not always obtain in a small office.

Administrative Department embraces in its personnel the Manager, the Assistant Manager, if any, the Manager's and Assistant Manager's personal stenographers.

General Department† consists of Office Boys, Mail Clerks and any clerical employees whose duties are of a miscellaneous or general nature.

The other departments require no particular comments.

The various steps in the process of allocation of Field Supervision Cost by lines of business are:

First: Separation of Expenses by Accounts
Second: Allocation by Departments.
Third: Allocation by Line of Business.
Fourth: Division of Expense between Field Supervision and Non-Production Costs.

The separation of expenses by account presents no difficulty as such a separation is required for Annual Statement purposes and Ledger Accounts are maintained for all the various kinds of expense required.

In dealing with Field Supervision Cost, we are not required to use all accounts entering into the expense of a Branch Office as

NOTE: (†) This is not strictly speaking a Department but rather a collection of miscellaneous employees.

the Acquisition Cost Rules previously referred to define Field Supervision Cost thus:

"Field Supervision Cost shall mean the entire cost of conducting a General Agency or Branch Office. It shall include all commissions (except Acquisition Cost) all salaries, allowances, bonuses, prizes, rewards, rent and other items of expense incident to the conduct of such an agency or office, hereinafter specifically defined, but shall not include expenditures for taxes and governmental impositions, or expenditures actually made in good faith for the adjustment of claims, the making of inspections and payroll audits.

"Field Supervision Cost shall specifically include the following items:

1. Remuneration to General Agents, Branch Office Managers, Assistant Managers and Salaried Special Agents.
2. Traveling expenses of General Agents, Branch Office Managers, Assistant Managers and Salaried Special Agents.
3. The cost of policy-writing in Agencies and Branch Offices.
4. The cost of collection of premiums in Agencies and Branch Offices.
5. Rent, heat, light and maintenance of Agencies and Branch Offices.
6. Remuneration of clerical office force in Agencies and Branch Offices.
7. Exchange, advertising, postage, telephone, telegraph and express in Agencies and Branch Offices."

Therefore it appears that the accounts generally involved will be:

Salaries
Traveling
Rent
General Office Maintenance and Expense
Advertising
Printing and Stationery
Postage
Telephone and Telegraph
Exchange
Express
Furniture and Fixtures
Entertainment of Agents

There is some question as to the propriety or necessity of including Printing and Stationery and Furniture and Fixtures as a part of Field Supervision Cost. However, it is assumed for

the purposes of illustrating methods of distribution of expense that such accounts are included.

The sequence indicated above for breaking up and assigning items of expense, first allocating by departments and then by lines of business, is for general guidance and not a fixed rule. Wherever an item of expense can be allocated directly to a single line of business such direct allocation should be made, but the identification of such items by departments should be preserved for reasons to be hereinafter explained. That the larger the percentage of expense items allocated directly to lines of business the greater the degree of accuracy obtained, requires no proof.

Taking up the various accounts mentioned above, the following suggestions are offered with respect to each for allocation of expenses by departments (or lines, where direct allocation to lines can be made):

Salaries: Charge each employee's salary to the department (or line) in which that person is employed. If an employee's duties involve two or more departments, make a division based on the time spent in each department. Such a division of time spent should be based upon a time test covering a sufficient period to give substantially accurate results and with due regard to seasonal variations among the various lines. The basis of division should also be tested periodically, at least quarterly, and the percentages revised.

Traveling: Traveling expense should be allocated on the same basis as Salaries, charging the expense to the department (or line) in which the employee incurring the expense is engaged.

Rents: The allocation of Rents should be based upon the floor area (in square feet) occupied by the various departments and accurate measurements should be made. Ratios should be revised each time space is vacated or additional space occupied.

General Office Maintenance and Expense: This account includes gas, electric light service, water, ice, janitor's salary and supplies, soap, towels, cleaning, etc. The allocation of this expense presents some difficulty but it seems entirely reasonable to allocate it between departments by using the percentages developed for allocation of rent.

Advertising: It is difficult to lay down any general rules for the allocation of this item for the reason that advertising practice

and policy will vary materially in the various companies. This expense will usually be charged against Underwriting Departments and will apply: to individual lines, to departments, or to all lines. Expense items chargeable to individual lines should be so allocated, that chargeable to departments should be allocated to individual lines on the basis of the premium volume ratios for the lines affected and that chargeable to all lines should be allocated to the individual lines on the basis of the premium volume ratios for all lines.

Printing and Stationery: So far as possible, allocate each item of expense to the department or line of business incurring the expense. Allocate the balance of such expense to departments on the basis of the ratios of the number of employees in each department to the total number of employees in the office.

Postage: This relatively unimportant item is unquestionably a difficult one to deal with on an equitable basis. The writer suggests that the expense be allocated to departments on ratios determined by a tally of outgoing mail items (letters, notices, bills, etc.) by departments over a period of one month or more. In making such tally, however, all bills or premium notices sent out by the Accounting Department should be charged to the respective Underwriting Departments having jurisdiction over the line or lines of business. Unless the period selected is a normal one, a certain amount of weighting will be necessary to eliminate the effect of seasonal variations in some of the lines.

Telephone and Telegraph: Telephone service should be allocated to departments on the ratios of the number of desk 'phones in each department to the total number of desk 'phones. Long distance and toll line calls and telegrams should be charged to the department incurring the expense.

Exchange: This account will usually represent only exchange on checks and drafts. It should be charged to Accounting Department.

Express: This account will include express, freight, cartage and moving. Items should be charged wherever possible to the department incurring the expense. If the item is of a general nature and applies indirectly to all departments, allocate to departments using the ratios of the number of employees of each department to the total number of employees.

Furniture and Fixtures: The difficulties encountered in making a reasonable allocation of this class of expense have been clearly brought out in previous papers presented to the Society and are generally recognized. In case of allocating Branch Office expense the difficulties are not of such consequence as in case of Home Office expense for the reason that in a smaller unit such as the Branch Office there is not an appreciable amount of shifting of furniture between departments. The following general rules would appear to be reasonable: charge items wherever possible to the departments for which the furniture, fixtures, etc., are purchased. Equipment purchased for Managers, Assistant Managers, if any, and their Stenographers should be charged to Administrative Department. That purchased for Office Boys and other miscellaneous clerical employees should be charged to General Department. Articles purchased for general use, apportion charge to departments using the ratios of the number of employees of each department to the total number of employees

Entertainment of Agents: This is an Underwriting Department expense and should be charged to specific departments or to all lines depending upon whether the Agents on account of whom the expense is incurred represent the lines of a certain department, or departments, or all lines. The expense should be allocated to individual lines on a premium volume basis.

If the allocation is carried out along the lines above indicated, we will have expenses segregated by departments, each department's expense falling into two sub-divisions:

a. Department expense allocated to specific lines and/or
b. Department expense not allocated.

The next step in the allocation is the separation of the unallocated department expenses by lines.* Departments involving Field Supervision Cost in whole or in part only need be considered. These are as follows:

Underwriting
Policy Writing
Accounting
Administrative
General.

Underwriting Departments: These departments will be individual line (such as Burglary and Plate Glass) or multiple line

NOTE: (*) In actual practice both steps in the process of allocation will be made at the same time.

(such as Accident and Health, Liability and Compensation, Automobile, Fidelty and Surety, etc.).

In case of a single line Underwriting Department, no further allocation is necessary as the allocation by department automatically produces the allocation by line. In separating expenses by lines for the multiple line Underwriting Departments as well as for the Non-Underwriting Departments, it is desirable, if possible to adopt a uniform method as the greater the number of formulae and refinements the greater the accounting expense in connection with the allocation. The simplest and least expensive method is according to premium volume. This method has been severely condemned by all writers on the subject of allocation of Home Office, or Administrative, expense and the objections that make it unsuitable for this purpose apply to some extent in considering its adaptability to the allocation of Branch Office expense. The conditions are, however, somewhat different. In case of Branch Office expense, the effort and expense in obtaining the business is unquestionably to some degree proportional to the premium involved—this is best illustrated by the direct compensation to the producing agent in the form of commission. It seems reasonable therefore to give some weight to premium volume in making the line of business allocation. There are, however, certain clerical operations not materially affected by the amount of premium and which, as respects the line of business involved, vary according to the number of items handled or according to the number of items handled weighted to give effect to differences in time cost.

If it were possible to really determine what proportion of the expense was to be distributed by lines according to premium volume and what proportion according to items handled, the problem would be considerably simplified. However, such a separation is not practicable. Further, the determining of relative cost of handling items is attended with many intricate problems, such as the case of Public Liability written concurrently with Compensation or Employers Liability and Automobile policies involving Liability (the basic coverage), Property Damage and Collision. The correct solution of such intricate problems, if attainable, would unquestionably involve a prohibitive amount of expense. It is therefore necessary to make a more or less arbitrary assumption and that suggested by the writer is to

assume that the relative cost of Underwriting Department expense between lines will be fairly distributed on the basis of the mean ratios of premium volume and risks handled, treating each coverage (in policies involving more than one coverage) as a separate risk. This basis has been tested out and found to produce results that appear reasonable.

Non-Underwriting Departments: The writer also believes that the last mentioned basis can be followed in distributing the Non-Underwriting departments (Policy Writing, Accounting, Administrative and General†) expense, with satisfactory results. In case of Policy Writing, the best method of allocation by lines is undoubtedly one based upon the relative time cost of writing the various forms of policies, but it is believed that the results obtained by this method would not vary to any great extent from the results obtained by the basis suggested and would not affect the approximate correctness of the total Branch Office expense by lines, particularly as the total Policy Writing Department expense forms only a small percentage of the total expense. The advantage of applying a uniform method of allocation of both Underwriting and Non-Underwriting departments expense by lines will justify the adoption of the most practical rather than the most theoretically correct method where the results obtained will differ to no material extent.

When the allocation of expense has been completed by departments and by lines, for the accounts considered, the final step is the determining of how much of the expense falls under Field Supervision Cost and how much under non-production cost. The conditions of the problem, as pointed out previously in this paper, will vary with different companies and accordingly any discussion must be along broad and general lines.

The various departments are considered in order:

Underwriting Departments: In general the total cost of each Underwriting Department will be chargeable to Field Supervision. There is a tendency, however, in companies operating Branch Offices in large cities to transfer Home Office Underwriting functions for certain lines, particularly Automobile, to the Branch and place a Home Office Underwriter in the Branch. Where this condition exists, due allowance should be made in determining

NOTE: (†) The method obviously does not apply to such departments as Payroll Audit Claim and Inspection.

Field Supervision Cost and it is suggested that an equitable basis of splitting the cost would be to compute the ratio of the salary of the Home Office Underwriter to the total salaries of the department and apply the resulting percentage to the total amount of the expense for the accounts considered. The product thus determined produces the non-production cost portion and the balance constitutes the Field Supervision Cost portion.

Policy Writing Department: The total cost of the Policy Writing Department should be charged to Field Supervision.

Accounting Department: The proper allocation of the expense of this department between Field Supervision and non-production expense requires careful study. In nearly every Branch Office certain Home Office accounting functions will be performed and it is necessary to make a separation which will reflect approximately the proper proportions of Field Supervision and non-production expense. The method suggested by the writer is briefly as follows: First analyze the duties of each employee to determine how many clerks or what proportion of a clerk each operation (Cash Book, Paid Premium Reports, Written Premium Journal, Paid Premium Journal, Agents Ledger, Collections, Billing, etc.) requires; second, analyze each operation to determine whether it is a Field Supervision or non-production cost operation; third, find the ratios of the number of Field Supervision cost operation clerks and the number of non-production operation clerks to the total number of clerks. These ratios furnish the basis of splitting the total department expense between Field Supervision and non-production costs.

In lieu of using the number (or fractional parts) of clerks, a salary cost basis might be employed. Such a basis would probably produce somewhat more accurate results but is more dfficult to operate as salaries change more rapidly than the number, or duties, of employees. The ratios should be revised at rather frequent intervals, preferably quarterly but at least semi-annually.

In analyzing to determine which are Field Supervision operations and which are non-production, or Home Office, operations, it will be of assistance in properly placing some of the doubtful operations to consider whether or not a General Agent would be subject to the expense of the particular operation. If the answer is in the affirmative, the operation is a Field Supervision one.

Administrative Department: If the time of the Manager is entirely devoted to business producing efforts, the total expenses of this department should be charged to Field Supervision Cost. If, however, the Manager devotes only a part of his time to business producing and spends the balance in supervising the general operations of all departments of the Branch Office, only a part of the total expense should be charged to Field Supervision Cost. To determine the proportions of cost to be charged to Field Supervision and non-production, time tests should be made extending over a period of one month or more. The best method is to have the Manager indicate on a small card at the end of each day the approximate number of hours devoted to business producing and general administrative duties respectively. At the end of the period, the data is drawn off the cards and the percentages computed.

General Department: The total expense incurred by this Department (or Group) will be relatively small. It is suggested that the separation of the expense between Field Supervision and non-production cost be made as follows: Combine the total Field Supervision Expense for all departments mentioned above, also combine the total non-production expense for the above departments and for all other departments embraced in the Branch Office except General Department. Determine the ratios of each expense (Field Supervision and non-production) to the total expense and use these ratios to separate the General Department expense.

Conclusion

The subject of expense allocation by lines of business, particularly as it affects multiple line Casualty Companies involves many perplexing problems for the reason that this business does not readily lend itself to accurate cost finding by lines. Due to differences in organization and administration the problems encountered in the various companies are not identical and their solution is, to a considerable degree, an individual matter with each company. While some progress has been made, there is still much ground to be covered.

We have had some valuable and constructive papers on the general subject of Casualty Insurance Expense Allocation pre-

sented to our Society, but to date very little has been written on the subject of the separation of Branch Office expenses between Field Supervision and non-production costs. The writer feels that the importance of this feature of insurance accounting justifies his pioneering efforts. He appreciates that the suggestions and recommendations offered are not as comprehensive as could be desired. He is hopeful, however, that his suggestions and recommendations will encourage further thought and discussion on the part of those interested and result in worthwhile contributions toward the solution of the many problems involved.

Some of the methods suggested have been tried out in practice, others are purely theoretical and have not as yet been put to the test.

A natural criticism of the writer's suggestions and recommendations is the amount of labor involved in arriving at the results. On this point, the writer feels most strongly that any system of expense allocation by lines of business and separation of Field Supervision and non-production expense intended to produce substantially accurate results must, in the case of a multiple line Casualty Company, involve a very considerable amount of labor and expense.

SOME RANDOM THOUGHTS CONCERNING FIRE INSURANCE

IS A STATISTICAL BASIS FOR RATING POSSIBLE?

BY

EDWARD R. HARDY

As you sail from the port of New York for a distant shore in due course of time the captain will take his departure from Ambrose Light. That point marks the beginning of the voyage and to that point the progress of the voyage will be related. I propose to emulate this practice of the mariner and take a starting point. I wish to remind you, however, that we may not return to this point and there may be times when as I proceed you will think I have forgotten it altogether. I think I shall have to improve upon the mariner's practice (if it can be improved upon) and have two points of departure. The first of these is embraced in the definition of an Actuary and the second in a definition of Science. For the definition of an Actuary, I believe the following from an address by Mr. Geoffrey Marks before the Institute of Actuaries on December 21, 1923, is excellent.

"What is an Actuary? The best dictionary definition which I know is in Murray's Oxford Dictionary, quoted in the *Journal* (Vol. XXXVI, page 389):

> "An official in an Insurance Office, whose duty it is to compile statistical tables of mortality and estimate therefrom the necessary rates of premium, etc., or one whose profession it is to solve for Insurance Companies or the public all monetary questions that involve a consideration of the separate or combined effect of interest and probability in connection with the duration of human life, the average proportion of losses due to fire or other accidents, etc."

My own definition would be rather more general:

> "One whose profession it is to devise means to solve all questions involving the application of the theory of probability to human affairs, whether in conjunction with the rate of interest or not, and to apply them to the solution of practical problems."

This definition is intentionally wide, and the ideal which it presents is probably impossible of attainment by any human

being. It implies a depth and breadth of knowledge to acquire which would leave no time or room for the practical experience of men and affairs, without which the practising Actuary at least is little or nothing worth.

As a former President said,—"An Actuary should be a man of general culture, with a knowledge both of books and men, and the more he has of both, the better." In this I heartily concur, but in the same paper the President committed himself to the definition of an Actuary as a "Scientific Financier," and in this, as things were then and are at present, I can hardly follow him. The description might serve to satisfy the lukewarm interest of one's neighbor at dinner, and has, in fact, been useful in that connection, but as a practical definition it seems to me to exaggerate in one direction the possibilities of our training, while limiting them in others.

So much for the Actuary—now for Science!

My first definition is from the "Meaning of Education" by Nicholas Murray Butler, President of Columbia University, 1917, page 6 of the Introduction:

"It is sometimes hastily objected that the attempt to formulate a scientific study of education is impossible. This objection rests upon a misunderstanding as to what a science is. Science is wholly a matter of method; it is knowledge classified and nothing more. The knowledge so classified may be knowledge of plants, or of heavenly bodies, or of the human body, or of forms of government, or of education, or of anything else in the known world of relations and related objects. Only the sciences based on mathematics are exact or lay claim to exactness; all others are descriptive only, and wider experience or further observation may modify their conclusions at any time. A science of education is analogous to a science of medicine. Both are built upon a group of ancillary sciences, and both arrive at conclusions that are only working hypotheses. With normal children, as with normal patients, these hypotheses, based as they are upon wide experience, require little or no modification; in abnormal cases, however, they must be modified or sometimes even abandoned. Neither medicine nor education makes any pretense to exactness."

The second is by Sir William Ramsay, President of the British Association in 1911 who said,—

"The definition of science in this, as in other connections, is simply the acquisition of knowledge and orderly reasoning on

experience already gained and on experience capable of being carried out so as to forecast and control the course of events, and if possible, to apply this knowledge to the benefit of the human race."

The speaker was dealing with the great fundamental truths of science. Yet I could take that definition and by substituting "insurance" for "science" make a perfect adaptation of it to what, through experience and education, we are attempting to do. Let us try it. "The definition of insurance in this, as in other connections, is simply the acquisition of knowledge and orderly reasoning on experience already gained and on experience capable of being carried out so as to forecast and control the course of events and, if possible, to apply this knowledge to the benefit of the human race." It is possible that these many points of departure may confuse, but I hope not.

The business of Fire Insurance (because I am treating it as such) had its commercial origin shortly after the Great Fire of London in 1666. All the research devoted to the question prior to that time has not brought to light instances where Fire Insurance was practiced on a commercial basis as it is today. From that Great Fire, however, it has grown until today it is among all civilized nations an accepted device for the prevention of an undue loss to an individual from the accident of fire. The growth was not rapid and indeed up to 125 years ago the fact that a property when destroyed by fire was protected by insurance was noted in the newspapers as an item of interest. That phase long ago passed away and today it would be a news item if property destroyed by fire was not protected by a policy of Fire Insurance.

The question of primary interest which I propose, however, to discuss in this paper, is not the historical aspect, but the question of the rate. How do you suppose the first man who sold a policy made his rate? He had no experience of insured property to go by, and if he had any statistics dealing with incidence of fire, they must have been rather unsatisfactory. So far as we know, but little if any attention was given to the statistical aspect of the business for the first half century. The following facts we do know:

The first policy issued covered buildings only and there were two rates, one for buildings of wood construction and the other

for stone or brick. When contents were first insured they took the same rate as the building, thus, if the property was contained in a wooden building, the contents took the rate of a wooden building; if in a brick or stone they took the rate of brick or stone. At the close of the first half century, or near thereto, the first system of classification was devised and it may be worthy of note in passing that it is still in use in many parts of the world. By that time there was actual experience with fires in insured properties, and observations alone without any attempt to collect the exact data must have led to the conclusion that properties which were occupied for certain purposes were more liable to have a fire than others. A system of classification consisting of three divisions was therefore devised and these were respectively, Common Insurance, Hazardous Insurance and Extra Hazardous Insurance. These were later (and not so very much later either) expanded into a five-fold class by putting a half class between the first and second, and between the second and third.

The next advance in the system of classification was the development of a class which was known as Specially Hazardous and while it was customary to furnish the rates for the first five classes, indeed in England they printed them on the policy, those that were considered as Specially Hazardous were subject to a survey and rating. Generally a provision was attached that the rates should not be less than a certain amount, in addition to the building rate. Now, this system of rating, which I repeat is in use in many parts of the world today, apparently sufficed for over one hundred years without much change, excepting as a business might be shifted from one class to another, according as experience showed it to be better or worse.

The development of large business enterprises did not take place until steam was adopted for manufacturing use. That adaptation changed Insurance as well as many other things.

The real problem of rating apparently began with the increase in the size of properties, used both for mercantile and manufacturing purposes and with the development or, rather, the increased use of the art of chemistry in connection with manufacturing operations. In other words, schedule rating followed as a means of computing the rate of Insurance and it is doubtful if it would have ever been necessary to adopt it had it not been for the increasing size of properties devoted to business purposes.

In a sense, schedule rating always applied in the business because the fact that there were two rates in the beginning was, in effect, a form of schedule rating; that is, there never was a time when all properties were insured against loss by fire for the same price per unit.

Schedule Rating

That form of rate making which is known by the general name of "Schedule Rating" (if we choose to consider that the forms mentioned were methods of rating by classes rather than schedule) began as early as 1842, and I have with me a reproduction of the schedule that was developed in Manchester, England for the rating of cotton mills. It covers but one side of a page, but from its beginning to the present time it illustrates very well the changes that have taken place in schedule rating. I am told that the schedule for this class of properties now takes up some eight pages of printed matter and is not at all the simple, clean-cut affair which was the distinguishing feature of the first schedule. The merits of schedule rating are set forth, with its distinctive features, by Mr. Willis O. Robb, Manager of the New York Fire Insurance Exchange, in the following words:

"Now, the most powerful and steadily operating of all existing forces for the reduction of the fire waste is the practically universal prevalence of the so-called schedule method of building fire insurance rates. That method, by assuming a basis or key rate, which is itself determined by the known fire loss experience of the territory or the class of risks dealt with, and by adding numerous though, considered singly, rather small charges for special defects of construction, protection, segregation of hazards, etc., and making numerous allowances for special features of excellence in all these respects, exercises a constant and effective pressure for the reduction of the fire hazard in every rated risk. In large measure it enables the policyholder to make or greatly reduce his own rate of insurance, and in doing so to influence the fire loss of the whole country. To a large extent even the public fire fighting facilities and water supply resources which have been so immensely improved of late years have owed their development to this constant pressure exerted by the schedule rating methods of insurance companies, since such improvements tend directly to reduce the cost of insurance to the whole community, just as independent action in any individual case reduces it to the individual. It is to be noted that the effect of schedule rating is even more powerful upon permanent factors like fireproof construction than it is in the matter of the installation and maintenance of the

more transient features of fire protection. In New York City, for example, no architect would dream of perfecting his plans for the building of a great office building like the Equitable and Woolworth Buildings, or a great modern theatre such as abound in the mid-section of the city, without repeated conferences with the fire insurance rating organization and the careful balancing of cost and benefits involved in every possible improvement in construction and permanent equipment, from the point of view of the underwriter. A half-cent difference in the final building rate of a building representing ten millions of investment will in the long run of the centuries cover a really immense difference, measured in dollars and cents, in the original cost of construction. And that and similar fractions are strongly contested for in the drafting of specifications for buildings of magnitude and high value. And just as the beneficial saving works through countless years afterwards, so does the permanent reduction of fire hazard, both to the individual risk and to the community in which it is set down."

There are two broad divisions in the rate making, one which applies to the general minimum, or class rate, and the other the schedule rating. The first furnishes no large problem because it applies to dwelling houses, stores-and-dwellings and their contents, which are of a fairly uniform and mild hazard. If in these classes there is a business with any hazard involved, the risk is taken out of the minimum class and put in that of specific, or schedule rating. There are probably about fifteen million buildings in the United States and of that number at least thirteen million are occupied to a large extent for dwelling purposes, if not entirely. It is evident that a class that is so large, so widely distributed, and with a hazard fairly uniform does not furnish a very large problem in the determination of its rate; the principal differences are geographical. It is possible in many parts of the country to insure a private dwelling for a sum about one-fifth the price which is necessary in another part—that is, to insure it with a reasonable degree of profit. Except for this feature, the problem is not important. In other words, we need spend but little time upon it.

It is wholly different when we come to schedule rating. Small, comparatively, as the number of properties are which are devoted to such a use that they must be handled by schedule, nevertheless they present the real problem.

Schedule rating may be defined as an attempt to give a prop-

erty credit for the good features embraced within it, and to charge it for the bad features. In other words, it is an attempt to distribute the insurance charge over that property in accordance with the conditions which are developed by the survey. There are certain primary features:

(1) The base rate of the city in which the property is located: (2) A rate for a standard building: (3) An analysis of the structural condition of the property: (4) A measurement of the occupancy hazard: (5) The internal exposure: (6) The recognition of fire prevention devices in the risk. These are the main factors and it is generally considered that the principal charges should stress the area, the height and the floor openings, so far as the structural conditions are concerned.

The first schedules were adaptations from the English schedules but with this significant feature which has always applied to schedule rating in the United States, the schedules as adapted for use in this country analyze the building conditions more closely than was done abroad, and that practice continues down to the present time.

With the merits or demerits of any system of schedule rating I am not concerned at this time; that is a technical problem that is hardly of large enough interest in this paper, at least, to be considered. On that feature of the matter I think it will be sufficient to state that I expect the time to come when none of the present methods in force will be used. In other words, I believe there are many things to be learned about the making of schedules which we have not yet learned, but the principle itself, it seems reasonable to suppose, will always be adhered to; that is, the rate of insurance will never in these major properties be based on one single charge, but will be based on a series of charges which will grant full consideration to the good features of the risk, and penalize the bad.

In turning from this phase of the subject to the other, I want to go on record as stating that I think schedule rating in a measure tends to defeat itself. In the first place, we do not know the proper charge to make for the specific item for which we do make a charge, and so the pressure may be placed altogether on the wrong points, or, at least, on many of them. But over and beyond this, where it defeats itself in my judgment is that it has within itself what is known as adverse selection: that is, the

Insured may elect to improve his property and thus reduce the rate of insurance, or he may elect not to do so and pay the higher rate. What he will do—and this is where adverse selection comes into the matter—is to reduce it to the lowest point at the time he takes his policies out, and then be more or less indifferent to the up-keep of the property until the policies come round for renewal. A policy that is written on a building for three, five or seven years, and in which great care is exercised to secure the lowest rate at the time it is written, may not be disturbed during the life of that policy, provided there is no increase of hazard, but, meantime, there may develop in the risk all sorts of conditions which make for fire waste and for which, because they had been taken care of when the policy was taken out, no charge was made in the rate. The whole question of untidiness, carelessness and general up-keep is now one of the primary causes of fire waste in this country and, frankly, I doubt whether schedule rating, with all its benefits, exerts a continual pressure to keep these matters in order. Experience seems to show that it does not.

The primary question, however, which I wish to consider is, how far is rating affected by experience? The question will apply to both the minimum and specific classes. So far as the minimum classes are concerned, almost any company is securing a sufficient volume and spread to enable it to determine if the rate is satisfactory. The slight disturbance over a period of years, a quarter of a century in fact, in rates applying to this class is quite comprehensive evidence that the rates established are satisfactory. They may need adjustment in some localities, but as a matter of fact the level fixed is apt to remain for years. It probably would not be difficult to secure from a large number of the companies fairly reliable figures on this class of property, but one would run into some snags, principally because of the presence or absence of co-insurance, and in some cases I believe the statistics are kept on private residences, at least, without any division between the building and the contents. It is evident that care would have to be exercised in getting your data that important factors like those mentioned were treated on a uniform basis.

The real interesting question in this connection is, have we or can we secure a statistical basis for rate making in risks which are subject to schedule rating?

In the preparation of this paper I communicated with every organization in the United States and Canada engaged in rate making for the fire hazard. From the replies I have made extracts bearing on the point as to the use of experience in rate making. I am not going to read all of these quotations, but only one or two which are illustrative of the attitude of those engaged in the work on this important phase of it. I have, however, deemed it best to include, should the paper be printed, a large number of quotations, because in many cases there is an angle to the reply which is suggestive.

1. "The present method of fire insurance classification is by occupancy and the fallacy of considering such figures as representing the true experience on the class is being clearly demonstrated every day. Let us assume that the experience on restaurants shows a loss ratio of 60% and that these losses were due to either lightning or exposure fires, why should the classification of restaurants, that is the rate level of restaurants be increased when the hazard inherent in such risks have no effect on the loss ratio. Let us assume that the loss ratio on apartment stores was 100% and the fires originated in the kitchen or the tea room, and the loss ratio on hotels was 30%; here we have three classes of occupancy each with the cooking hazard and let us assume that the conditions are identical in each of the kitchens, by a loss ratio determined by occupancy classification, one class will be increased on account of fires originating outside of the building, one class increased by fires originating in the inside and one class reduced because the hazards which caused the fires in the second class did not cause fires with equal regularity. We maintain that there was an inherent hazard in the kitchen of the hotel the same as in the restaurant and that in fixing the fire rate for these three classes, the charges for this hazard should bear a consistent relation to the rate on the risk and not a relationship to the experience on the class, for during one period of experience the cooking feature may cause a fire in one class and during another period fires in a different class. It will never be possible to classify hazards by fire insurance loss experience and we feel that it is therefore necessary to analyze and classify hazards through the study of the elements which cause or retard fire and that loss experience is only valuable in distributing the fire insurance cost along very broad lines."

"Some classes are written with not less than the 80% co-insurance clause and other classes are written without co-insurance, to throw two of such classes together as a means of striking an average would be mathematically incorrect. Insurance is sometimes written blanket covering on several buildings and/or

their contents and in other cases insurance is written specific on buildings and specific on contents. The present tendency toward blanket insurance will destroy any system of classification based on occupancy and furthermore since the question of whether a risk is placed in one class or in another class is subject to different opinion based on the judgment of the examiner. It is possible for different policies on the same risk to be classified under different classes and the same situation is true in the case of losses and since the theoretical basis of classifiaction is in comparing like relationship, I feel that the complications inherent to the fire insurance business makes any method of classification impracticable and unreliable."

2. "Replying to your query for certain information as to methods in this jurisdiction, will say that in preparing new schedules, it is our custom to request the companies to furnish us with their loss experience and the premiums on the particular class for a period of five years and also request this information by years. This same method is adopted generally in the revision of schedule. We do not follow this method in some isolated cases where we are positive that the record has been exceedingly profitable or exceedingly bad."

"It is my further opinion that in the years to come if our classfication and statistical bureaus get to functioning along proper lines, it will be very helpful to the rate making bureaus."

3. "In regard to the second matter as to the value of statistics for rate making purposes, beg to state that I consider statistics of reasonably wide foundation to be of the very greatest value to the experience rate maker as a guide for his work. I consider those same statistics as the most unreliable and dangerous information that can be placed in the hands of the layman who is not an experienced insurance man or rater.

"It generally is a pretty true proposition that high explosives are useful in the hands of the experienced man, and extremely dangerous in the hands of the inexperienced man, and statistics are a good deal like high explosives."

4. "As to opinion as to the value of obtaining figures to be used for the determining of rates, my opinion is that statistics as usually obtained, or as published by public bodies, are not of great value for rate making but that, if the *actual* figures can be obtained, this is, of course, the logical way of adjustment. This opinion of course brings in the question of classification with its imperfections, and I think there are many imperfections in *any* classification. For instance, what may be reported as a loss under a woodworker may be caused by an exposure from a risk of an entirely different character and therefore such reporting is not correct in so far as the classification for the rating schedule

is concerned. Or again, the building might be an omnibus block in which the fire is caused by a tailor but a Company interested on an entirely different hazard in such block would record classification not as the tailor but the risk upon which the loss is paid, and, indeed, in like cases, classification as regards the rating for individual classes is not strictly correct. With all the difficulties and imperfections of classification, however, I believe that, for the adjustment of rates (up or down) the figures of the larger premium income Companies longest in the territory might fairly form the basis of such adjustment—of course, considering separately conflagration hazard, lack of protection, etc., etc., which are taken care of apart from the actual classification."

5. "It is indeed unfortunate that rating authorities can not have a comprehensive scheme of classification that could be used by the companies in keeping their statistics so that our rating can be upon a more scientific and defensible basis."

6. "Up to the present time I am free to say that I do not believe that loss statistics not segregated as to the class, obtainable in any one territory are of any value for the purpose of rate making. The total premiums received and the total losses paid showing the average loss ratio as to premiums as a whole appears to be the only question at present considered."

7. "It cannot be said that actual statistics are available, or at least not available in a form that will permit of experience being truly reflected in each individual rate. Undoubtedly statistics are valuable. For instance, if the record of a large proportion of companies shows an 80% loss on country clubs, it is pretty conclusive evidence that the general level of rates upon country clubs is below the profit line. That experience does not tell us what each particular kind of frame country club should pay, and it probably never will. The schedule has never been framed that will automatically take up all the slack and at the same time be elastic enough to produce a true rating. At this point we should drop all reference to scientific rates and tell the truth."

"Schedule rating is unquestionably the best method that has been devised, and because it isn't utopian, should not require exaggeration in its defense. Many of the alleged inconsistencies in rate-making are not any more glaring, if as much so, than the lack of refinement in nearly every branch of business activity. Magazines published in New York City can be purchased in San Francisco for the same price that they are sold next door to the publishing house. The average traction company will carry you a block or ten miles for the same price. Similar conditions, involving lack of price refinement, are apparent at every turn."

8. "As to my opinion of the value of statistics for the purpose of rate making, would say I believe that if we could have a classification, both as to premiums and losses, it would be invaluable as a guide in formulating our rate making machinery. Of course, as you well know, even if we had these statistics there would be jurisdictions where, because of political influence, they would be loathe to increase materially the non-paying classes, but nevertheless I do firmly believe that if we were in possession of more facts and statistics, we would be in a position to more scientifically make our rates and at the same time offset most of the criticism that could be levelled under the heading of 'discrimination.' "

9. "Speaking as to the question of opinion of the desirability of using statistics as a basis for rate, I would say that while I know from bitter experience that statistics are far from being perfect, I know of nothing else on which you can justifiably base classifications."

10. "From our experience, unless a most comprehensive system is devised and all companies report their income and outgo on each class in a systematic manner, the making of fire insurance rates on statistics is not feasible. Without such data it is merely a matter of concensus of opinion on the part of what we term rating experts and securing the permission of the Insurance Department to bring about changes in insurance rates on this basis."

11. "The principle of increasing or reducing rates as a result of unfavorable or favorable experience seems to us to be sound providing a large enough spread can be secured. The difficulty has been and is to secure such statistics from a large number of companies over a country-wide area for a long term of years. Anything less is apt to be misleading."

12. "You will observe from this that the little information we may get from the companies so far as actual statistics are concerned would have but slight influence in the making of rates. It is true that we make inquiries from time to time but the information thus obtained, such as it is, is valuable chiefly in case of argument to substantiate a position. Our experience tells us that regardless of statistics there are two things which enter largely into the making of rates, one of which is competition for the business and the other comparison of rates. These two things are bound to have more or less influence, and when either one of them bobs up is when the old hard-boiled rate-maker comes in. When competition is keen and comparisons are odious statistics usually take a back seat; then the old experienced rate-maker is called upon to settle the matter, and he usually does.

"Statistics may be all right in guiding the chap who is to make up a schedule, but after the schedule is made up and finally adopted the man who is to use it in the field is usually the man who knows how, when and where to put the elasticity into it to make it fit."

13 "This Association in the past has, when considering the rates for certain classes of business, endeavored to gather statistics from its members, outlining their experience covering for as great a term of years as possible, and the information collected has proved to be very helpful to the Rating Committee in their deliberations in establishing either new schedules or making revisions to existing schedules for rating the particular class in question."

14. "I am not prepared now to go into a discussion of the question of the uses of classification and statistics in the construction of our schedules for the fixing of rates. I can say, however, that I believe that unquestionably experience and classification does have an effect in the aggregate and upon individual classes.

"From my past experience in the rating field I know that from time to time we have had pressure, and even today are subject to pressure from both companies and local agents, in revising both upwards and downwards the rates upon particular classes of business. Upon occasion we have sought to obtain the experience of companies upon individual classes and while the knowledge we have obtained from such inquiry has not always been complete and satisfactory, it has upon occasion been sufficient to aid us in the final determination of such questions."

15. "We most certainly invite experience statistics whenever they are available and such experience is given full consideration in establishing rates. We believe that statistics are of great value in rate making if they are not taken from too large an area. A class might be profitable in the New England States and might not be profitable in the south for the reason that rates collected in the south were not adequate so that it is the Writer's opinion that experience should be limited as much as possible to territories controlled by one rating board and subjected to the same grade of rates."

A summary of the replies would show a distinct yearning for a statistical basis with an underlying feeling that it is only indicative of the charges to be made and not conclusive. There is one group representing a large territory and large premium income which does not believe that a statistical basis is of the slightest value in making schedules and the only value of statistical

basis is on totals which will show general results in regard to the business in the territory under consideration. Whatever we may wish about the matter, it must be recognized that statistics today in fire losses are not collected in such a way as to be useful for rate making purposes. They are of some value as indicating the trend, but are not of value in the making of schedules.

The interesting question then arises, how is it possible to conduct the work? It must be remembered that the business of fire insurance is old. It has now over 250 years of experience since the London fire and indeed there are at least three companies in existence which are over 200 years old. It is needless to point out that where the same kind of a business has been conducted for over 250 years it must have gathered to itself a wealth of experience which is invaluable in solving its problems. It must be remembered also that many of the chief problems in fire insurance have centered about the question of making the rate. This has been true of every investigation that has been held. In other words, the rate making feature has been on trial and is on trial almost all the time.

After that much is said, however, there still remains the broad question as to the possibility of collecting statistics which will be of conclusive value in rate making. So far as the conclusive is concerned, that will have to be rechecked, not only by the important factor of the constantly changing methods in building construction, but in the conduct of business itself. There remains the important factor that insurance must provide for new and untried hazards long before any experience is available or of value in rate making. May I cite one single instance. The modern theatre is of fireproof construction and in most cases well built and well protected. Public opinion has forced the standard. It is quite a different thing from the theatre of twenty years ago. The old theatre had a bad experience, although it had a very high rate. There is comparatively little experience on the new type of theatre. Certainly none on which rate making could be based. That rates which are scarcely one-fifth of the rates applying to the old properties are all right today is generally conceded, but at the same time there is absolutely no statistical basis for it because there is a total lack of loss experience or if it be not total it is so slight as to be almost total.

Another type, to continue the illustration, is the modern fireproof hotel. In this case there has been some experience and it has been of a kind which has shown a substantial loss. It is probably true that the reasoning which put the rate on the fireproof hotel at its present point allowed too much for the difference in the type of structure and did not sufficiently consider that the same activities, only in a largely increased measure, would be conducted in the new one.

It must be remembered also that schedule rating has made for competition between the agents and the brokers and furnishes the most valuable opportunity for changing business from one to the other by means of reductions in rate brought about by improvements to the property and thus eliminating charges made in the rate. The result is that the risks tend to seek a level and a low level at that under this competitive strain. There comes a time, in fact, in many classes when most of the companies decline to write the line and then an advance must be made. Usually at such times experience can be secured from a sufficient body of companies to show the trend and to give some indication as to how much of an advance ought to be made.

Before coming to a conclusion, because I shall, one very important point must be mentioned. I refer to the question of co-insurance. I belong to that school, I am afraid it is a small one, which believes that the policies of fire insurance should be issued for 100% of the value of the property. In other words, there should be full co-insurance. Co-insurance is the only factor which enters into rate making that enables us to establish absolute equity among the policy-holders. The value of the property at risk is the only element that furnishes the common denominator and in my judgment it ought to be used for 100% of its value. I am not interested, however in arguing the percentage, but I do stand solidly for the thing itself and any statistical basis in fire insurance for rate making purposes must be preceded by the requirement of co-insurance for all properties insured. This may be fixed at 80, 90 or 100. It may vary in some cases, but there should be a minimum for all, at least 80. Now this important factor is not in force in all parts of the United States and so many of the statistics which we have cannot be used with those where co-insurance is in force. There is a gradual extension of co-insurance and it is reasonable to suppose

that in another generation it will be used everywhere and with at least the same minimum amount.

Would it be possible to collect the statistics of loss records in such a way that they could be used for rate making purposes? When one thinks of the varying sums which are charged for different businesses, whether manufacturing or mercantile and realizes that if these differences are to continue and to be statistically justified it would be necessary to collect loss statistics for each of these, the problem appears a bit hopeless. Is it not possible, however, to reduce the number of classes and collect statistics in accordance therewith? To get consent to a common classification is almost impossible and while the thing itself is greatly to be desired, it is exceedingly doubtful as to whether a common ground can be found on which to work. Up to the present time the common ground has been too general to furnish anything of value for rate making purposes and there is no immediate prospect that one will be discovered.

In spite of the somewhat pessimistic outlook, I venture to state that as I belong to the hopeful optimists I think eventually it will be done. It is only one of the difficulties and problems of the business and mistakes may easily be made, but I am firmly convinced that it ought to be given a fair trial. Difficulties after all are things to be overcome and very frequently they are not as serious as they seemed to be before they were tackled. The fact that the business of fire insurance tends more and more to group control, thus lessening the number of individual units, is going to make it somewhat easier to handle a statistical problem of this kind if a common basis can be secured. At the present time, however, this represents fully a utopian idea, because there is nothing on the immediate horizon that shows the slightest indication that such a broad and comprehensive work is to be undertaken. If by any chance the state should take over the business it would be necessary to establish a statistical basis as well as insist on the principle of co-insurance. It is doubtful, however, whether the work would be any too well done under those conditions. At least very few of us I think would look to the state to settle such a problem for us. The problem happens to be one which is involved in every transaction of a commercial nature and that is the changing nature of the problem itself coupled with the fact that the business must continue to be conducted in spite of this changing

nature. To bodies such as this we should come to look in time for the proper answer to questions of this kind and it is sincerely to be hoped that ways and means may be found in due course to undertake a suggested classification system which will make an appeal to those interested so strong that it will be adopted and followed for a sufficiently long period of time to give it an actual field test.

I proposed to leave you where I took you from and that is at Ambrose Light. May I refresh your memory as to the point of departure by re-quoting the definition of an Actuary as given by Mr. Marks:

"One whose profession it is to devise means to solve all questions involving the application of the theory of probability to human affairs, whether in conjunction with the rate of interest or not, and to apply them to the solution of practical problems."

Again, the definition of Science as defined by Sir William Ramsay:

"The definition of Science in this, as in other connections, is simply the acquisition of knowledge and orderly reasoning on experience already gained and on experience capable of being carried out so as to forecast and control the course of events, and if possible to apply this knowledge to the benefit of the human race."

If to the problem of a statistical basis for the making of fire insurance rates we can bring the skill of the Actuary as defined and also the scientific outlook as set forth, much, I believe can be accomplished. The problem has been regarded too much as one of exact mathematical solution—it is not of that precise order, but it requires an approach which unites the skill of the Actuary and that outlook on science which regards it as a means to the solution of problems and not always a finality.

A REVIEW OF THE STATISTICAL PROBLEMS OF CASUALTY COMPANIES

BY

S. D. PINNEY

The complexity of statistical problems which today confront actuaries and statisticians of casualty companies would seem to indicate the desirability of a review of these problems as a whole in order to obtain a better perspective as to the value of statistical work and the methods used in arriving at results. Especially does it seem appropriate that such a review should be made at this time when the element of the expense of conducting casualty lines of insurance is so strongly in the foreground. It is felt that the broadest possible viewpoint should be taken in making such a study with the end in view of linking each component part of the statistical program with the rest, outlining methods of procedure and calling attention to any possible opportunities for further improvement.

The rapid development of casualty lines of insurance during the past decade has been productive of numerous statistical problems which must be dealt with. Within the field of the casualty technician there may be enumerated the following lines of insurance: Accident and Health; Workmen's Compensation; Employers' Liability; the various forms of Automobile Insurance; Public Liability lines, including Owners', Landlords' and Tenants', Manufacturers' and Contractors', Teams, Theatre and Elevator together with the allied Property Damage lines; Fidelity and Surety; Burglary; Plate Glass; Steam Boiler; Fly Wheel; Engine; Electrical Machinery and others of less importance. The mere multiplicity of lines of insurance, each with its own peculiarities, makes it evident that in meeting the statistical requirements of all there must be solved a set of statistical problems sufficiently diversified to necessitate the most careful study and concentration.

These statistical problems may be grouped under two major headings,—those encountered in the preparation of accounting records and those met with in collecting and compiling experience data. The two divisions are of course not absolutely independent

of each other inasmuch as we find items occurring in one group which are necessary in the preparation of items in the other group. Accounting records are necessary for annual statement requirements and in this connection there are such problems as the computation of unearned premium reserves, claim reserves, written premiums and paid losses by line of insurance. There also falls within this group the allocation and analysis of expenses by line of insurance. The preparation of certain Home Office records such as Agency or Branch Office Production Records also may be classed as coming under this heading.

In complying with annual statement requirements and in the preparation of various Home Office records the procedure for each line of insurance may be considered to follow along practically the same general lines. The allocation of written premiums and paid losses to line of insurance and the compilation of production records need hardly be dealt with at length. These records are prepared in much the same manner for all lines of insurance and involve simply the assignment of written premiums and paid losses to each specific line of insurance and to state, branch office or agency as required. Written premiums are assigned when the proposal or application for insurance first comes into the Home Office and paid losses are allocated as each claim payment is made. The premium record in addition to annual statement requirements is necessary in the determination of state and federal taxes.

Unearned premium reserves are usually computed on the monthly pro rata basis. Under this method written premiums are posted to the proper month of expiration and to these amounts must be added or deducted any additional premiums or cancelations which may affect the amount of premiums in force. The unearned premium reserve is determined by applying to the premiums in force as of the date of determination the proper percentages representing the pro rata portion of the policy period which has yet to run and for which the premiums are therefore not yet earned. These percentages are determined on the basis that the premiums of a given month became effective as of the middle of that month. It goes without saying that it is necessary to use a different set of percentages in determining the unearned premium reserve on annual policies and on those written for longer or shorter periods. For example, a great

many Accident and Health policies are written for periods of three and six months, whereas in Public Liability Insurance we find a large number of policies which run for a period of three years. Obviously the unearned portion of a six months' Health premium at the end of the fourth month would be represented by an altogether different percentage than the unearned portion of a three year Elevator Public Liability premium at the end of the fourth month. This outlines briefly the method of determining unearned premium reserves on the so-called monthly pro rata basis. There is another method known as the "50% basis" which involves a similar procedure, with the exception that the percentages representing the unearned portion of the premium are applied on an annual rather than a monthly basis. Under this method the unearned premium reserve is computed as though the total premium writings of a given year became effective as of the middle of that year. For example, at the end of a given calendar year the unearned premium reserve on all annual policies written in that year would be considered equal to 50% of the premiums in force; on all two year policies written in that year the unearned premium reserve would be equal to 75% and on all three year contracts equal to 83⅓%; etc. The use of this latter method presupposes a uniform distribution of business throughout the year and is accordingly not as accurate as the monthly pro rata method.

Claim reserves may be determined by one of several different methods. There is the notice average method which may be satisfactorily used in evaluating recent losses by companies having a sufficient volume of experience to produce a dependable average claim cost per notice reported. Under this method the average cost per notice is determined on the basis of the company's past experience and is of course checked from time to time with the latest experience developments. In setting up the reserve it is simply necessary to apply the average cost per notice to the number of notices received. However, in following this procedure which is used particularly in arriving at Accident and Health claim reserves, it is customary to evaluate long term claims by the use of a claim reserve table which is based upon past experience and indicates the incurred loss to be expected on the average for a claim which has run for a given length of time as of the date of valuation. In applying the notice average method

an estimate must be made with respect to losses which may have been incurred but which have not yet been reported to the company. This estimate is best made by a study of developments of previous experience. Another method of setting up claim reserves is to estimate for each individual claim its ultimate expected incurred cost. Death claims are always evaluated on this basis. Outstanding compensation claims due to their very nature are best reserved for on an individual estimate basis. In this connection it would be well to mention that in setting up Workmen's Compensation loss reserves in the annual statement it has been required that for the two most recent years the reserve for unpaid compensation losses shall be equal to 65% of earned premiums less loss and loss expense payments which have already been made. We are all familiar with the recent criticism of this requirement which at the present time does not provide adequate claim reserves for the two latest policy years.

For Automobile Liability and other Public Liability lines the claim reserves set up in the annual statement are determined by application of certain fixed amounts to the number of suits outstanding for a given policy year or period. These average amounts per suit have been determined on the basis of past experience and are intended to cover not only the ultimate cost of the losses themselves but also of any legal expense involved. For annual statement purposes there is a requirement similar to the requirement outlined above in connection with compensation reserves, with the exception that 60% of the earned liability premiums less loss and loss expense payments is required as the legal reserve for the two latest policy years. In the case of Liability reserves this legal requirement appears to be fully adequate at the present time.

The allocation and analysis of expenses for each of the various lines of insurance is a combined accounting and statistical problem which has engaged the attention of all casualty company technicians especially within the past year or two. The New York Casualty Experience Exhibit which was required this year for the first time calls for the subdivision of expenses of each of the casualty lines into its component parts. The problems involved in meeting this requirement will not be discussed in this paper, although it might be mentioned in passing that the determination

of expenses for each line of insurance is most important due to its bearing upon the question of ratemaking. For a complete discussion of the problems involved reference should be made to papers written by Messrs. Hull, Craig, Van Tuyl and Tarbell appearing in the Proceedings of this Society and to Mr. Elston's paper published in the Transactions of the Actuarial Society of America. Whereas as yet no uniform procedure has been adopted by the various companies in making this allocation and analysis of expenses, it is altogether probable that the investigations which many of the companies have carried on during the past year or two will in time be productive of some standard method which will be accepted by the majority. This field is perhaps the most fertile one for further investigation and should therefore be productive of the most progressive results in the future.

We have just given consideration to the question of properly determining the expense portion of insurance rates and now we turn to the matter of compiling and collecting experience data which are just as necessary for proper ratemaking. This is a subject which requires much consideration, especially in the case of a company writing several different lines of casualty insurance. Whereas there are certain general characteristics of experience data which may be said to be common to all lines, it is nevertheless true that the variations in the special items peculiar to each line of insurance make the preparation of experience data almost a problem for each line in itself. Certain items will be necessary in the correct formulation of Accident and Health rates for example which are not a part of the insurance hazard covered under other lines. Here we would be interested in such features as the accident rate or rate of morbidity by age or possibly by occupation, whereas in determining compensation rates we are interested in the amount of loss cost per $100 of payroll exposed in various industrial classifications. For this reason, therefore statistical plans outlining methods of collecting experience statistics for each line of insurance have been prepared by various central organizations. Thus we have the Personal Accident and Health Statistical Plan issued by the Bureau of Personal Accident and Health Underwriters, the Workmen's Compensation Statistical Plan issued by the National Council on Compensation Insurance, the Automobile Statistical Plan issued by the National

Bureau of Casualty and Surety Underwriters, etc. Each plan has been designed for the primary purpose of collecting and compiling all experience data necessary for the establishment of the underlying pure premiums or loss portion of insurance rates. Furthermore, the plans have been constructed in a manner which permits a certain degree of flexibility in carrying out other investigations which may be of value in connection with rate-making problems. Thus under the Accident and Health Statistical Plan a study may be made of the experience data grouped according to size of policy and also the relative importance of certain diseases as causes of sickness claims may be studied. Likewise, under the Compensation Statistical Plan valuable information may be obtained respecting the relative importance of certain machine hazards in producing accidents. Another point which has been taken into consideration is that the plans have been made uniform insofar as has been possible with respect to any points which they may have in common. By way of illustration, the state and city codes which are used in the various plans have been standardized, although of course for certain lines of insurance such as Automobile and Burglary it is necessary to use a much more finely subdivided code than in other lines. Whether or not the plans have been unified to the extent which might be possible is a question which might well be made the subject of further investigation by representatives of the various central organizations. It is perhaps needless to say that the whole system of statistical procedure should be outlined in a manner which will produce the necessary results in as efficient a manner as possible, whether it be for a company conducting a single line of insurance or a company writing fifty lines. After the statistics have been collected there should be uniform methods of presenting the compiled experience in order that whoever has to deal with the experience on a number of different lines will readily be enabled to recognize the desired information. This is possible in preparing exhibits of unearned premium reserves, outstanding losses, written premiums, etc., and there is no reason why it should not be carried out in making experience exhibits. Some lines of insurance will of necessity require the reporting of the experience in more detail in certain respects than others but the general presentation of experience should follow a uniform outline.

The experience data for each type of insurance may be divided into two major groups—exposure and losses. Each of these groups in turn may be broken up into a number of subdivisions, some of which may be classified as general to all lines and others as peculiar to the particular line in question. Under exposure there are such general subdivisions as the identification, classification and location of the risk, the date of issuance of the policy, number of units of exposure and amount of premium. In like manner under losses we have the general subdivisions—identification, classification and location of the risk, date of issuance of the policy, date of accident, cause of accident and amount of loss. Whereas it has been stated that the foregoing subdivisions are general to all lines, it is understood that such items as classification of the risk, units of exposure and cause of accident vary for each individual line. For Accident and Health Insurance the classification of the risk refers to the accident hazard of the assured's occupation, whereas in Compensation the risk is classified according to specific industrial operations. The exposure under Accident and Health is measured in terms of the number of months the individual was insured, whereas under Compensation the exposure is expressed in terms of number of dollars of payroll over the insured period. The cause of accident code used in Accident and Health Insurance is not as finely subdivided as the cause of accident code used in Compensation Insurance, although under Accident and Health there is of course necessary a complete disease code which is not needed in compiling Compensation experience which involves occupational accidents only.

Brief consideration might be given to the special items which depend upon the hazards covered by each individual line of insurance. Special items in connection with Accident and Health experience are the age and occupation of the insured, the duration of disability, nature of injury and the splitting of losses to indemnity and medical amounts. In collecting Workmen's Compensation experience losses are also analyzed to medical and indemnity payments and such other special information as type of disability, manner of occurrence, nature and duration of injury as well as the weekly wages of the injured employee is required. In reporting Automobile Liability experience it is necessary to secure information relative to the

amount of excess premiums and losses over and above the standard 5/10 policy limits. The same is true with respect to other Liability experience and in the case of Property Damage experience excess premiums and losses above the standard policy limit of $1,000 are required. The Burglary Plan calls for information respecting the use of different types of alarm systems, etc. Under the Plate Glass Plan the item of salvage is required in connection with claims, etc. Compensation experience is segregated by states, whereas Automobile experience is not only divided by states, but also by cities with a population of 25,000 or more; by territories surrounding the cities; and by territories representing the remaining portion of each state. Similarly the miscellaneous Liability experience must be reported by state and for certain of the larger cities and, furthermore, within New York City and Boston by territorial zones. Burglary experience is reported by state and the important cities and counties within each state. Plate Glass experience is segregated to states and important cities and within certain cities to zones. Thus it is seen that, whereas there is a certain homogeneity underlying all of these plans, there is nevertheless for each of the various lines a number of modifications of the general outline.

The collection and compilation of the statistics necessary in the case of a single line company does not prevent the complexity of procedure nor the need for the same degree of efficient "dovetailing" as is found necessary in a company writing multiple lines. As long as the single line company compiles its statistics in such form that they may be readily combined with the experience of other companies there is nothing to prevent that company from using whatever methods it may care to in arriving at the information desired. Since experience statistics are often compiled by central organizations from punch cards submitted by member companies it is evident that each member must necessarily make use of a uniform card in reporting its experience data. At first glance it might seem that this would work a hardship in the case of the single line company since where there is but one line on which to collect and compile experience data it might be possible to prepare accounting records and experience records from the same set of cards. However, it is felt that even in the case of a single line company it is preferable to prepare accounting records and experience data from different

sets of cards. Following this procedure a duplicate set of punch cards could be prepared for the experience data and submitted to the central organization.

Next let us consider the statistical problems met with in the case of a company writing several lines of insurance. Here there must be more attention given to deriving the utmost in results from the statistical organization of the company. An example of such a company is one writing Compensation, Automobile Public Liability, Property Damage and Collision and the various Public Liability lines. The collection and compilation of experience is naturally a more complex problem than in the case of a single line company for whereas the information desired follows the general outline the special items are considerably varied as already pointed out. The preparation of Compensation experience involves a tremendous amount of statistical work. For each policy year the experience data must be compiled by state and industrial classification. Since there are approximately thirty Compensation states and about eight hundred classifications and since this experience known as Schedule "Z" must be compiled twice for each policy year, it is evident that in the case of a company transacting a countrywide business it will be necessary to prepare approximately forty-eight thousand reports for each policy year. Each classification experience consists of a report of payroll and premium earned in the policy year together with a detailed analysis of loss payments by type of disability. Also individual reports of all major accidents are required. In collecting Compensation experience there are even more details taken into consideration than this. For instance, information is required with respect to cause of accident, manner of occurrence, nature and duration of injury together with such special information as weekly wages of the injured employee. The purpose of this additional information is primarily for use in the establishment of proper Compensation rates. Cause of accident and manner of occurrence are necessary in providing a check of the time values in the Schedule Rating Plan. Nature and duration of injury provide the basis of the Standard Accident Distribution. A study of the trend in average weekly wages has been used in establishing manual rate levels.

The reporting of Automobile experience also is a task of no

mean proportion. Whereas the number of classifications is much smaller than in the case of Compensation, being about one hundred and twenty-five in number, the experience on each classification must be split up into a much finer group of territorial subdivisions, these being about two hundred and seventy-five in number. In this connection it has been found very advantageous to use master punch cards for each classification experience by territorial subdivision, the master cards being prepared upon the completion of the policy year experience. The various lines of Liability Insurance add to the statistical work involved, although these do not present the same amount of detail necessary in compiling Compensation and Automobile statistics. In compiling experience on certain lines such as Accident and Health, Burglary and Plate Glass, perhaps the procedure most generally followed has been to submit duplicate punch cards to the central organization and have the experience compiled for all companies combined, rather than have the tabulation of experience made up in individual company home offices.

Another element in the statistical problem confronting the multiple line company is the necessity for compiling experience as soon as possible after the completion of the policy year. Especially important is this in connection with workmen's compensation experience in order that rates may be revised on the basis of experience which will be representative of the conditions to be expected during the period for which the rates are to apply. The tendency is more and more in the direction of a speeding up of the process of compiling and reporting experience data and the result is that more of the work must be completed in the early part of the year than was formerly the case. This speeding up is likely to result in a peak load on the statistical department during the early and middle parts of the year followed by a slack period in the later months. The companies through the medium of the central rating organizations must lay down statistical programs which will produce as nearly as possible a uniform distribution of work throughout the year. For certain lines of insurance it is not necessary to revise the rates each year and consequently the compiling of detailed classification experience for those lines may be placed upon a biennial instead of an annual basis, the experience on certain of these lines being reported in one year and on others in the year

following. This procedure has been adopted by the National Bureau of Casualty and Surety Underwriters in the outline of its statistical program as recently adopted. However, workmen's compensation and automobile experience must be reported each year inasmuch as these two lines are of such importance that it is highly desirable that a review of the rates should be made annually.

Thus it is evident that the company writing a great variety of casualty lines must plan its statistical procedure in a most careful manner. Every effort possible must be made to prevent duplication and to apportion the statistical work as efficiently as possible. Even though there might be sufficient volume of business in each line of insurance to justify the use of full time clerks exclusively in the preparation of statistical data for each line by itself, it might be possible to effect a saving by organizing one group of coders for items which were more or less common to a certain group of lines of insurance and apportion the coding of special items peculiar to the individual lines among clerks trained for that purpose alone. In the organization of a multiple line company the following grouping of statistical work might be suggested:

1. Accident and Health
2. Workmen's Compensation—Employers' Liability—the various Public Liability lines other than Automobile together with the allied Property Damage lines
3. Automobile
4. Fidelity and Surety
5. Burglary, Plate Glass, Steam Boiler, Fly Wheel, Engine and Electrical Machinery Insurance.

Statistics play a most important part in present insurance practice. They are necessary in determining the component elements of insurance manual rates and are of much importance in other ratemaking procedure. Through the medium of statistics a company is enabled to review its loss ratio experience by line of insurance and thus govern itself with respect to its underwriting procedure in the lines affected. Statistics form the basis of annual statement requirements and expense analyses which play such an important part today in determining the attitude of state insurance departments as respects the adequacy or inadequacy of rates. There is of course the danger that the

statistical program will become top-heavy and the companies will find themselves confronted with the necessity for getting out a volume of statistics altogether disproportionate to the value derived therefrom. To this end, therefore, there should be a constant checking up of details in the various statistical plans for in this particular field of endeavor much depends on details. It may be that certain types of insurance will permit of statistical treatment under a combined or master statistical plan. The forms on which the statistics are collected, in most instances punch cards, may be brought into uniformity to a greater extent than they are at present. Some companies doubtless have already made considerable progress along this line and in one instance at least that I know of a standard form of punch card is being used for the preparation of experience data on several different lines of insurance. Study along this line might well be undertaken under the auspices of this Society for it is felt that such investigation would be productive of worthwhile returns in the form of time, effort and money saved to the various casualty companies in the carrying out of their statistical work.

THE PAST AND THE FUTURE OF WORKMEN'S COMPENSATION RATEMAKING

BY

A. W. WHITNEY AND O. E. OUTWATER

I.

A Statement of the Situation

The development of the rating system for workmen's compensation insurance in the United States has been mainly a product of the last ten or twelve years. The problem has involved most of the contingencies with which life insurance deals, even such as remarriage and degree of dependency, the most important elements of fire insurance, such as a basic manual and a schedule and then some features peculiar to itself, such as experience rating. It is safe to say that never before has such a system of rating been developed in such a short time; and perhaps this stands today in its main features, although not in its refinements, as the most comprehensive rating system in the whole insurance field.

It is undoubtedly true that the main features of the problem have now been solved and yet it is equally true that certain other important parts of the problem remain to be solved. This present time may be considered to be the end of an era that was characterized by the solution of the problem in its essentials and the beginning of a new era which will be characterized by the development of refinements, and yet refinements that are so important that the rating system will continue to be quite imperfect until they have been added.

The situation at the present time is apparently as follows: the manual, so far as the general structure goes, is in a definitive and generally satisfactory form. The most outstanding need here appears to be a thoroughgoing and encyclopedic analysis of the hazards of the various industries as a basis for a more satisfactory system of classifications; this need may be otherwise described as the putting of underwriting upon a technical engineering basis, to whatever degree may be practically feasible.

The schedule is apparently now in a very satisfactory form.

Its structural rightness on the one hand and, on the other, the reflection in its parameter values of the more important features of accident causes as given by actual statistics have made it a close measure of the hazard. Furthermore, it possesses an intrinsic flexibility which should be sufficient to take care of all future needs. Investigation into the engineering basis of hazard by classifications will undoubtedly be accompanied by still further statistical research which should give the basis for a still more refined determination of parameter values.

The fundamental structure of the experience rating plan has been justified not only by general reasoning but by actual results and yet the last word has undoubtedly not yet been said with regard to the problem of bringing this general plan into practical relationship to the facts. There are certain parameters in the experience rating plan which so far it has not seemed possible to measure statistically and the result is that we have a system which while apparently qualitatively correct is quantitatively largely a matter of judgment. While the problem is exceedingly difficult there is apparently the possibility of making a real advance in this field by an investigation that is sufficiently searching to go down into fundamentals.

But none of these developments, and they are all in the nature of refinements, is comparable in importance with what still remains to be done in the field of pure premium determination. The determination of pure premiums has always been at the real heart of the rating problem. It is the means by which we make our first approximation; it is our primary and main attack upon the problem of getting right rates.

The methods that have been developed for pure premium determination have yielded notable results and yet today we have a system which while founded upon exactness both in method and statistical material has become top-heavy with calculations that are based largely upon assumptions, and in practice it is not giving the necessary results. The difficulty arises from the fact that too much has been attempted upon too narrow a basis of analysis.

Pure premium determination involves (1) fixing the relativity between the various classifications and (2) fixing the rate-level as a whole. These two parts of the problem are distinctly separable. The relativity in hazard among classifications is in the

main independent of variations in the basic conditions upon which rate-level depends, and it is comparatively stable; in other words the general rate-level may rise or fall without seriously disturbing the relativity among classifications.

The next advance seems to demand a more explicit recognition of the practical separability of these two parts of the problem and an intensive study of the problem of rate-level. Basic pure premium determination is in a very satisfactory condition and while there are improvements possible, such as in dealing with the reducing of experience to a common basis, no serious harm would be done if this part of the problem remained stationary.

The rate-level situation is however acute. It involves not only the question of whether a particular assured is paying too much or too little but the question of whether all assureds are paying too much or too little, and not only that but the question of whether the companies are collecting too much money or not collecting enough to remain solvent. The outstanding problem of the new era is the problem of determining rate-level.

Rate-level can be satisfactorily determined upon the basis of loss ratio reports, assuming that information can be had as to the actual rates charged, that is, with regard to the effect of schedule and experience rating and of rate-cutting if present; but if such determination is to be effective the data must be fully matured and that means that it must be at least two years old. Here lies the difficulty, the two years that our rate determination is behind the times!

There are two possibilities, either first to make definite plans in our rating system for a two year lag in the rates, that is, to be content to use rates that are always at least two years behind the times, or second to devise methods of fore-casting, and by fore-casting I mean both bringing the experience up to the present and projecting these results into the future.

There are such serious objections to accepting a two-year lag in rates, first its fundamental inequity and second, the competitive abuse that it fosters, that it seems unlikely that this will be acceptable as a practical solution and yet there are on the other hand so many difficulties in connection with fore-casting that even a two-year lag should be given serious consideration.

The superposition of methods of fore-casting upon the loss

ratio method of rate-level determination seems, however, to be what we must look forward to as an almost inevitable necessity. Fore-casting is necessary in every other business and it is scarcely likely that we shall be able to escape from it here. The problem is partly a question of extrapolation but mainly a question of whether we can determine a correlation between rate-level and the quantities that express economic and industrial conditions that is sufficiently close to be of practical value. This is a perfectly definite research problem, but it is undoubtedly a matter of great difficulty. It seems certain that this, the determination of the relation between rate-level and economic and industrial conditions in such form that it can be used as a basis for forecasting is the outstanding problem in workmen's compensation rate making today, and its solution will apparently be the characteristic accomplishment of the new era in workmen's compensation insurance just as the setting up of the elements of the rating problem was the characteristic accomplishment of the era that has just closed.

The algebraic statement of the problem is as follows:

Let N = Number of full-time workers.

f = Average accident frequency per worker, that is, the probability that a given worker will be injured during the year.

s = Accident severity, measured in average duration of disability in years.

w = Average annual wage.

r = Effective commuted rate of compensation, being namely, the quotient of the total compensation payable under the law to the total wages which would have been receivable during the average period of disability.

R = Average manual rate expressed as a percentage of payroll.

ρ = Loss ratio.

Then $\rho = \dfrac{N \cdot f \cdot s \cdot r \cdot w}{N \cdot w \cdot R \cdot}$.

This reduces to $\dfrac{f s r}{R}$

If we can assume that the loss ratio at a given time t_0 is known, then the loss ratio for a time t, will be expressible as:

$$\rho = \rho_0 \left(\frac{R_0}{R}\right)\left(\frac{f}{f_0}\right)\left(\frac{s}{s_0}\right)\left(\frac{r}{r_0}\right)$$

ρ_0 is supposed known (presumably from loss ratio returns), $\frac{R_0}{R}$ can be had by a comparison of the average collectible rates at the two times; the problem therefore reduces to a study of f/f_0, s/s_0 and r/r_0, that is, to a study of the functions f, s and r.

Some general statements about such a study can be made. r is mainly a function of wages, although of course also of the particular law and perhaps other variables; it can be determined in tabular form (that is precisely what is done when we evaluate the provisions of a law) and might doubtless if it seemed desirable be thrown into the form of an empirical equation. f and s are evidently functions of economic and industrial conditions and the real problem is the determination of these relative values. It is scarcely likely that we shall be able to do much with the problem from an a-priori point of view although the probable nature of the relationship is suggested in the second part of this paper. We must, however, undoubtedly depend upon an empirical correlation and for this it will be necessary to obtain a series of values of f and s either separately or combined.

We should, however, be no better off after we had established these correlations if it were not that the values of the indices expressing economic and industrial conditions can be had much more closely to date than either f and s individually or when combined. If we can establish such correlations we can bring the value of ρ up practically to the present and then by taking tendencies into account we can even project it into the future.

It was hoped that something more than a theoretical discussion of this subject could be given in this paper but everything that we have done on the problem indicates that no appreciable results can be expected except through a determined and thoroughly planned attack; in other words that the solution of the problem is a really big undertaking. For instance, fresh statistical facts must be produced; there seems to be very little now in the possession of the rating offices or of the companies that will be of appreciable value for this purpose.

It may be possible to get statistical data on which determinations of f and s can be made, but it is quite possible that the equation itself will prove to be the readiest means to the desired result.

Suppose the experience is available for a series of years $f_1, f_2, f_3, \ldots$ The equation $\rho = \rho_0 . \frac{R_0}{R} . \frac{f}{f_0} . \frac{s}{s_0} . \frac{r}{r_0}$ can be written in the form

$$\frac{f\,s}{f_0\,s_0} = \frac{\rho}{\rho_0} . \frac{R}{R_0} . \frac{r_0}{r}, \text{ and this yields}$$

$$\frac{f_1\,s_1}{f_0\,s_0} = \frac{\rho_1}{\rho_0} . \frac{R_1}{R_0} . \frac{r_0}{r_1} = A_1$$

$$\frac{f_2\,s_2}{f_1\,s_1} = \frac{\rho_2}{\rho_1} . \frac{R_2}{R_1} . \frac{r_1}{r_2} = A_2$$

$$\frac{f_3\,s_3}{f_2\,s_2} = \frac{\rho_3}{\rho_2} . \frac{R_3}{R_2} . \frac{r_2}{r_3} = A_3$$

. . . , where A_1, A_2, A_3 . . . can be had from the experience.

From these equations we have:

$$f_0\,s_0 : f_1\,s_1 : f_2\,s_2 : f_3\,s_3 \ldots = 1 : A_1 : A_1 A_2 : A_1 A_2 A_3 \ldots$$

This gives us a trend which will serve as a basis of possible correlation with the various indices of economic and industrial conditions.

II

A Survey of the Possibilities of Solving the Rate-Level Problem

The study of the correlations between f, s and r and industrial conditions involves a study of the business cycle and all its attendant economic changes. Let us for a minute review some of the characteristics of the complete cycle as it moves forward starting say at the trough or lowest point of the wave and note

the probable effect upon industrial accidents. At this point wages and employment are at their lowest points. Selection has operated to eliminate inefficient employees. Overtime work is comparatively rare and work is done at the steady pace of the unrushed efficient laborer. Both accident frequency and severity are probably at a low ebb, frequency because the best workers are engaged in their regular work with which they are entirely familiar, and severity, not only for this reason but also because the man who malingers or stays away from his job too long is apt to lose it since workers are plentiful. However, the tendency of employers to economize in such a period by neglecting ordinary safety education and accident prevention measures may be assumed partially to offset the expected accident slump. Wages tend to be stationary because efforts to obtain higher wages are not apt to be successful when there are plenty of the unemployed.

Suppose then that industry begins to pick up. During the depression, people economized, used old supplies as long as they would last, lived on the savings of the more prosperous years, and in general buying was at a low ebb. Merchants were cautious in laying in new stocks of goods, buying only in small lots and in response to the demand for staple goods. But old stocks, both public and private become exhausted in time and buying must begin again, though slowly at first. Then the small beginning reacts upon itself and as new goods are demanded, they must be manufactured and so work is supplied to a larger number of men. These in turn, as they become able to buy, themselves increase the demand.

It is thus that the pendulum starts on its forward swing gathering momentum as it progresses. And what is the effect upon accidents? The new employees are not only in general the less efficient workmen but many of them go into an industry with which they are entirely unfamiliar so that the hazard per employee immediately begins to rise unless the employer offsets the tendency by increased attention to accident prevention and safety training among his employees. This movement continues, employees gradually becoming more proficient in their work and less liable to accidents until full employment is reached. But wages continue to rise as competition is felt, as employees find themselves in a position to make their demands effective, and as the argument gains weight that increased prices make

increased wages imperative if the standard of living is to be maintained. And the increased wages in turn are reflected in increased commodity prices and the rise continues. But the increase in wages is not uniform in all industries and so labor turnover increases. Men leave one industry to enter another which pays higher wages and so green help continues to affect the frequency and severity of accidents, while plenty of work results in the retention on the payroll of the careless and unreliable employees thus preventing the attainment of the low accident frequency experienced in the trough of the wave.

When the crest of the wave is reached, again there is a short period of stability, when wages and employment change little. The slower turnover of this period should result in a smaller number of accidents. Safety work now is probably at its height and wages being high in comparison with compensation malingering is not encouraged. But the influences which call a halt upon unlimited expansion have been felt. The merchant has begun to feel that he may be overstocked and grows more cautious in his buying. Money lenders fear the over expansion of industry and tighten up on loans. Up to a certain point increased production may be accomplished without increased facilities and it is when this saturation point is reached that profits are greatest. But at the crest of the wave this point has been passed and profits are diminishing, a fact which of itself tends to a slowing down of rapid expansion. All these influences are soon felt upon employment, as orders decrease in size or are canceled altogether, and the laying off of help begins, the more inefficient going first. A change in number of accidents per unit of exposure may, however, be retarded by the holding of men on the payroll and the reduction of the number of hours worked per man. For a while malingering is encouraged, compensation being drawn as long as possible by the man whose job has gone to somebody else. Malingering has also been known to have been encouraged at such a period by the employer whose work is slack and who is interested in holding an old employee without cost to himself while the insurance company pays for a disability that has ceased to exist. The necessity for economizing leads the average employer to neglect his safety program. But there are offsetting factors caused by the slowing down of industry and the discharge of the newer and less efficient employees.

This analysis follows in a general way ideas which have been frequently expressed by Mr. S. B. Perkins and which we understand he has tested to some extent by the experience of the Travelers Insurance Company. However, we have no conclusive proof and the analysis, it is true, is only theoretical as yet. But you will agree, we believe, that accident frequency and severity are directly dependent upon economic conditions and not a matter of chance. It has been argued that the current growing sympathy for the laboring man and increasing socialistic tendencies have led to an increased liberality in the interpretation of state compensation laws. It is true that these tendencies are undoubtedly expressed in the increased benefits provided by the various laws, many of which are liberalized at practically every session of the state legislature, but such changes are easily taken account of in rate determination and it is doubtful if the increased liberality of interpretation could materially affect loss costs throughout the United States within a four or five year period. If there is such a steady upward trend, however, our investigations should reveal that fact.

The chief difficulty in the way of solving our problem is the lack of adequate statistical data, not only for recent periods but for any period. Let us go back to the formula as stated in the first part of this paper and examine it to see just what our requirements are. To take the simpler problem, suppose we are trying only to determine rates on the basis of present, not future conditions. Referring to the equation on page 152, suppose the time t_0 is the last policy year for which a complete Schedule Z is available. p_0 and R_0 may be obtained directly from the experience. s_0 should be obtainable from accident punch cards, though we suspect that further studies of this factor may show that it varies little from year to year except as affected by changes in the compensation law such as decreases in the waiting period, and by changes in distribution of industry. The first condition can be taken care of with a fair degree of accuracy by theoretical calculations while the second is one which must be eliminated from our comparisons of rate level and taken care of by proper attention to correct relativity factors between classifications. Investigation should be made, however, of the correlation between accident severity and industrial conditions to determine whether malingering has an appreciable effect. r_0

reduces to $\frac{\text{average cost per case}}{s \times w}$. Average cost per case defined as total loss divided by number of compensable cases is obtainable from Schedule *Z*, while the present statistical program of the National Council on Compensation Insurance calls for regular semi-annual reports of wage data. The determination of the value of f_0 presents greater difficulty. We have a value for $N_0 f_0$ which is the number of accidents and we also have the value of $N_0 w_0$, or the total payroll. If we can assume that the value of the average wage reported to the National Council on accident cases is equal to w_0, the average wage of *all* employees, then we may determine N_0 by dividing the total payroll by the average yearly wage. f_0 is equal to the total number of compensable accidents divided by the number of full-time workers.

Suppose we wish to determine the value of ρ_1, the loss ratio to be expected under current conditions. Let us see what approximations we must use and what difficulties would be encountered in securing the necessary factors.

R_1 may be determined by applying present manual rates to the payrolls produced during the time t_0, having adjusted the total premium so calculated for the effect of schedule and experience rating. The effect of both these merit rating plans on current business can be determined from current applications. f_1, s_1 and r_1 present serious difficulties and it is these values which we propose to determine by establishing correlations with economic and business conditions. It should be noted that it is not necessary to establish absolute values, but that the ratios between values at the different periods is sufficient. It is possible also that values of $\frac{s_1}{s_0}$ and $\frac{r_1}{r_0}$ based upon a standard accident distribution would be entirely satisfactory. That however can be decided by a study of past experience.

One recent attempt to secure values of $\frac{f_1}{f_0}$, that is, current accident frequency trend, is worthy of note here. In spite of all the objections to the use of premium volume as a basis of exposure, it is a basis readily obtainable from the books of casualty insurance companies and does reflect, though probably with a considerable lag, employment and wage conditions. With this

in mind the New York Association of Casualty and Surety Statisticians has compiled an exhibit of premiums in force and accident notices by month for calendar years 1921, 1922 and the first nine months of 1923. The premiums have been modified by the index numbers for factory payrolls in New York State for the corresponding months and an accident frequency factor calculated per $100,000 of modified premium. The combined data is published herewith by consent of the secretary of the Association. The results look fairly reasonable and comparable with similar results obtained from other sources. It would seem, however, that the inaccuracies in such material are too great to make the indications usable for rate making purposes. Advance estimates of premiums vary according to past wage and employment trends and are also influenced by the competitive situation. Premiums in force and number of accident notices are not available by state nor are country-wide index numbers for payrolls available. Only a few states publish statistics showing current employment conditions, but the number is increasing, and we believe that the possibilities along this line should be carefully investigated.

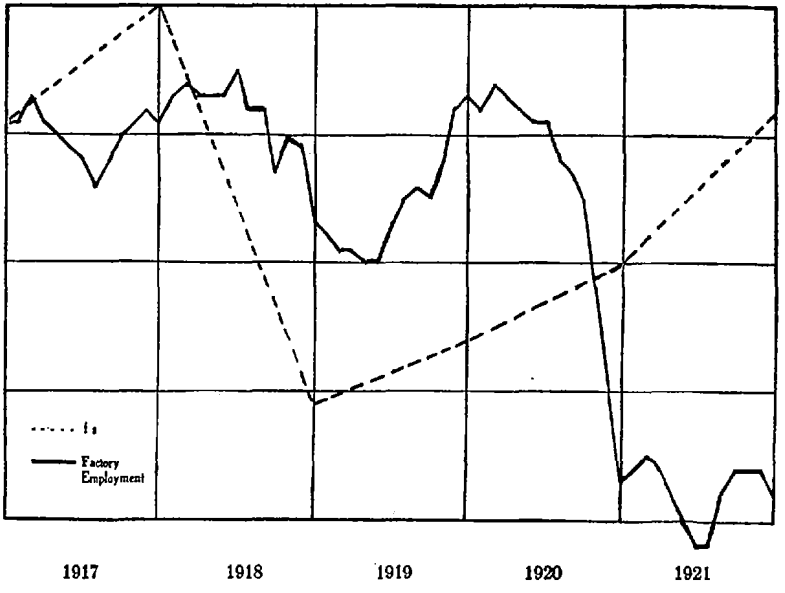
In order to test the possibility of securing accident trend data to use for correlation tests we used National Bureau Schedule Z experience for New York State for policy years 1916* to 1921 inclusive. The indicated values were substituted in the equation as written on page 153, values of r being determined by using the actual average cost per case and a value of s determined from the American Accident Table distribution. Using subscripts to denote the values for the successive policy years and letting $f_{16}\, s_{16} = 1$, we have

$$\begin{aligned} f_{17}\, s_{17} &= 1.076 \\ f_{18}\, s_{18} &= .818 \\ f_{19}\, s_{19} &= .862 \\ f_{20}\, s_{20} &= .906 \\ f_{21}\, s_{21} &= 1.006 \end{aligned}$$

Plotting these figures roughly with those for New York State factory employment published by the Industrial Commission, and assuming the above values for policy years as indicative

*The data for policy year 1916 is the total for all companies writing in the state.

of conditions at the end of the respective calendar year, we have something like this:



Another problem to be solved is the method of eliminating the effect of changes in distribution of industries. Accident frequency factors by classification are unsatisfactory even for the largest classes and for several states combined. Rate-level factors, like the projection and wage factors now used, can only be expected to fit the average, not the individual risk or class. Peaks of employment, high wages, etc., do not occur at exactly the same time in all industries. Even though refinements may enter later, we must remember at this stage that we are trying primarily to solve the problem of general rate-level, not individual class or industry level. The question as to how far it is practicable to go in fitting the average rate for all industries to the proper rate for the individual risk is still open, but should not be confused with the general rate-level problem.

In conclusion it should be understood that although the fundamental equation which has been stated in this paper is obviously correct, the analysis of the problem as built thereon is admittedly only hypothetical, and its chief value lies in its suggestiveness,

not in any absolute truth which has been discovered. We have tried only to outline in brief the problems which must be solved and possible ways of attacking them. Our study of the problems, however, leads us to believe that the difficulties are not insurmountable and that a thorough investigation of the possibilities will lead to valuable concrete results.

WORKMEN'S COMPENSATION EXPERIENCE COMPILED BY THE N. Y. ASSOCIATION OF CASUALTY & SURETY STATISTICIANS

Year	Month	Countrywide Premium in Force	Index No.*	Modified Premium	No. of Notices	Accident Frequency†	
						Modified	Actual
1921	January	10,153,287	203	10,153,287	13,883	137	137
	February	10,263,530	201	10,161,921	13,635	134	133
	March	10,387,259	204	10,438,157	15,034	144	145
	1st Quar.	30,804,076	..	30,753,365	42,552	138	138
	April	10,426,862	195	10,016,044	14,666	146	141
	May	10,397,093	188	9,628,748	16,046	167	154
	June	10,428,023	184	9,451,960	17,227	182	165
	2nd Quar.	31,251,978	..	29,096,752	47,939	165	153
	July	10,232,760	177	8,921,943	17,501	196	171
	August	10,208,875	178	8,951,142	19,477	218	191
	September	10,062,350	182	9,021,903	18,184	202	181
	3rd Quar.	30,503,985	..	26,894,988	55,162	205	181
	October	10,072,706	183	9,080,544	19,259	212	191
	November	10,003,886	181	8,919,465	17,555	197	175
	December	9,667,250	185	8,809,765	17,486	198	181
	4th Quar.	29,743,842	..	26,809,774	54,300	203	183
	Total	122,303,881	..	113,554,879	199,953	176	163
1922	January	9,643,503	179	8,503,641	14,050	165	146
	February	9,817,323	182	8,802,212	12,980	147	132
	March	9,803,444	188	9,078,969	15,611	172	159
	1st Quar.	29,264,270	..	26,384,822	42,641	162	146
	April	9,901,098	182	8,877,324	15,176	171	153
	May	9,889,419	187	9,110,133	17,406	191	176
	June	9,894,508	192	9,358,226	19,129	204	193
	2nd Quar.	29,685,025	..	27,345,683	51,711	189	174

WORKMEN'S COMPENSATION EXPERIENCE COMPILED BY THE N. Y. ASSOCIATION OF CASUALTY & SURETY STATISTICIANS—*Continued*

Year	Month	Countrywide Premium in Force	Index No.*	Modified Premium	No. of Notices	Accident Frequency†	
						Modified	Actual
1922	July	9,961,037	191	9,372,340	19,589	209	197
	August	10,173,151	198	9,922,891	22,876	231	225
	September	9,983,062	207	10,179,728	21,654	213	217
	3rd Quar.	30,117,250	..	29,474,959	64,119	218	213
	October	10,071,053	213	10,567,556	22,968	217	228
	November	10,160,258	222	11,111,258	21,423	193	211
	December	9,885,426	228	11,103,310	20,625	186	209
	4th Quar.	30,116,737	..	32,782,124	65,016	198	216
	Total	119,183,282	..	115,987,588	223,487	193	188
1923	January	10,014,173	227	11,197,848	20,097	179	201
	February	10,000,682	226	11,133,759	19,131	172	191
	March	9,995,395	241	11,866,533	20,661	174	207
	1st Quar.	30,010,250	..	34,198,140	59,889	175	199
	April	10,070,415	241	11,955,597	21,166	177	210
	May	10,144,264	244	12,193,405	23,872	196	235
	June	10,101,167	244	12,141,603	24,217	199	240
	2nd Quar.	30,315,846	..	36,290,605	69,255	191	228
	July	10,202,053	240	12,061,887	26,777	222	133
	August	10,166,749	234	11,719,212	27,835	238	274
	September	10,191,790	234	11,748,076	25,842	220	254
	3rd Quar.	30,560,592	..	35,529,175	80,454	226	263
	Total	90,886,688	..	106,017,920	209,598	198	231
Grand Total		332,373,851	..	335,560,387	633,038	189	190

*New York State factory payrolls as reported by the N. Y. State Industrial Commission.
†Per $100,000 of Premium.

THE COMPENSATION RATEMAKING PROBLEM IN THE LIGHT OF THE 1923-24 REVISION

BY

WINFIELD W. GREENE

The 1923-24 general revision of compensation insurance rates is only now being completed. In its inception, this revision was based upon a theory of ratemaking which Mr. A. H. Mowbray developed in a paper presented to this Society on May 25, 1923.

Mr. Mowbray's basic thesis might, I believe, be concisely approximated as follows:

1—In making compensation rates, the principal factors are
  a—the accident rate
  b—the rate of wages, and
  c—the benefit scale.

2—For practical purposes we may assume that the accident rate per "full time worker" is constant.

3—The wage rate is variable and accordingly it is necessary to ascertain the wage rate which will prevail in the immediate future and translate our experience to that wage level.

4—Our experience must, of course, be adjusted to the latest benefit scale.

Mr. Mowbray developed the application of this theory in considerable detail in his paper along the following lines:

1. Conversion factors were to be applied to each of six "kinds of injury" and to "payroll," to translate the experience of a stated policy year to "state latest," *i. e.*, to the "level" of present law and "future" wages.

  (a). The payroll conversion factor was to be identical with the estimated change in average wage rate.

  (b). The loss conversion factors (with the exception of medical) were to reflect both wage change and benefit change, as applied to the "type of injury" and dependency distributions of the American Accident Table.

2. The medical differential was to reflect the actual change in cost per compensable case, as indicated by a comparison of the data for the latest Schedule "Z" year with that for earlier years. In this comparison, allowance was to be made for any change in

the number of compensable cases owing to a change in waiting period.

3. The Schedule "Z" data were to be converted first to the state latest level and then to a "basic" level, *i. e.*, that of a selected state (New York), by the use of factors computed by methods in every way analogous to those just described.

4. It was intended to select pure premiums upon the basic level, with due regard to "state exceptions," separately for each of the six kinds of injury (death, permanent total, major permanent partial, minor permanent partial, temporary and medical).

5. The selected pure premiums (on the basic level) were to be "reverted"* to the "latest" level of each state by using the reciprocals of the factors used in combining the data.

The 1923-24 revision itself afforded no comprehensive test of its original theory upon which, consequently, we shall not attempt to pass judgment. Our object will be to describe and account for certain material departures from this theory which took place during the revision as well as some details of its practical application. As the question of rate level is obviously paramount we shall first discuss

The Projection Factor

The use of a "projection factor" would not appear to be consistent with the hypothesis advanced by Mr. Mowbray although in the concluding paragraphs of his paper, he admitted the possibility that its introduction might be justified under certain conditions. The Rates Committee of the Council, however, in reviewing a working outline of the method July 13, 1923, adopted a resolution which approved the proposed method, as far as the combination of experience was concerned, but made the following reservation regarding rate level; "in order to translate such experience to the level of present day experience, the Actuarial Committee is instructed to prepare the necessary factors to accomplish this result and report to the Rates Committee." This resolution reflected a doubt in the minds of some members of the Rates Committee that the proposed method would

*Mr. Mowbray did not use this term.

produce adequate rates in view of the unfavorable experience under policies issued in 1921 and 1922.

In the first instance, the Actuarial Committee and the Council Staff recommended keying the new rates to the cost level of policy year 1922, through a comparison of "manual loss ratios," to be made separately for each state.

Aggregate data as to premiums written and losses paid and incurred for policy years 1918-1922 were being tabulated by the Council from individual carrier reports (See Exhibit B). Premiums written and losses paid down to June 30, 1923 *for policy year 1922 were to be "projected" to "ultimate" earned premiums and losses incurred by factors derived from study of the corresponding developments for previous policy years. Ultimate (collected) premiums were to be modified for changes in rate level, and to eliminate the effect of schedule and experience rating, in order to put such premiums upon the basis of the then manual rates. Ultimate (actual) losses were to be modified to bring them to the basis of the latest workmen's compensation law. Dividing the "ultimate" losses on the basis of the latest law by the "ultimate" premiums on the then manual basis would give the 1922 "manual loss ratio" which would be the numerator of the projection factor.

The denominator of the projection factor, the manual loss ratio represented by the individual classification experience employed in making rates, was to be obtained by (1) converting Schedule Z aggregate data for 1918-1920 (the policy years for which data were to be reviewed in the selection of pure premiums) to "state latest" basis (using the conversion factors above described), and taking off the aggregate *state latest pure premium* for the three years combined; (2) applying current manual rates to the classification payrolls for the same years, and taking off the *average manual rate*, and (3) dividing the state latest pure premium by the average manual rate.

The Actuarial Committee recognized that this procedure might have to be modified for states where, because of the lack of rate regulation, there would be uncertainty that the 1922 loss ratio would be upon a correct manual basis.

*The projected 1922 loss ratio as actually employed in the rate level calculations was based on premiums written and losses paid brought down to the latest practicable date,—December 31, 1923, in a majority of the states.

The projection factor was intended to apply to the indications of each state's own experience. The pure premiums actually employed for each state would largely be based upon national experience, reverted to the state latest level by theoretical factors. It was consequently provided that before applying the projection factor, those pure premiums not based on local experience were to be "trued up" by a comparison of actual state losses with the expected losses obtained by applying the selected pure premiums to the state classification payrolls.

The recommendations* of the Actuarial Committee and Council Staff were presented to the Rates Committee and approved by it on October 18, 1923. However, the presentation of concrete data for certain states precipitated a marked divergence of opinion in both committees as to whether this "a priori" decision should be adhered to.

It became apparent that keying to 1922 would result in a material modification of the "state latest" level, the "developed" loss ratio for 1922 being generally higher than that for 1921, which in turn was almost universally higher than the average for 1918-1920. Some committee members held that 1922 was the correct basis because that year represented a new high level of pure premium cost due to increases in accident rate and in the liberality of claim administration. Others held that no projection factor was needed for the following reasons:

1—The upward cost trend of 1921 and 1922 policy years (to the extent to which it actually existed) was characteristic of an industrial depression which had already passed.

2—Improvement in general economic conditions would bring about an amelioration of loss ratios (largely through increased wage rates) analogous to the bettering of the business during the war period.

3—The indicated 1922 loss ratio was erroneously high, as heavy additionals would bring the ultimate premiums to a point higher than that indicated by the premium development factors used.

In these discussions, whose ramifications defy the chronicler, there evolved a type of "rate level calculation" which was to be generally employed throughout the revision (see Exhibit C). On this sheet are shown manual loss ratios for policy years 1918-

*See Exhibit A for a general outline of these recommendations.

1920 combined (column 3), 1921 (column 12) and 1922 (column 21). All these manual loss ratios are upon the "state latest" basis, *i. e.*, they reflect current manual rates, current law and "future" wages. Similar loss ratios for 1921-1922 and 1918-1922 are obtained as arithmetic averages. "Increasing cost" factors are taken off on the basis of the latest one, two, or five years observed, by comparison of their respective loss ratios with that of the years (1918-20 or 1918-21) whose experience is employed in making classification rates.

Up to this point, the calculation indicates what modification of the results of the original procedure should be made, assuming that the selected "future" average wage is correct. This average wage had been generally based upon payroll audit data covering approximately calender year 1922. It was known that for many states and industries a material wage increase had occurred from the summer of 1922 to the spring of 1923, recognition of which would tend to offset the increasing cost factor and consequently a "wage change factor" was introduced.

In the first few states considered the wage change factor was based on data compiled by the National Industrial Conference Board. These data were confined almost entirely to manufacturing and, although gathered from all over the country, were preponderantly representative of the states east of the Mississippi and north of the Mason and Dixon line. The Board's data indicated a wage index for the middle of 1923 about 14.4% higher than for the average of 1922. As soon as practicable, the Council secured wage data from its members covering policy years 1921 and 1922, and the last six months of 1923 calendar year, and the carrier figures were used for all states for which they were available in time. The wage increase indicated by the Board's data was found to be about 50% too high for our purposes* even for the northeastern states and about treble the correct (for our purposes) figure for the southeast, the Rocky Mountain states, and California. The company wage data indicated little if any wage increase for the west central and southwestern states.

The translation of the 1921 loss ratio to the manual rate basis in "non-supervised" states was accomplished by applying manual rates to the actual classification payrolls as reported in Schedule Z. The payrolls were not available for policy year 1922, but the

*This is no reflection upon the intrinsic correctness of the Board's data.

(collected) premium as reported in the loss ratio data was raised to the manual basis by applying the ratio of "manual to collected" derived from the 1921 calculation. In such states the difference between collected and manual not accounted for by the merit rating plans ran generally between 5% and 10%.

Generally speaking, the rates made effective or proposed as the result of the 1923-24 revision have either explicitly or by implication, involved a projection factor which was the product of a selected increasing cost factor and a wage change factor. Where practically no change in wage levels (from the average of policy years 1921 and 1922 to the last half of calendar year 1923) was observed, the wage change factor was "rounded off" at unity. In other cases it was the projection factor itself which "came out" close to 1.000, and was accordingly forced to the even figure.

The wage change factor was determined statistically. The increasing cost factor, on the other hand, represented the exercise of committee judgment.

The original plans of the Staff contemplated following the projection procedure of the 1920 Rate Revision, namely keying the rates to the latest policy year available, which in this instance implied the use of policy year 1922. No wage change factor was contemplated. For the first few states (principally supervised states) considered, the Rates Committee rejected this basis in favor of the average of policy years 1921-22 with a wage change factor. The non-supervised states were next taken up. By this time loss ratio data brought down to December 31, 1923 were available, and indicated that policy year 1923 loss ratio for these states would probably exceed that of policy year 1922. Partly for this reason, and partly because the statistical data for these states were regarded as less reliable than those for supervised states, it was the opinion of the Staff that the 1921-22 basis should be modified, and the following policy was recommended:

Keying the rates to (a) 1922 or to (b) 1921-1922 (with wage change factor in each case), whichever resulted in the lesser disturbance of existing manual level; with the continuance of previous manual level wherever it fell between (a) and (b).

This plan was generally followed by the Rates Committee and also by the Regional Committees of the Council.

The last states considered in the revision were regulated states. For these states also loss ratio data indicated that 1923 loss ratio

would probably exceed 1922, and the Rates Committee in its proposals for these states reverted to the original idea of keying rates to policy year 1922 with no wage change factor. This change of policy was not accepted generally by the regional committees and independent bureaus, who adhered generally to the indications of policy years 1921-22 with such wage change factor as statistics justified.

We are appending for reference a table indicating for each state for which new rates have been made (or proposed) the projection factor and its basis (see Exhibit D).

Technical Problems

Wage Selections

The revision as originally planned hinged upon the trend of wage levels. Individual accident reports from Schedule Z were the only wage data available for policy years 1918-1920 and these were, for many states, inadequate in volume. The data for calendar year 1922, based on payroll audits covering that year, were sufficient in volume but reflected the wage level of *all employees* which is presumably lower than that for *seriously injured employees* only.* The first difficulty was overcome to some extent by study of regional combinations of data, and the second by a reweighting of the wage data for serious cases according to the Schedule Z payroll distribution by industry. The importance of the original wage selections was minimized by the method adopted for determining the projection factor, whereby the wages selected for policy years 1921 and 1922 and for the later half of calendar year 1923 were the only ones affecting rate levels. These latter selections were generally based on adequate wage data, compiled by the carriers, covering all compensable cases.

Limit Factors

Compensation is computed at a stated percentage of wages, subject to monetary weekly maxima and minima. Obviously, the (1) average rate of compensation paid in a given community will seldom be identical with the (2) product of the specified percentage and the average weekly wage. The ratio (1) to (2),

*Both industrial Commission and company statistics indicate that the average wage for serious ***injuries*** is some 5% higher than for all ***injuries***.

i. e., of realized percentage to nominal percentage, is termed the "limit factor".

Limit factors may be computed upon a detailed distribution of wage rates among employees injured but this method is generally impracticable. Assuming a normal wage distribution introduces very little error for law differential purposes, and Mr. Mowbray developed a method of computing limit factors based on this assumption. (*Proceedings*, Vol. IX, Page 208.) The writer devised a "shortcut" application of Mr. Mowbray's method (See Exhibit E) reducing the time of computation materially. Since between ten and a hundred limit factors were required for each state, the resultant saving in time was substantial.

Ratemaking Procedure

Two important changes were made in ratemaking procedure.

(a) Experience was converted direct to New York 1920 level and then to state latest; instead of first to "state latest," then to New York 1920, and finally back to state latest.

This change was made to eliminate one step in the conversion, and also to expedite the selection of national pure premiums.

(b) Pure premiums were selected by three parts, "serious," "non-serious," and "medical," instead of by all six kinds of loss shown in Schedule Z. Simplicity and the wish to avoid "thinning out" the data dictated this change.

Conclusions

The National Council on Compensation Insurance is now on the eve of a further revision of compensation rates which presumably for many states will become effective as early as January 1, 1925. Accordingly this is by no means an appropriate time to make predictions as to future methods of compensation ratemaking.

We may, however, consider for a moment what are the criteria of a method of making compensation rates.

In the first place, it seems necessary to break up the problem to a certain extent into its component parts. For this purpose, the first division which we would have to make would appear

to be between the medical pure premium and the indemnity pure premium.

With respect to the medical pure premium, there would appear to be three elements which, other things being equal, it would be desirable to study separately.

1—wage rate
2—accident rate
3—cost per case. (ratio of total medical cost to number of compensable cases in Schedule Z).

Similarly, the indemnity pure premium may be broken up into
1—wage rate
2—accident rate
3—duration of disability.

This makes four separate elements to be studied, wage rate and accident rate being an element common to both medical and indemnity pure premiums.

The task before us with respect to each one of these elements is to ascertain if possible the law which governs it. Apparently, we shall know how to utilize the data we have as to the past with respect to any element if one of the following things can be proved:

1—that the element is practically speaking, a constant, or,
2—that it varies in a cycle so that a "moving average" for a certain number of years may be taken as constant, or
3—that it is correlated with some other variable either directly or inversely so that its future course can be predicted from a study of such other variable.

The implications of the theory originally proposed for the 1923-1924 revision as respects indemnity pure premiums, were

1—the element of duration is constant
2—the accident rate is constant
3—the wage rate is a variable whose course for the immediate future may be predicted with a satisfactory degree of accuracy.

At this stage premises (1) and (2) cannot be separately tested on a satisfactory basis. Evidently the indemnity pure premium (even when adjusted to a fixed wage rate) cannot be regarded as constant.

In concrete terms, the pure premium for policy years 1921 and 1922, and probably for policy year 1923, has proved so much higher than that for policy years 1918-1920 (as evidenced by the comparison of manual loss ratios) that the use of the 1918-1920 experience without a projection factor was obviously unwarranted.

Furthermore, the wage rate has a way of changing unexpectedly, and our recent past attempts at prediction warrant the statement that wage rates cannot be prophesied. Accordingly, it is desirable to find, if possible, a plan for fixing rate levels which will not involve any premise as to the wage rate of the future.

EXHIBIT A

OUTLINE OF WORKING PROGRAM 1923 RATE REVISION

PRESENTED TO RATES COMMITTEE OCTOBER 18, 1923

At its July meeting the Rates Committee considered and approved the general method of combining experience presented by Mr. Leslie. This method was, in principle, first outlined by Mr. Mowbray.

The complete working program of the Council for the current revision, which includes some steps not covered by the original plan, may briefly be outlined as follows:

(1) Posting of Schedule "Z"

Schedule "Z" returns from the individual carriers are first audited then combined for each state, classification and policy year. The combined experience for each classification is then posted to a State Classification Card.

(2) Conversion to New York 1920

Using appropriate factors, the raw experience on the cards is converted to the level of New York policy year 1920, and the results are posted on the cards. Seven factors are used for each

policy year and each state. These factors are the result of valuing the respective compensation laws upon the American Accident Table and the wage level of the particular policy year and state.

The State Classification Cards are so designed that in any future use of experience, early policy years may be omitted and new policy years added to the total of converted experience. The cards provide space for a second reporting of the experience, or a second conversion of the same data. One of the principal purposes of the cards is to provide a means whereby clerical work once done will be permanently preserved in useable form.

(3) Experience Exhibit Sheet

The converted experience of each state is added under the following headings:—Payroll, Serious (death, permanent total and major permanent partial), Non-serious (minor permanent partial and temporary) and Medical, all policy years of a given state being combined. The totals are posted upon an Experience Exhibit Sheet, upon which pure premiums are computed.

(4) Selection of Pure Premiums

With copies of the experience exhibit before them, the staff of the Council selects "national" pure premiums and "state exception" pure premiums, all upon New York 1920 level.

(5) Reversion to "State Latest"

The selected pure premiums are then *reverted* to state latest level using theoretical factors, which are consistent with those employed in combining the experience. The so-called "state latest" level corresponds to the latest benefit provisions of the compensation law and to the wage level of calendar year 1922 of the individual state. Three factors are used, respectively applicable to Serious, Non-serious and Medical pure premiums; except where the experience basis of the "state exception" is confined to the experience of the individual state, in which case detail factors are applied in order to insure precise results (in the latter case there are seven factors for each policy year, applying respectively to Payroll, Death, Permanent Total, Major Permanent Partial, Minor Permanent Partial, Temporary and Medical).

(6) Correction of Cost Level Represented by State Latest Pure Premiums

The object of the general method of combining experience is to obtain pure premiums which will represent the cost level of the "latest" law and "latest" wages (1922 wages being regarded for "reversion" purposes as "latest"). Theoretically, the "reversion" of selected pure premiums just referred to should accomplish this purpose and practically it will do so for classifications where only the experience of the individual state is employed. Selected pure premiums which result from the combined experience of all states or of a number of states, when "reverted," may not produce the desired cost level, hence a correction must be introduced.

To this end the cost level indicated by the state latest pure premiums (the "reverted" selected pure premiums) will be compared with the cost level resulting from translating the bulk experience (Schedule "Z" summaries) of the individual state, policy years 1918, 1919 and 1920, to "state latest" and the indicated correction will be applied to the selected pure premiums for those classifications where the selection was not based solely on the state's own data. (The pure premiums based entirely on the experience of the individual state require no such adjustment).

In order to determine the cost level of the state latest pure premiums (before they have been corrected) we apply them to the classification payrolls of the state in question, adding for each classification the payrolls for policy years 1918, 1919 and 1920.

(7) Projection Factor

There are a number of reasons why our theoretical state latest may not correspond to the actual current cost level.

By our theoretical method we have taken into account law changes and wage changes. We are not able to bring in wages after 1922. We can't predict future wages anyway. Our theoretical method does not reflect changes in accident rate nor does it measure changes in the interpretation and administration of the workmen's compensation laws.

Having gone as far as we can on theory, we propose to compare our results with the best available index as to current cost, which

we believe to be the loss ratio of policy year 1922. Our plan contemplates making the closest estimate we can of this loss ratio and adjusting it for comparative purposes to a Manual rate basis, in the light of the known effect of schedule and experience rating.

NOTE: In states where benefit schedules of the Compensation Act have been amended effective subsequent to January 1, 1922, an appropriate adjustment of the losses will have to be made.

The test described under (6) discloses the "expected losses" produced by applying our *corrected* state latest pure premiums to the classification payrolls of the individual state. To these same payrolls we will apply the Manual rates which were in effect in 1922 policy year and, in this way, we will obtain a theoretical loss ratio upon the same Manual rate basis as the estimated loss ratio of policy year 1922.

Comparing the actual loss ratio with the theoretical loss ratio we will get an indication of what adjustment must be made in our corrected state latest pure premiums in order to reach a proper cost level upon the assumption that the cost conditions of policy year 1922 are representative of those which will obtain during the period to which the new rates will apply.

(8) MULTIPLIER

Assuming that the schedule and experience rating plans will produce a balance, the multiplier to convert the corrected pure premiums into rates will be the product of the following factors:

(a) Projection factor
(b) Expense loading factor

* * * * * * * * *

This working program is merely the "modus operandi" of the plan already approved by the Rates Committee. There is brought in, however, the method of determining the "Projection Factor" which was previously referred to the Actuarial Committee for consideration.

The Projection Factor represents merely a "trueing up" of our theoretical results with what we know of actual cost levels.

The principle source of information on loss ratios, from which to determine the "Projection Factor," will be the data now being compiled as a result of our special call of July last. This information is not as complete as we would wish, but we have useable returns from the majority of important carriers, which will give us fairly reliable indications for more states.

The Actuarial Committee, after considering this subject, at its meeting of October 16th and 17th, adopted the following resolution:

RESOLVED: That it is the sense of the Actuarial Committee that the rate level be determined in accordance with the estimated loss ratio of policy year 1922; that such estimated loss ratio be determined in the light of all available information, including the loss ratio data recently reported to the Council, and that the calculation of loss ratios of individual states be reviewed by the Actuarial Committee.

EXHIBIT B

NATIONAL COUNCIL ON COMPENSATION INSURANCE

July, 1923, Special Call for Loss Ratio Experience

_____Company State of_____

Year of Issue		RECORD AS OF					
		June 30, 1918	December 31, 1918	June 30, 1919	June 30, 1923		
1918	Net Prems. Written						
	Unearned Premium Reserve						
	Losses Paid						
	Losses Incurred						
		June 30, 1919	December 31, 1919	June 30, 1920	June 30, 1923		
1919	Net Prems. Written						
	Unearned Premium Reserve						
	Losses Paid						
	Losses Incurred						
		June 30, 1920	December 31, 1920	June 30, 1921	June 30, 1923		
1920	Net Prems. Written						
	Unearned Premium Reserve						
	Losses Paid						
	Losses Incurred						
		June 30, 1921	December 31, 1921	June 30, 1922	June 30, 1923		
1921	Net Prems. Written						
	Unearned Premium Reserve						
	Losses Paid						
	Losses Incurred						
		June 30, 1922	December 31, 1922		June 30, 1923		
1922	Net Prems. Written			XXX			
	Unearned Premium Reserve			XXX			
	Losses Paid			XXX			
	Losses Incurred			XXX			
					June 30, 1923		
1923	Net Prems Written	XXX	XXX	XXX			
	Unearned Premium Reserve	XXX	XXX	XXX			
	Losses Paid	XXX	XXX	XXX			
	Losses Incurred	XXX	XXX	XXX			

EXHIBIT C

NATIONAL COUNCIL ON COMPENSATION INSURANCE

1923 Revision **PROJECTION FACTOR** **State**_____

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
POLICY YEARS 1918-19-20 AND 21 COMBINED			POLICY YEAR 1921 "Z"						
S.L. Pure Prem.	Average (Pres.) Manual Rate	Loss Ratio (1) ÷ (2)	Actual Losses	Conver. Factor (to State Latest)	Product (4)x(5)	Actual Premiums	Payroll Conver. Factor (to State Latest)	Ratio Adjusted to Manual Premiums	Present Manual Level ÷ 1921 Level
.837	1.588	52.7	319250	.997	318292	519722	.993	.951	1.000

(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
POLICY YEAR 1921 "Z"		POLICY YEAR 1922						
(7)x(8)x(10) / (9)	Loss Ratio (6)÷(11)	Actual Losses	Conver. Factor (to State Latest)	Product (13)x(14)	Actual Premiums	Payroll Conver. Factor (to State Latest)	Ratio Adjusted to Manual Premiums	Present Manual Level ÷ 1922 Level
542675	58.7	427322	1.003	428604	575949	1.007	.951	1.000

(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
POLICY YEAR 1922		INCREASING COST FACTORS					
		I	II		III		
(16)x(17)x(19) / (18)	Loss Ratio (15)÷(20)	I. C. F. (21)÷(3)	Aver. Loss Ratio 1921-22 (12)÷(21) / 2	I. C. F. (23)÷(3)	Average Loss Ratio 1918-22 4x(3)+ 21) / 5	I. C. F. (25)÷(3)	Wage Factor Change from 1922 Cal. Year to Present
609930	70.3	1.334	64.5	1.224	56.2	1.066	1.012

(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)
Selected Increasing Cost Factor	Projection Factor (27)x(28)	Loading	Proposed Average Manual Rate (1)x(29)x(30)	Present Average Manual Rate	Ratio (31)÷(32)	Present Average Collectible Rate	Ratio (31)÷(34)
1.224	1.239	1.667	1.728	1.588	1.088	1.510	1.144

NOTES.

Column (1) obtained by converting Schedule Z total losses and payrolls to State Latest.
Column (2) obtained by applying current manual rates to classification payrolls.
Columns (4) and (7) taken from Schedule Z (except in the case of the first few states reviewed, for which loss ratio data were employed.)
Column (9) (a) where loss ratio data were used, this value was based on estimates furnished by rating offices as to the effect of schedule and experience rating on premium volume.
(b) where Schedule Z was available, this ratio was obtained by comparing reported (collected) premiums with manual premiums (obtained by applying manual rates to classification payrolls.)
Columns (13) and (16) generally from loss ratio data (from Schedule Z in the case of last two states reviewed.)
Column (18) (a) based on rating office estimates, except (b) where corresponding ratio for 1921 (column (9)) was computed on Schedule Z data, in which case the 1921 ratio was used for 1922 also.
Column (27) The wage change factor is discussed in the body of the paper.
Column (33) This is the estimated increase in manual rate level.
Column (35) This is the increase in collectible rate level, as estimated upon the assumption that the new experience and schedule rating plans, generally made effective concurrently with the new rates, will "balance", i. e., that credits will be offset by debits.

EXHIBIT D

Brought down to October 1, 1924

State	Selected Increasing Cost Factor	Basis of Same	Wage Change Factor	Projection Factor	Ratio of Proposed to Present Manual	Ratio of Proposed to Present Collectible	Effective Date	Action by State Authorities
Alabama	1.023	Average 1921-1922	.967	.989	.940	1.007	March 1, 1924	
California	1.000	2.9 points below average 1921-1922	1.000	1.000	.956	1.004	Sept. 30, 1924	
Colorado	1.250	5.1 points below average 1921-1922	.924	1.155	1.121	1.150	July 1, 1924	
Connecticut	1.038	5.6 points below average 1921-1922	.963	1.000	.900	1.065	June 1, 1924	
Georgia	1.088	Average 1921 and 1922	.965	1.050	1.203	1.289	.....	X
Idaho	1.150	4.4 points below average 1921-1922	.874	1.005	1.182	1.255	Feb. 1, 1924	
Illinois	1.110	Continue present collectible level	.909	1.009	.865	1.000	June 1, 1924	
Indiana	1.238	1922	.946	1.171	.992	1.130	June 1, 1924	
Iowa	1.204	Continue present manual level	.979	1.179	1.000	1.127	July 1, 1924	
Kansas	1.224	Average 1921 and 1922	1.012	1.239	1.088	1.114	June 1, 1924	
Kentucky	1.247	1922	1.000	1.247	1.050	1.150	.....	X
Louisiana	1.264	Continue present manual level	1.000	1.264	1.000	—	Sept. 1, 1924	
Maine	1.126	Average 1921-1922	.969	1.091	1.012	1.124	July 1, 1924	
Maryland	1.300	Approximate 1922. 5 points above average 1921-1922	.933	1.213	1.137	1.236	Jan. 1, 1924	
Massachusetts	..	Projection Factor Sel. by Massachusetts Rating and Inspection Bureau	—	.977	1.050	1.140	Dec. 31, 1923	
Michigan	1.223	1922	.929	1.136	.916	1.095	June 1, 1924	
Minnesota	1.000	2.3 points below average 1921-1922	1.000	1.000	—	—	.....	X
Montana	1.102	Continue present manual level	1.000	1.102	1.000	1.051	June 1, 1924	
Nebraska	1.177	Average 1921-1922	.894	1.170	1.070	1.188	June 1, 1924	
New Hampshire	.877	Continue present manual level	.921	.808	1.000	.997	July 1, 1924	
New Jersey	1.143	Approximate average 1921-1922	.936	1.070	1.079	1.079	July 4, 1924	
New Mexico	1.307	Continue present manual level	1.000	1.307	1.000	.949	June 1, 1924	
Oklahoma	1.250	6.4 points below average 1921-1922	.921	1.151	1.211	1.256	.....	D
Rhode Island	1.067	Approximate average 1921-1922	.937	1.000	.885	1.033	June 1, 1924	
Sonth Dakota	1.175	Continue present manual level	1.000	1.175	1.000	1.106	June 1, 1924	
Tennessee	1.102	Average 1921-1922	.964	1.062	1.326	1.421	.....	D
Texas	..	Projection factor of unity sel. by Texas Fire Ins. Commission	—	1.000	1.177	1.252	April 1, 1924	
Utah	1.300	5.7 points below average 1921-1922	.909	1.182	1.165	1.196	.....	X
Vermont	1.116	1922	.946	1.056	.983	1.102	July 1, 1924	
Virginia	1.200	1.4 above average 1921-1922	.934	1.121	1.064	1.064	Jan. 1, 1924	
Wisconsin	1.104	Average 1921 and 1922	1.000	1.104	1.131	—	Sept. 1, 1924	

X—means pending. D—means disapproved. All others—approved or no approval required.

EXHIBIT E

NATIONAL COUNCIL ON COMPENSATION INSURANCE
1923 Revision

STATE_____

LIMIT FACTOR CALCULATION

SHEET_____

No. OF SHEET_____

TABLE

Ratio to Average %	(A)	(B)
10	.02	0
15	06	1
20	14	2
25	32	7
30	65	17
35	1.24	37
40	2.20	76
45	3.66	142
50	5.75	246
55	8.56	401
60	12.14	616
65	16.48	898
70	21.52	1251
75	27.13	1672
80	33.13	2154
85	39.39	2684
90	45.68	3250
95	51.85	3836
100	57.76	4427
105	63.31	5010
110	68.41	5573
115	73.03	6104
120	77.15	6599
125	80.77	7051
130	83.91	7459
135	86.61	7824
140	88.91	8146
145	90.86	8429
150	92.49	8673
155	93.85	8884
160	94.98	9065
165	95.91	9219
170	96.66	9350
175	97.31	9460
180	97.82	9552
185	98.24	9630
190	98.58	9694
195	98.86	9749
200	99.08	9793
205	99.26	9830
210	99.41	9861
215	99.53	9888
220	99.63	9910
225	99.71	9928
230	99.77	9942
235	99.82	9954
240	99.86	9963
245	99.89	9971
250	99.92	9978
255	99.94	9983
260	99.96	9988
265	99.98	9994
270	100.00	10000

1	2	3	4	5	6	7	8	9	10	11	12	13
CLASS OF INJURY	Compensation Law as of	Nominal % of Compensation	Minimum Weekly Compensation	Maximum Weekly Compensation	Minimum Effective Weekly Wage (4) ÷ (3)	Maximum Effective Weekly Wage (5) ÷ (3)	Policy Year	Average Weekly Wage	Ratios to Average: Minimum (6) ÷ (9) %	Ratios to Average: Maximum (7) ÷ (9) %	Ratio Adjusted to Nearest 5%: Minimum %	Ratio Adjusted to Nearest 5%: Maximum %

14	15	16	17	18	19	20	21	22
(B) for (12) From Table*	(B) for (13) From Table*	Difference (15) — (14)	(A) for (12) From Table*	(A) for (13) From Table*	Difference 100.00—(18)	PRODUCTS (10) x 17))	(11) x (19)	Limit Factor (16)+1301+(21) 10,000

ABSTRACT OF THE DISCUSSION OF PAPERS READ AT THE PREVIOUS MEETING

A New Experience Exhibit for Casualty Insurance Companies

H. O. VAN TUYL

VOLUME X, PAGE 7.

WRITTEN DISCUSSION

MR. GEORGE D. MOORE:

Mr. Van Tuyl's paper is a fairly detailed and a very clear exposition of the information called for by the casualty experience exhibit blank. As no theories are advanced by Mr. Van Tuyl, it is hardly possible to criticize this paper. For this reason, all I can do is to call your attention to some of the difficulties casualty companies have encountered in determining the various items called for as well as some of the methods employed in distributing the disbursements to lines of business.

There are four classes of stock casualty companies whose methods and results are probably quite dissimilar, namely: first, specialty line companies writing only one or two of the major lines of insurance; second, multiple line companies on a general agency basis; third, multiple line companies on a branch office basis; fourth, multiple line companies on a general agency basis having also departmental offices organized along the lines of fire insurance companies.

Of course, companies coming under these various groups have entirely different accounting records, and from my knowledge of the companies' methods of operation, I will endeavor to set forth in as clear a manner as possible how, in a majority of instances, the results determined by the various classes of stock carriers were arrived at.

Part 1 of the Underwriting Exhibit:

I. Premiums: This disclosed the earned premiums by line of business for the country as a whole, and presented no particular problem to the companies.

II. The same might be said of "Losses".

III. Investigation and Adjustment of Claims: The fact that the unpaid expenses of investigation and adjustment of claims for

both December 31, 1922 and December 31, 1923 under the Automobile Liability, Liability other than Auto, and Workmen's Compensation lines were eliminated by most companies on account of their inclusion in the Schedule P reserves will have in the aggregate little effect on the results disclosed in this portion of the exhibit, as it is only the difference in the figures for both years which affects the result.

IV. Acquisition and Field Supervision Expenses: This section gave the companies considerable trouble, for when it came to the question of determining what items made up Acquisition and Field Supervision expenses other than commissions, and how the item itself was to be distributed to lines of business, considerable diversity of opinion existed. It was a mooted question whether the expenses, (home office rents, salaries, etc.) of the Agency Department should be charged to this item. In fact, probably 40% of the companies included it, and 60% of the companies excluded it. It seems to the writer that, in theory at least, the expenses of the Agency Department should have been included with the Acquisition Cost.

When it came to the question of the basis of distribution, a still greater diversity of opinion appeared to exist. About 45% of the companies probably reported this item distributed upon the basis of the entire company's premium volume; 40% of the companies evidently attempted an analysis of their branch office or general agency expense in order to allocate it to line of business where possible; 15% of the companies distributed this item partly on the total premium volume, and partly on some other basis. It is the opinion of the writer that a company under a branch office system should be allowed in all fairness to make an analysis of its branch office cost, and it is fair to assume that a portion of this branch office cost is in reality home office general expense. Such being the case, a company of this character should be allowed to deduct from the item appearing on line 30, page 3, of the Annual Statement "Salaries, Traveling and All Other Expenses of Branch Office Employees, etc.", that portion which in its investigation it finds is properly chargeable to the item of general expense.

Many of the above companies are compelling their branch offices to do a considerable amount of head office accounting and

statistical work, and it is manifestly not fair to charge all of this item against Acquisition cost.

In the case of a carrier organized on a departmental basis, *i. e.*, when a company maintains in various sections of the country offices organized and run on the same basis as the home office, it should be entitled to charge the entire cost of these departments against general expense.

V. General Administration Expenses: About half of the companies probably distributed the general expenses to line of business on the basis of premium volume alone, and the remaining half attempted some form of a distribution based on statistical investigation, and used it in distributing a portion of the expenses, the remainder being distributed on a premium volume basis.

The cost of payroll auditing included in various items in the Annual Statement was undoubtedly removed and distributed in this section to the lines of business requiring audit.

Not a few of the companies had difficulty in obtaining the correct total of General Administration Expenses, in that the item of investment expense in the Underwriting Exhibit of the Annual Statement had to be deducted in order to obtain this figure.

VI. Inspection and Bureau Expenses: That portion of the item referring to the expenses and maintenance of Bureaus, of course, was allocated in accordance with the direct Bureau charges, but there was quite a diversity of opinion on the question as to the method of distributing the cost of Inspections; about 40% of the carriers distributed this expense in accordance with the time expended in inspecting the various lines of business, and about 60% on the basis of the number of inspections made.

VII. Taxes: The Federal Income Tax was the one disturbing element in this section, some companies holding that this tax should be charged partly to Underwriting and partly to Investment income, but the greater majority holding that it should be distributed entirely to underwriting on the basis of premium volume. A few companies suggested that the item ought to be omitted entirely from this section as it had no bearing whatsoever on the Underwriting profit. Without this item, however, the exhibit, as the blank own stands, will not balance to the

gain from underwriting as shown on page 8, item 39, of the Annual Statement.

The taxes paid on premiums included in this item were distributed to lines of business in different ways, some carriers going so far as to take the specific items of taxes and distributing them in accordance with the basis for such taxes to the lines of insurance, while other companies simply distributed the total premium taxes paid in 1923 in accordance with the premiums written during 1922. This seemed to be the general practice, the companies distributing their outstanding premium taxes for 1922 and the paid taxes in 1923 on the basis of 1922 premium writings by lines, and the outstanding premium taxes for 1923 on the basis of 1923 premium writings by lines.

VIII. Other Underwriting Items: The amount to be entered on line 54 of the Exhibit consists of item 22, page 8, Annual Statement (with the exception of policy fees), but apparently a number of companies think that this amount should not have been called for, as the individual items concerned are not true underwriting items. However, with the present blank, it is necessary to insert this amount in order to arrive finally, on line 79, at the amount of Gain from Underwriting, as per item 39, page 8, Annual Statement. The apportionment of the amount with the exception of the change in overdue premiums is not easy, as it is difficult to determine to which lines such items as Agents' balances, bills receivable, etc., belong.

Some companies entered the amount in the total column, but did not distribute it to line of business. This course, however, throws the exhibit entirely out of balance. A premium volume pro rating was probably used by those companies that completed this line, and it seems to be the best that could be adopted under the circumstances. The remainder of the section presented no difficulties.

IX. Ratio of losses and expenses to Earned Premiums: The ratios disclosed in this exhibit should be fairly indicative with the exception of those for Acquisition and Field Supervision expenses incurred on those lines of insurance where policies are written for a longer term than one year, such as Burglary, Fidelity, Surety, Steam Boiler, Engine and Fly Wheel. This is especially true if the volume from year to year has fluctuated considerably

as these expenses have been incurred on three year premiums, and are referable in the exhibit to the earned premiums for the calendar year 1923.

Wherever a distribution of any of the above items was made on premium volume with the exception of taxes, I believe the correct method is the use of the net *direct* written premiums as all expenses other than taxes should be referable to this item.

Part 2 of the Exhibit. Acquisition and Field Supervision Cost by Lines of Insurance: This provided some interesting problems for most of the carriers, as it referred entirely to the net premiums written on direct business, and as this was the first year that the exhibit was filed, some carriers had of necessity to make an estimate of some of the items.

Part 3 of the Exhibit. Loss Ratio Experience of Policies in New York: Mr. Van Tuyl in his paper outlines a method of arriving at the earned premiums by lines of business for policies written in the State of New York, and I trust that this method will continue to be satisfactory to the Department. He states, and quite correctly, that the earned actual pro rata premium reserve at the end of each year by lines for business written in New York would involve an unreasonable amount of labor. Some companies have followed the method outlined by him, while others have assumed that the earned premiums in a given state for any line of business in a given year are the average of the writings for the given year, and the preceding year.

Part 4. Workmen's Compensation Loss Experience by Policy Years: This exhibit, of course, speaks for itself.

While I do not wish to minimize the results achieved by an intricate cost analysis (and the making up of schedules of this character easily leads to the conclusion that some analysis of this character must be made), nevertheless it is itself a costly proposition, and if apparently correct results are achieved without too extended a system, then I believe that short cut methods should be used. Any system of cost accounting providing figures of this character must be subject to constant correction, and any change in the company's office procedure might very easily disturb a considerable part of the system. It was, therefore, my aim in making up schedules for the companies which I represent

to as far as possible determine broad pro rating methods, and the results which we have achieved have proved quite satisfactory.

In fact our main basis of pro rating was an analysis of the home office salaries which could have been supplemented by a similar analysis of rents had there not been so many changes affected during 1923 that it was impractical. This analysis was accomplished by furnishing each department head with a sheet showing headings of "Underwriting", "Claim" and "Inspection" by lines of business; the salaries for a given month were then distributed on this basis. This distribution of home office salaries as regards the underwriting by lines of business was then assumed to have been the proper distribution for apportionment of a part of the expenses during 1923, and this apportionment weighted 50% together with the net direct premiums written also weighted 50% was used in distributing a large proportion of our expense. The cost of payroll auditing was distributed by our company on the basis of an analysis of one month's auditing of the various policies subject thereto, and 50% weight was given to the number of audits made for the various lines of business, and 50% to the total of the additional premiums plus the refund premiums for the entire year by lines of business. The cost of inspections was determined from an analysis of the inspectors' reports which contained the number of inspections made by lines of business together with the salaries and traveling expenses assignable to those lines. With the number of these inspections having a weight of 50% and these costs having a weight of 50%, the remaining cost of inspections, including home office supervision, rents, etc., was distributed.

When the combined results are finally tabulated, I feel that a fairly good picture of conditions as they existed in 1923 will be disclosed. I also commend the wisdom of making this exhibit supplementary to and not a part of the Annual Statement blank.

MR. R. A. WHEELER:

The new experience exhibit for casualty insurance companies drafted by the New York Insurance Department marks an important advance in state supervision of rate making for it will give the Insurance Department all the information necessary to test the adequacy and reasonableness of rate levels for the various

casualty lines of insurance and also information as to the relationship of nation-wide rate levels in these lines of insurance as compared with rate levels for New York State. It further gives the necessary information for the determination of the expense loading included in the rates.

The exhibit has been very carefully drafted with a view both to the purpose to be served and the practicability of obtaining the information desired. It will probably be possible to obtain a certain amount of uniformity in methods used for the allocation of expenses after the exhibit has been in actual operation for a few years although this will be difficult of actual accomplishment on account of the difference in organization of the individual companies.

From the point of view of the purpose which the exhibit will serve I would suggest that a test as to the adequacy or excessiveness of company reserve estimates in the form of a review of reserves be included in future exhibits so that some check may be made upon the accuracy of results of previous years.

It might be pointed out that the incurred loss ratio on compensation insurance as computed in this exhibit is not a true calendar year loss ratio in view of the manner in which compensation premiums are collected, the advance premium on one year's policies being considered as earned in the year in which the policies are issued and audits received on the same policies during the subsequent year being considered as earned in the subsequent year. Where there are rapidly changing industrial conditions this introduces a very considerable error in the true loss ratio of the companies for calendar year periods. This criticism, of course, also applies to a certain extent to manufacturers' and contractors' public and automobile commercial policies but the inclusion of these figures on all lines of insurance is necessary to balance with the financial statement.

In addition to this insurance exhibit the New York Department has made a call for classification experience on automobile, manufacturers' and contractors' public liability insurance which will not only supply the necessary information for making individual rates but, being compulsory upon the part of all companies, will give the rate making organizations themselves the advantage of a larger volume of experience upon which rates can be based. This additional call very well supplements the casualty experi-

ence exhibit in giving the department information not only as to rate levels but also as to the basis of the rates for individual classifications within each line of insurance.

This exhibit is a step in the right direction and deserves the whole-hearted co-operation of all carriers. The companies may experience some difficulties in making a separation of expenses but these difficulties are not insurmountable and the information called for is no more or less than information which every company should have as a basis for analyzing its own business.

Miscellaneous Property Damage Insurance

S. D. PINNEY

VOLUME X, PAGE 33.

WRITTEN DISCUSSION

MR. MILTON ACKER:

Mr. Pinney has explained the fundamental principles underlying the miscellaneous forms of property damage insurance which have been developing during the past two years. These forms of coverage will undoubtedly increase in importance as the insuring public comes to realize their place in the plan of complete insurance protection against loss by reason of legal liability for injury to the persons and property of others. Property damage insurance logically supplements public liability insurance for the reasons (1) that both involve the legal responsibility of the policyholder and (2) that in general both arise out of the same sort of occurrences.

The use of the term "property damage" insurance is inconsistent with the terms already in use for other forms of insurance which cover the legal liability of the policyholder. This point was emphasized recently by Vice President Cowles of the Travelers Insurance Company who suggested that the proper name should be "property liability" rather than "property damage," inasmuch as the legal liability of the policyholder for damage to the property of others is covered in the same manner that "public liability" covers the legal liability of the policyholder for bodily injuries to members of the public, and "employers' liability" covers the legal liability of the policyholder for bodily

injuries suffered by his employees. The term "property damage" should logically be applied to insurance which protects against loss because of damage to the property of the policyholder, but the latter form is now generally known as "collision" insurance and change in nomenclature would undoubtedly result in confusion. However, the term "property damage" in its present interpretation should be changed to read "property damage liability", and undoubtedly the latter term will be adopted in the future.

Mr. Pinney has stated that the miscellaneous forms of property damage insurance known as Manufacturers' and Contractors', Owners', Landlords' and Tenants', Residence, Farm and Private Estate, Theatre, and Owners' or Contractors' Protective Property Damage insurance, provide indemnity against loss by reason of the policyholder's legal liability for damage to or destruction of the property of others, but exclude coverage for damage to property which is owned, leased, occupied, used by, or in the care, custody or control of the policyholder or any of his employees. This coverage is similar to that afforded by Aircraft, Automobile, and Teams Property Damage insurance. This condition should be contrasted with that which obtains in other forms of property damage insurance which indemnifys the policyholder for loss or damage to his own property in addition to covering his legal liability because of injury to the property of others—I refer to Steam Boiler, Engine, Flywheel and Electrical Machinery, Sprinkler Leakage, and Water Damage insurance. In the latter forms, indemnification for loss or damage to the property of the policyholder is the primary consideration, coverage for legal liability being of secondary importance.

Elevator Property Damage insurance includes coverage for loss or damage for which the policyholder is legally liable, to property in the care, custody or control of the policyholder or of any of his employees but excludes coverage for loss or damage to property owned, leased, occupied or used by the policyholder or to any of his employees. Elevator Collision insurance provides indemnity for loss or damage to the property excluded under property damage insurance in much the same manner that Automobile Collision takes care of coverage which is excluded from Automobile Property Damage insurance. The Elevator Collision policy excludes (a) loss from collision due directly or indirectly

to fire, (b) loss resulting from collision due directly to the breaking, burning out, or disrupting of any electrical machine which is not located within the car of the elevator, and (c) damage to any electrical machine by reason of the breaking, burning out, or disruption thereof. Exclusion (a) is inserted to avoid conflict with fire insurance whereas exclusions (b) and (c) are inserted to avoid overlapping the coverage afforded by the Electrical Machinery policy.

The property damage contract covers liability for damage to the property of others and does not insure the property of the policyholder. But this exclusion is difficult to define. Property which is leased, occupied or used by the policyholder is not necessarily held by legal ownership, nor does property which is in the care, custody or control of the policyholder always belong to him. The element of possession does exist in these cases and recognition of proper underwriting principles, therefore, demands the exclusion of property which is in the possession of the policyholder and for which he is held responsible. The result otherwise would be a considerable variation in the property damage hazards of individual risks. The introduction in the policy coverage, of leased or occupied property, or property in the control of the policyholder in risks which are otherwise on a parity from the exposure standpoint, would require the same premium charge for these risks in spite of a considerable difference in the hazards assumed under the property damage contract.

A clear understanding of the exclusions just mentioned is important, and in this connection it might be well to refer in particular to the case of contracting risks. If a general contractor erects a building, performing certain operations himself and subcontracting the remaining operations to others, question arises as to the scope of the general contractor's property damage contract. The element of possession determines this. If the general contractor damages any of his own materials, or any of his own work, finished or unfinished, there could be no recovery for property damage, because all of this property is either owned by or in the control of the general contractor. If, however, he caused damage to the material or to the finished or unfinished work of a subcontractor, before the work is turned over to the general contractor, the property damage would be covered,—the property is not considered as being in the care or control of the policy-

holder until he actually secures possession of it. But once the work of the subcontractor has been completed and accepted by the general contractor, it comes under the latter's control and if damaged by him, no recovery is possible. Similarly, coverage for the subcontractor applies to all property damage caused during the course of his work, excepting only damage to his own material and work still in his charge or control. The same line of reasoning may be applied to a contractor who performs special jobs on or in completed buildings—possession on his part includes his own material and the material in place at the point where the work is to be performed. This is property in the care, custody or control of the policyholder, and damage to it is not covered by the property damage contract.

In line with the thought that property damage insurance and public liability insurance provide practically complete coverage necessary to protect the policyholder for full legal liability in respect to personal injuries or damage to property of others, it is reasonable from an underwriting standpoint, to require that the two forms of insurance should go hand in hand and that property damage should not be written unless concurrent public liability is written. It frequently develops that the same accident is productive of both public liability and property damage claims, and with concurrent insurance written in the same company, the investigation and settlement of such claims can be administered much more expeditiously and satisfactorily than would be the case if the insurance were divided between two companies. Steam Boiler insurance provides a precedent for this treatment because the steam boiler policy covers the legal liability of the policyholder for personal injury as well as for damage to the property of others. The same is true also of Engine, Flywheel and Electrical Machinery insurance.

In the development of rates for the miscellaneous forms of property damage insurance, Mr. Pinney has pointed out that it was necessary to pay particular attention to the various sources of property damage claims. Experience will undoubtedly prove that many causes of loss exist of which underwriters are unaware at the present time or to which they attach little importance. Even at this early date, it is apparent that property damage insurance must be underwritten with extreme caution, and unless careful investigation is made before individual risks are

accepted, unless due consideration is given to causes of property damage losses in certain industries, the experience on this line of insurance will be disastrous.

At present the property damage contract affords full coverage up to a limit of $1000 with the option of securing coverage for higher limits upon payment of an additional premium. Mr. Pinney has explained that no attempt has been made as yet to provide deductible average coverage. Indications point to the possible necessity of introducing the deductible coverage in much the same manner and for the same reasons that we have this coverage in connection with Automobile Collision insurance. Property damage claims will unquestionably involve smaller average losses per claim than public liability claims, but the frequency of accidents will be considerably higher for property damage, and the tendency at the outset, as is usually the case in the development of a new line of insurance, will be for those risks in most need of the protection to secure coverage. The burden will be shifted to the insurance company and the introduction of a deductible coverage which would require the policyholder to assume all losses up to a stated amount, would have a salutary effect upon the business for it would introduce an incentive for policyholders to exercise a more careful supervision over their operations and so to conduct the work as to reduce the frequency and severity of accidents.

REVIEWS OF PUBLICATIONS

RALPH H. BLANCHARD, BOOK REVIEW EDITOR

Life Insurance. Joseph B. MacLean. McGraw-Hill Book Company, Inc., New York, 1924. Pp. viii, 423.

Life Insurance is one of those modern developments of civilization which earns greater appreciation the better it is known. We welcome therefore every new book dealing with the subject; each one has some features of individuality, and every reader helps along the educational program, whereby Life Insurance with her protecting arms can enfold an ever increasing number of applicants and "Prospects." The new book "Life Insurance" by Joseph B. Maclean is written by an educator, and it has been developed from his own experience with students. His information is accurate, he has the gift of expression, and therefore the work is one which will do much good in disseminating useful and instructive information. While the handling of the subject is scientific and correct, the discussions and explanations are not so technical but that a man with a good general education may read the book with great advantage.

In the early part of the book the Assessment and the Level Premium Systems are carefully compared and discussed; passing from this we are told how Life Insurance companies are organized, while the fundamental differences between mutual and stock companies are also illustrated. The author's remarks are pertinent, but when he indicates that "The situation in the mutual companies has been improved by legal restrictions on the proxy system and by provision for a more active participation by the policyholders in the elections for directors and officers" we are impelled to remark that the votes usually cast by policyholders in an election are extremely meagre. It is not an uncommon practice for the officers of a company to ask all the clerks who carry policies to go in and vote; also to get a few of their friends to cast their ballots in order that the election may have some semblance of reality. As the author also suggests that "there is no reason to suppose that a stock company will be managed better than a mutual company" a reader might gain an impression of pessimism, indicating that the management of both classes of companies is doubtful. On the

contrary the general situation is that the management of life companies is so good that there is little reason for policyholders or stockholders to interfere or to take steps to alter present methods, even though an active interest by policyholders is unusual, and stock control is frequently held by an individual or a restricted group of officers.

The author goes on to explain the life insurance policy, the privileges it confers, the options and advantages it includes, also the fundamental basis on which insurance is written, with the methods of computing premiums, the necessity for accumulating reserves, etc. Modern reserve systems, including the Preliminary Term Method and some of its modifications, are explained. The reasons for such modifications are explained clearly, yet in brief compass. In his reference to the Select and Ultimate Method the author speaks of this method as computing reserves "apart from any consideration of the incidence of initial expense." But the method was devised with the particular object of making allowance for initial expense by means of the lower mortality rates experienced amongst newly selected policyholders. The selection of risks from a medical and also from a practical standpoint is discussed at some length, including the division of new applicants into standard and sub-standard classes. A chapter is given to sub-standard risks and the author points out that if a sub-standard risk becomes standard "in many cases it would not be correct" to remove the extra premium. But he at the same time hints pretty broadly that practical consideration must govern this question, which is not one of exact mathematical science; and with most companies the practical considerations are given the greatest weight—properly so.

The laws generally adopted after 1906 were to a great extent an interpretation of the practices of the more liberal companies at that time; but in some directions restrictive measures were imposed as the result of unfair methods conducted by only one or two companies—hampering all for the foolishness of the few.

Moreover, it was fondly hoped, and believed, that the new laws would encourage—almost *force*—the promotion of several new mutual companies. Yet the actual result of eighteen years' operations under those laws has not produced a single new mutual company in New York State. Many companies

started just after the 1905-6 agitation all over the United States, and most of them were on a stock basis. They were deliberately located in states other than New York and Massachusetts where the laws were more liberal in matters of reserves and expenses.

The handling of the assets in a life insurance company, the statements that are rendered from year to year, and the distribution of dividends by participating companies are explained at some length, also the internal organization of a home office, of which the author seems to have a clear conception. One or two chapters towards the end are devoted to discussion of disability benefits, group insurance, and other modern developments. In the Appendix there are some mathematical demonstrations, also specimen policy contract, specimen forms of applications for insurance and reinsurance, etc.

Throughout the book the mortality illustrations are given on the basis of the American Experience Table; and, although reference is made to the more modern death rates, with an accurate explanation of the legal situation which necessitates the use of the older table, nevertheless the continued reiteration of higher death rates than experience shows at the young ages, will give to students a wrong impression, and the student is apt to think that the forecasts by the American Experience Table are not unreasonable, whereas actual results for thirty or more years have proved that the American Experience is altogether discordant in the light of present day business.

For example, how differently would the following quotation read if we insert figures more nearly accurate:

> Suppose.....that deaths occur at the rate indicated by the American Experience Table of Mortality. The number of deaths in the first year will be 98—[58] ..... The death rate at age 20 is about 8—[4] per 1,000, and at age 60 it is 27—[27] per 1,000.

In general the book is practical in its tone and places a proper emphasis on conditions as opposed to theories; but in this particular there is perhaps a little more of theory than is desirable. An increase in the death rate from 4 at age 20 to 27 at age 60 is far more pronounced and more nearly correct than the figures given, namely—from 8 to 27.

Taken all in all the work will receive a hearty welcome and will well repay a careful perusal not only by young students, but also by experienced life insurance men, whether in the home office or in agency work.

HENRY MOIR

Mathematical Theory of Finance. T. M. Putnam. John Wiley & Sons, Inc., New York, 1923. Pp. ix, 117.

The author, who is Professor of Mathematics in the University of California, states in the preface that this book has been prepared to meet the needs of students in Schools and Colleges of Commerce and Business Administration and that in scope and method it has been designed for a three hour course for one semester. The equivalent of two years study of algebra and a thorough knowledge of logarithms on the part of the student is assumed.

The mathematics that are involved in the solution of financial problems in practically all business, and that form the basis of banking and insurance, are clearly set forth. The text is clear and precise and the student is led by natural and easy stages from the simpler propositions to the more difficult. The acquirement of the principles is made relatively easy and it would seem that anyone with the requisite preliminary training could readily master the contents of this book without the aid of an instructor. Short lists of problems are provided throughout the text and these should prove of value to the student in testing his ability to apply the various formulae.

The principles underlying the calculation of compound interest are set forth in the first chapter and then further elaborated in the following three chapters on "Annuities," "Amortization—Sinking Funds" and "Bonds." Algebraic formulae are developed for the present value and the amount of an annuity as well as for the determination of the annuity that $1 will purchase and the annuity that will amount to $1. Perpetuities and capitalization are discussed briefly. In the third chapter amortization is explained and illustrative schedules are presented. The sinking fund method of computing depreciation is set forth and the application of this method where objects of different probable lives are involved and in the valuation of mining property is shown.

In the chapter on bonds there are developed the principles and formulæ involved in the determination of the effective rate of interest, the amortization of premium and accumulation of discount. The application of these principles in connection with investment transactions is illustrated.

Chapter 5 is a clear exposition of the theory of probability. Permutations, combinations, probability in connection with mutually exclusive events, compound events and with repeated trials and mathematical expectation are all explained and the appropriate formulæ developed in each case. The use of mortality tables and the determination of single life and joint life probabilities are explained in the closing paragraphs of this chapter and serve as an introduction to the chapters on "Life Annuities" and "Elementary Principles of Life Insurance."

In the last two chapters the student is given a glimpse of the mathematical basis of life insurance. Pure endowments, life annuities of various kinds and the development and use of commutation columns are explained in chapter 6. In the final chapter formulæ are developed for the determination of net single premiums and annual net premiums for term, endowment and whole life policies. The fundamental principles underlying the valuation of policies and the computing of the reserves are likewise set forth.

In the seven chapters of this book there are developed over 100 formulæ and more than 200 practice problems are given. While the various steps in the development of the formulæ are given in detail and their application illustrated with examples yet the entire text is compressed within the limits of 90 pages. Supplementary to the text are compound interest tables, the American Experience Table of Mortality and a table of commutation columns based thereon.

In no single previous text has there been gathered in such compact form the series of related subjects that comprise this volume. It should prove of real value to the student who is preparing for either life or casualty actuarial work and should also be a valuable and convenient book of reference to one engaged in solving problems involving the application of the mathematical principles set forth therein.

H. O. VAN TUYL

Readings in Risk and Risk-Bearing. Charles O. Hardy. University of Chicago Press, Chicago, 1924. Pp. xvi, 368.

In this collection of readings the author has brought together from a wide variety of sources illustrative material to serve as a

supplement to his earlier volume "Risk and Risk-Bearing."* The material has been very well selected and should prove valuable both to students in universities and to others who are interested in the study of the risk problem.

Nearly one-half of the book is devoted to insurance. The selections indicate choice from a wide field and while, in a volume of this size, it is impossible to cover fully all of the subjects treated, a careful reading of these selections would give one a very fair notion of the questions which are interesting the insurance world.

RALPH H. BLANCHARD

*Reviewed in Proceedings No. 21.

ACTUARIAL AND STATISTICAL NOTES

REPORT OF SUB-COMMITTEE ON NON-CANCELLABLE ACCIDENT AND HEALTH INSURANCE TO COMMITTEE ON BLANKS OF THE NATIONAL CONVENTION OF INSURANCE COMMISSIONERS.*

Preliminary Statement.

At the May, 1922, meeting of the National Convention of Insurance Commissioners' Committee on Blanks, the question of the proper treatment of special reserves for deferred losses under Non-Cancellable Accident and Health policies was referred to a special sub-committee with instructions to consider the matter and make a report thereon as soon as convenient. At the May, 1923, meeting of the National Convention of Insurance Commissioners' Committee on Blanks the special sub-committee was instructed to give consideration to the necessary amendments in the Annual Statement Blank to take care of Non-Cancellable Accident and Health insurance as well as to the question of the proper reserve liabilities.

The sub-committee as appointed consisted of the following:

Sherman C. Kattell, Chairman and Actuary, Connecticut Insurance Department
H. G. Brunnquell, Actuary, Wisconsin Insurance Department
Grady H. Hipp, Actuary, New York Insurance Department

The work of the sub-committee was seriously retarded by the resignation of Mr. Sherman C. Kattell as Actuary of the Connecticut Insurance Department and as Chairman of the sub-committee, effective March 10, 1923.

Meaning of Non-Cancellable Accident and Health Insurance.

In the course of a preliminary survey of the field to be investigated by our sub-committee, it soon became apparent that it would be necessary to agree on the meaning and scope of the

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term "Non-Cancellable Accident and Health Insurance," and to conduct our investigation in accordance therewith.

We found that the above term is often used rather loosely to include several kinds of Accident and Health insurance. It has been applied to all kinds of Accident and Health policies which do not provide a cancellation clause but the benefits of which differ materially. For example, it has been applied to policies which do not contain the cancellation clause but which may be discontinued by the company at the end of any policy year by refusing to accept renewal premiums. Our sub-committee adopted a more restricted definition of Non-Cancellable Accident and Health insurance. The meaning of "non-cancellable" as used in this report may be defined as guaranteed renewable to some limiting age such as 60 and non-cancellable during the term for which it is written. This definition is not intended, of course, to include group accident and health insurance nor does it cover policies which a company may refuse to renew on the anniversaries inasmuch as such policies are, for all practical purposes, the same as the contracts which contain cancellation clauses.

Questionnaire Sent to State Insurance Departments.

On October 20, 1922, a circular letter was sent to all State Insurance Departments advising them of the appointment of a sub-committee to look into the matter of necessary changes in the Miscellaneous Annual Statement Blank to take care of Non-Cancellable Accident and Health insurance business and also to investigate the matter of proper reserves to be maintained on such contracts. The various Departments were requested to fill out a questionnaire, a copy of which is hereto attached and marked "Exhibit A."

Replies were received from forty-five states and the District of Columbia. The Commissioners of three states failed to reply.

A brief analysis of the replies is set out in "Exhibit B" hereto attached.

Questionnaire Sent to Insurance Companies.

On November 6, 1922, a circular letter was sent to all companies which appeared to be writing Non-Cancellable Accident and Health insurance. This letter was of the same general tenor as the circular letter sent to the State Insurance Departments.

These companies were requested to fill out a questionnaire and transmit it to the Chairman of this sub-committee. The questionnaire contained the following definition of Non-Cancellable Accident and Health insurance:

"The meaning of 'Non-Cancellable' as used in this questionnaire may be defined as guaranteed renewable to some limiting age, as 60, and non-cancellable during the term for which the policy is written."

Among other things, this questionnaire requested the following figures for this class of business:

1. The total amount of premiums in force October 31, 1922.
2. The amount of new premiums written in 1921.
3. The amount of new premiums which the company expected to write in 1922.

It later became apparent that further information along these lines would be enlightening and desirable in checking the trend of this business. Under date of December 1, 1923, therefore, the companies which replied to our questionnaire were requested to furnish the following figures with respect to Non-Cancellable Accident and Health insurance:

1. The amount of new premiums written in 1922.
2. The amount of new premiums written during the first ten months of 1923.
3. The amount of premiums in force on October 31, 1923.

Replies were received from twelve companies. A brief analysis of the replies is set out in "Exhibit C" hereto attached. In this analysis the figures for the items noted above are given for seven companies only. This was necessary in order to make the totals of any value for comparison. Each of four of the companies excluded had less than $10,000 non-cancellable premiums in force on October 31, 1922, and did not supply full information under all questions. The figures of the fifth company are excluded because its contracts differ appreciably from the ordinary non-cancellable policy and did not seem to be applicable to our investigation.

Proposed Amendments to Miscellaneous Annual Statement Blank.

The Non-Cancellable Accident and Health business is essentially different in nature from the cancellable Accident and Health busi-

ness. Our investigation shows that the amount of such business in force at the present time is by no means inconsiderable in the case of some companies. It also leads us to believe that this form may be of considerable importance within a few years. It seems advisable, therefore, that a separate line should be set up for such business on pages 2 to 7 inclusive of the Miscellaneous Annual Statement Blank. However, lines have already been set up for so many kinds of business in this blank that there hardly seems room for an additional line.

In endeavoring to obtain a solution to this problem, it was suggested that the two Accident and Health lines should be combined and thereby allow space for reporting Non-Cancellable Accident and Health business. The Commissioners' replies to our questionnaire indicate that about two-thirds of them approved the suggestion. However, objections which were raised by the Commissioners who disapproved and by others have led our sub-committee to the conclusion that it would not be advisable to combine the present accident and health lines. There are indications that in the case of some companies the health business is a losing one and the accident business a profitable one. If the lines were combined, such facts would be covered up in the future, whereas such information should appear in the companies' annual statements.

Only one feasible suggestion appears to remain. This is to insert a new line for Non-Cancellable Accident and Health insurance and to eliminate the line now used for sprinkler insurance. This leaves one blank line in which the companies may enter sprinkler, credit or livestock insurance. It is not believed that any causalty company writes more than one of these three lines, hence no difficulty would ensue from this treatment.

The claim payments under Accident, Health, and Non-Cancellable Accident and Health policies should be properly reported in the various columns on page 3 of the annual statement blank opposite the corresponding items.

It has been suggested that the present values of deferred claims should also be included in the above items of disbursements. This would necessitate carrying the commuted values of the deferred claims through income by adding a new item after item 20 on page 2. After giving the matter careful consideration our sub-committee has decided it is preferable not to include the com-

muted-values on deferred claims in income and disbursements for the following reasons:

1. There are a great many recoveries under such claims.
2. The true liability under such claims cannot be calculated with a satisfactory degree of accuracy. Accordingly, the income and disbursements would be incorrectly stated if the commuted values of the deferred liabilities were included therein.

The commuted values of incurred deferred claims under Accident, Health, and Non-Cancellable Accident and Health policies should be properly reported in the various columns on page 5 of the annual statement blank opposite the corresponding items. The new item No. 4, page 5, covering Non-Cancellable Accident and Health claims should be starred for reference to a footnote to be placed at the bottom of the page.

Item 25½ on page 5 should be amended to read as follows:

"25½. Additional Reserve on Non-Cancellable Accident and Health Policies $..... less $..... Reserve on Policies Reinsured."

The reason for the above change is that a company should be required to carry as a liability only the reserve on the net amount retained by it. That is the basis on which the unearned premium reserve liability reported in item 25, page 5, is calculated.

A footnote should be added at the bottom of page 5 reading as follows:

"State reserve basis and describe methods used."

On page 8, amend items 6 and 8 to read as follows:

"6. Add Unearned Premiums and Additional Reserve, December 31, 192.., per item 8 of last year's exhibit."

"8. Deduct Unearned Premiums and Additional Reserve, December 31, 192.., per items 25 and 25½, page 5."

The reason for the above change is that item 25½, a new liability item, was added on page 5 several years ago. In order to arrive at the correct underwriting gains and losses the increase or decrease in the additional reserve during the year must be taken into account.

It has also been suggested that the amount of interest required to maintain the reserve on Non-Cancellable Accident and Health policies be added to the premiums earned, on page 8, and deducted from the interest earned, on page 9. Our sub-committee

is inclined to the view that this constitutes a refinement which is not necessary at the present time.

Standards of Valuation for Accident and Health Insurance.

In June, 1921, a "Revised Joint Report of the Committees known respectively as the Underwriting and Actuarial Committees on Non-Cancellable Disability Insurance" was submitted to the Bureau of Personal Accident and Health Underwriters. This report recommended the adoption of the net premiums and reserves on the basis of the tables set out in a paper, "Premiums and Reserves for Non-Cancellable Accident and Health Policies" by E. E. Cammack, as published in No. 16, Proceedings, Casualty Actuarial Society, Vol. VII, Part II, May 24-25, 1921. These tables are based on the A. H. J. group of the Manchester Unity Sickness Experience, modified so as to count each successive case of sickness as a new case, and to conform with Hunter's Permanent Total Disability Table at ages above 50. The report states that the experience of the Manchester Unity Independent Order of Odd Fellows is the most suitable table of disability available. The modifications were made for the purpose of applying it to American experience.

In his paper presented to the Casualty Actuarial Society, Mr. Cammack states that it is not suggested that sickness rates in this country are likely to follow very closely the Manchester Unity. Opinions of experienced accident underwriters are divided. Some believe that the incidence of sickness will be more favorable in America, while others doubt whether the Manchester Unity Experience makes sufficient provision for the moral hazards undoubtedly existing under disability policies issued for substantial amounts. Mr. Cammack states, further, that a start must be made, however, and that the Manchester Unity seems to be as reasonable a table as any available.

Two minority reports were made to the Bureau of Personal Accident and Health Underwriters, one of which contained a proposed substitute table giving reserves which are, in general, lower than the reserves on the so-called Cammack tables. The other minority report took the position that the Bureau should recommend no tables until it was assured that they were not only safe but also accurately measured the companies' liability and that there was no such assurance in the case of the tables recommended

by the majority report. It appears that strenuous opposition to the Cammack tables was made by two of the companies which are the largest writers of Non-Cancellable Accident and Health insurance.

In a paper presented to the Actuarial Society of America at its May meeting, 1923, Mr. E. H. Hezlett included tables applicable to the valuation of non-cancellable benefits. These tables resulted in higher reserves than the Cammack tables.

The problem before the various State Insurance Departments is not easy of solution. If Non-Cancellable Accident and Health insurance is of great economic value, and if it can be developed along permanent and safe lines, as many experienced underwriters think, and as our sub-committee believes can be done, the Insurance Departments should encourage the development of the class of business along proper lines. The reserve standards should not be fixed at such a high level as to strangle the business. At the same time companies should be required to maintain reserves which are adequate and which accordingly will not imperil the future safety and protection of the policyholders.

Our sub-committee has endeavored to secure all possible data and opinions relative to the subject. A wide divergence of opinions as to the proper reserve basis is apparent. It will be seen from an analysis of the company questionnaires that a majority of the companies favor the Cammack tables. There is a question whether or not these tables provide a reasonably close measure of sickness experience in this country. Experience may show that they accurately measure the sickness experience under Non-Cancellable Accident and Health policies written by American companies, or it may prove quite the contrary. There does not appear to be at the present time either sufficient or satisfactory experience upon which to test the reliability of this or other tables. It should be remembered that all three proposed tables are aggregate tables, while very few, if any, of the policies written on this form by American companies have yet passed out of a period of selection.

It would be most unfortunate to enact laws prescribing valuation standards for Accident and Health policies at the present time and find in a few years that the standards are not satisfactory and

should be changed. In view of all the facts now at hand, our sub-committee does not believe that the time is ripe for the Insurance Departments to prescribe fixed valuation standards. Inasmuch as the enactment of uniform laws in the various states requires a considerable number of years as well as much work and effort, it appears that the recommendations for valuation standards applicable to Non-Cancellable Accident and Health policies should not be made until experience has demonstrated what tables are reasonably satisfactory.

While our sub-committee does not believe that fixed standard for valuing Non-Cancellable Accident and Health insurance should be prescribed at the present time, we desire to emphasize the need for adequate reserves. No company can be justified in setting up no additional reserves or in setting up reserves which are clearly inadequate. Our sub-committee is particularly impressed with the fact that each succeeding investigation of sickness data indicates a tendency in the rates of sickness to increase continuously. The Insurance Departments have generally prescribed Hunter's disability table as the minimum standard for the calculation of reserves to cover total and permanent disability benefits in life insurance policies. There is some doubt whether or not this standard is sufficiently high to cover such benefits where the waiting period is reduced to three months or less. Clearly, the reserves for Non-Cancellable Accident and Health insurance payable during the continued disability of the insureds should be higher than those based on Hunter's disability table for corresponding waiting periods. The experience of life companies, with total and permanent disability benefits in their policies, will, no doubt, be more favorable than the experience of Accident and Health companies with non-cancellable benefits, in view of the differences in underwriting methods and policy limitations.

Recommendations.

In view of the foregoing facts, our sub-committee makes the following recommendations:

1. That the amendments to the Miscellaneous Annual Statement Blank be made as outlined above in this report.

2. That each company be required to set up, in addition to a reserve for incurred deferred claims under such policies a net

premium reserve upon the basis which it believes adequate and which will be described in the footnote on page 5.

3. That the companies be requested to test the accident and sickness tables, which have been suggested as the proper reserve standards, on the basis of their actual experience under Non-Cancellable Accident and Health policies. If no one of the proposed tables is found to be satisfactory, the companies should be requested to compile a table showing sickness experience under these forms.

4. That as soon as the experience of the companies indicates what tables are reasonably satisfactory, the various Insurance Departments should prescribe by rulings or otherwise the standards upon which adequate reserves should be calculated to cover liabilities under Non-Cancellable Accident and Health policies. It is suggested that the Commissioners of the states which do not give them adequate authority to make such rulings should endeavor to have their laws amended. In other words, departmental rulings are considered to be the first step in the program after experience has shown what tables are reasonably satisfactory.

5. That after the companies have had some experience under such departmental rulings and as soon as it has become more clearly established just what tables are reasonably satisfactory, uniform valuation provisions should be recommended for adoption by all of the states.

6. That the companies be given to understand clearly that Insurance Departments expect each of them to calculate and set up reserve liabilities in accordance with their best available information. We believe that under no conditions can slipshod reserve methods be justified or condoned. Rigid valuation requirements are not recommended at this time. However, the companies should prepare for the time when they will be required to set up reserve liabilities calculated in accordance with prescribed standards which will be as soon as experience demonstrates what table is satisfactory as a minimum standard. It seems clear that reserves based on Hunter's disability table are not adequate for Non-Cancellable Accident and Health benefits.

7. That this sub-committee be continued to study the returns made by the companies, to gather additional information having a bearing upon this subject and to render reports from time to time to the Committee on Blanks.

Respectfully submitted,

WILLIAM M. CORCORAN, Chairman,
Actuary, Connecticut Insurance Dept.

GRADY H. HIPP, *Actuary,*
New York Insurance Dept.

H. G. BRUNNQUELL, *Actuary,*
Wisconsin Insurance Dept.

EXHIBIT A

QUESTIONNAIRE TO STATE INSURANCE DEPARTMENTS WITH REGARD TO NON-CANCELLABLE ACCIDENT AND HEALTH INSURANCE

.....1922.

1. What is the Statutory basis of reserves for Accident and Health insurance in your State?

2. (a) Have you a special Statutory basis of reserves for Non-cancellable Accident and Health insurance?

(b) If so, will you kindly furnish this Committee with three copies?

3. (a) Has your Department any power or authority to make enforceable rulings with regard to reserves on Non-cancellable Accident and Health insurance?

(b) If so, give reference to the section of the Statute under which such rulings can be made.

(c) If any such rulings have been made, will you kindly furnish this Committee with three copies?

4. In an effort to find a line in the Miscellaneous Statement blank for the separate entry of Non-cancellable Accident and Health insurance, it has been suggested that the present separate lines for Accident and Health be combined, leaving a blank line in which this new class of business might be entered. What is your opinion as to this?

....., *Commissioner of Insurance,*

....., *State.*

EXHIBIT B

BRIEF ANALYSIS OF REPLIES FROM 45 STATE INSURANCE DEPARTMENTS AND THE DISTRICT OF COLUMBIA

The first item in the questionnaire read as follows:

"1. What is the Statutory basis of reserves for Accident and Health insurance in your State?"

In reply to the above question, 18 Commissioners replied "None." 23 Commissioners replied "Unearned Premiums" or words to that effect; and 2 Commissioners replied that their laws required the reserves on the basis of the British Friendly Society Table or Manchester Unity Experience Table, with 3½% interest. The law of one State requires that "Industrial" companies must hold a reserve of $1.50 per $100 of insurance in force whether life or accident and health insurance or both. Section 16-a of the Insurance Laws of Oregon gives the Commissioner blanket authority to require such a reserve for the deferred liabilities under insurance policies as he may deem proper. One Commissioner failed to reply to the above question. It is quite probable that in the States whose Commissioners answered "None," unearned premium reserves are required in accordance with the Convention Annual Statement Blank. In answering "None," they probably had in mind extra reserves for deferred liabilities under Non-Cancellable Accident and Health policies.

The second item in the questionnaire to the Insurance Departments consists of two parts, as follows:

"2 (a) Have you a special Statutory basis of reserves for Non-cancellable Accident and Health insurance?"

" (b) If so, will you kindly furnish this Committee with three copies?"

In answer to the first part of the above question, 3 Commissioners answered "Yes"; one Commissioner failed to answer; and 42 Commissioners answered "No."

The third item in the questionnaire to the Insurance Departments contains three parts, as follows:

"3 (a) Has your Department any power or authority to make enforceable rulings with regard to reserves on Non-cancellable Accident and Health insurance?

(b) If so, give reference to the section of the Statute under which such rulings can be made.

(c) If any such rulings have been made, will you kindly furnish this Committee with three copies?"

In answer to the first part of the above question; 12 Commissioners answered "Yes"; 5 Commissioners indicated that they had been given supervisory authority to enforce such rulings; 4 Commissioners indicated that it was questionable whether they had such authority; one Commissioner failed to answer; and 24 Commissioners answered "No." One of the Commissioners who answered "Yes" referred to a Supreme Court Decision in his State to the effect that the Insurance Commissioner is vested with a wide range of discretion, with the exercise of which the courts will not interfere. Three of the Commissioners who answered "Yes" referred to their general supervisory authority. Eight of the Commissioners who answered "Yes" referred to specific Sections of the statutes of their States. Two of the Commissioners who indicated that they had general supervisory authority to make such rulings, referred to specific Sections of the Insurance Laws of their States. Two of the Commissioners who indicated that it was questionable whether they had authority to make such rulings indicated that possibly they might have general supervisory authority to do so.

In answer to the third part of the above question, one Commissioner attached a ruling which had been made tentatively; 12 Commissioners answered "None"; and 30 Commissioners failed to answer.

Item 4 of the questionnaire to the Insurance Departments reads as follows:

"4. In an effort to find a line in the Miscellaneous Statement blank for the separate entry of Non-cancellable Accident and Health insurance, it has been suggested that the present separate lines for Accident and Health be combined leaving a blank line in which this new class of business might be entered. What is your opinion as to this?"

In answer to the above question, 26 Commissioners indicated their approval; one Commissioner was noncommittal; 6 Commissioners failed to answer; and 13 Commissioners indicated their disapproval. Five of the Commissioners who indicated their disapproval suggested that an additional line be inserted in the Miscellaneous Annual Statement Blank for non-cancellable accident and health insurance.

EXHIBIT C

BRIEF ANALYSIS OF REPLIES FROM TWELVE COMPANIES

All replies were not complete, particularly in regard to figures requested. The following figures therefore are given for seven companies only:

1.	Amount of New Premiums written in 1921 (6 companies)	$1,313,244.69
2.	Amount of Premiums in force October 31, 1922	2,244,456.54
3.	Amount of New Premiums written in 1922	916,014.84
4.	Amount of New Premiums written during first ten months of 1923	861,194.23
5.	Amount of Premiums in force October 31, 1923	2,858,181.81

The second item in the questionnaire to the companies consists of three parts as follows:

"2 (a) Does your company give surrender values under these contracts?

(b) If so, give basis of same.

(c) If not, does your company contemplate doing this at some future time?"

In answer to the first part of the above question all of the twelve companies answered "No." In answer to the last part of the above question, 9 companies answered "No"; one company answered "Possibly"; one company said that "It depended on future experience"; and one company answered "Yes." The company which answered "Yes" has only a very small amount of non-cancellable premiums in force.

The third item in the questionnaire to the companies consists of four parts, as follows:

"3 (a) Give amount of Unearned Premium Reserve ($.....) Extra Reserve ($.....) carried by your company on December 31, 1921, making total reserve liability of ($.....) on non-cancellable business as of that date.

(b) On what basis was this total reserve computed?

(c) What basis does your company propose to use for the computation of this total reserve as of December 31, 1922?

(d) What do you consider to be the proper reserve basis for this class of business?"

In answer to the first part of the above question, two companies failed to reply. The unearned premium reserve reported by ten companies was $969,376.35. The extra reserve reported by ten companies was $183,409.91. The total reserve reported by ten companies was $1,152,786.26.

In answer to the second part of the above question, three companies failed to reply; five companies indicated that the total reserves were calculated on the unearned premium basis; one company stated that it used Maverick's Tables; two companies stated that they used Cammack's Tables; and one company stated that they used a modification of Cammack's Tables.

In answer to the third part of the above question, one company failed to reply; one company indicated that it would use the basis required by law; two companies indicated that they would use unearned premium reserves; two companies indicated that they would use unearned premium reserves plus an additional sum; one company indicated that it would use Maverick's Tables; four companies indicated that they would use Cammack's Tables; and one company indicated that it would use a modification of Cammack's Tables.

In answer to the last part of the above question, four companies failed to reply; one company stated that it did not know what was the proper reserve basis for Non-Cancellable Accident and Health insurance; one company replied that it depends on future experience; one company gave Maverick's Tables; three companies gave Cammack's Tables; and two companies gave modifications of Cammack's Tables.

The fifth item of the questionnaire to the companies consists of two parts, as follows:

"5 (a) In your opinion what is the present day importance of the non-cancellable contract?

(b) What is your opinion as to the future of this business?"

In answer to the first part of the above question, two companies failed to reply. The remaining ten companies gave answers along the following lines:

1. Comparatively small importance.
2. It is of particular importance in connection with life insurance.
3. Considerable.
4. Largely educational.

5. Business still in its infancy.
6. Of great economic value.
7. Not much business can be sold at present rates.
8. Less popular than formerly.
9. Importance is not great.
10. Of very slight importance.

In answer to the second half of the above question, one company failed to reply; five companies indicated that the future of the business is doubtful; and the remaining six companies answered along the following lines:

1. Decreasing importance.
2. Slow, but increasing demand.
3. Of considerable importance, and constantly increasing.
4. Of considerable importance if the business is fostered.
5. Permanent. The future of the business is bright.
6. Possibly increasing.

CURRENT NOTES

WILLIAM N. MAGOUN, CURRENT NOTES EDITOR

Acknowledgment is gratefully made for contributions furnished by Messrs. Albert W. Whitney, H. P. Stellwagen, L. H. Carr and E. S. Cogswell.

National Conference on Street and Highway Safety

During the last year or so intensive automobile safety campaigns have been entered into by various public and private interests. Recently, at the call of Secretary Hoover of the Department of Commerce, a conference was held at Washington at which various organizations interested in the safety movement were represented. Mr. Hoover stressed the fact that in order to secure effective results from a national safety campaign, the work must be properly organized. He suggested that a call be issued for a national conference on automobile safety, the work to be accomplished by such a conference to be carefully prepared in order that tangible results might be secured. A plan of operation was adopted by the meeting and committees appointed to study the following subjects as related to automobile accidents:

1. Statistics
2. Control of Traffic
3. Construction and Engineering
4. City Planning
5. Insurance
6. Education
7. The Motor Vehicle
8. Public Relations

Most of these committees have already met, appointed subcommittees and are at work on reports which are to be finished about the first of September, when they will be acted upon and printed. A call will then be sent out to interested representative organizations to send delegates to Washington, probably during October or November to a National Conference on Street and Highway Safety.

The movement has been financed to the amount of approximately $25,000 subscribed by interested organizations. The

Department of Commerce has supplied office space and some stenographic help; the U. S. Chamber of Commerce has loaned the services of Colonel A. B. Barber, Manager of the Transportation and Communication Department, who is to have general charge; the National Bureau of Casualty & Surety Underwriters has loaned the services of its Traffic Engineer, Mr. William J. Cox, and the National Safety Council has agreed to contribute part time of its engineer, Mr. S. J. Williams. Mr. S. S. Huebner of the University of Pennsylvania has been appointed chairman of the Committee on Insurance, while Mr. A. W. Whitney is chairman of the Education Committee.

Recent Developments in the Automobile Field

Mileage and Earnings Bases

In the Spring of 1924 the National Bureau of Casualty and Surety Underwriters adopted two new bases of underwriting for public passenger carrying vehicles. The Mileage Basis was adopted for fleets of five or more metered taxicabs and the Earnings Basis was adopted for fleets of three or more public passenger carrying vehicles of any type other than metered taxicabs. Within three months after the adoption of these bases, several hundred risks, involving thousands of automobiles, had been written on either one or the other basis thus indicating the popularity of the new methods and their peculiar adaptability to the risks to which they apply.

Rates for the Mileage Basis are developed by dividing the the Manual Specified Car premium by the actual average mileage per car developed for individual risks. It has been found that the average taxicab in the United States travels about 21,000 miles a year. In the very large cities where cruising is permitted and perhaps encouraged by the taxicab companies the annual mileage is often in excess of 40,000 and in the smaller communities the average annual mileage is sometimes as low as 12,000 per cab. The rate per mile for public liability, 5/10 limits varies in most cases between 1 and 2 cents according to territory and actual mileage developed. The premium for a risk written on the

Mileage Basis is developed by audit from the actual records of the taxi meters.

The Earnings Basis is perhaps best adapted to the jitney or bus risk. Most bus operators are obliged to own several busses in excess of those regularly operated in order to take care of emergency and peak loads. By basing the premium on the receipts it is possible to develop a premium on the risk's actual exposure and the assured is not required to pay a premium on his reserve busses when they are standing idle in the garage.

Earnings rates are developed for individual risks by first ascertaining the average annual earnings per bus operated and by dividing this figure into the Manual Specified Car premium. The premium for the policy is developed by applying the Earnings rates to each $100 of the total receipts.

Compulsory Insurance on Automobiles for Hire in New York State

On July 1, 1924, Chapter 413 of the Laws of 1924 made compulsory the insurance of all automobiles operated anywhere in New York State for the purpose of transporting passengers for a consideration. Prior to that date, insurance was required on public automobiles operated only in the cities of the first class, that is, in New York City, Buffalo and Rochester.

The more recent law requires insurance in the sum of $2500 but provides that the policy may limit the liability of the insurer on any one judgment to $2500 for bodily injuries or death and $500 for damage to, or destruction of property, and on all judgments recovered upon claims arising out of the same transaction or transactions connected with the same subject of action, to $5000 for bodily injuries or death and $1000 for damage to, or destruction of property. Under the old law, which applied to cities of the first class, no provision was made for upper limits of liability and the companies were, therefore, compelled to write unlimited policies. The definite limitations set forth in the new law made it possible for the companies to promulgate a schedule of reduced rates for the class of risks affected.

The new law, like its predecessor, requires complete and absolute protection for the public, and the usual exclusions and warranties of the policy apply only between the company and the assured, and do not in any way prejudice the right of other per-

sons to make recovery under the policy. A special policy form has been developed by a conference of the companies with officials of the Insurance Department and of the State Tax Department which directly administers the law.

Burglary Insurance

A new manual of Burglary Insurance Rates and Rules was issued by the National Bureau of Casualty and Surety Underwriters effective July 1, 1924. Although there were few changes in the actual rules and rates the method of presentation is quite different and the new manual is much easier of interpretation by the man not thoroughly acquainted with general underwriting practices in this line of insurance. One of the changes made effective at that time was a new schedule of alarm system discounts and qualifications. No alarm system now receives a credit unless it has been classified by the Underwriters Laboratories and then only when an Underwriters Laboratories certificate indicating the class and installation of the alarm system is held by the individual assured. This is a final step that has been taken in turning over the supervision of alarm companies to the Underwriters Laboratories who are capable of exercising the jurisdiction needed to properly classify alarms from a technical standpoint. The new discounts range from 5% to 70% depending upon the character and extent of the wiring.

Some time ago two new policy forms were put on the market, coverage under one form being limited as to jewelry, silverware and furs to 25% of the total insurance, and under the other form to one hundred dollars on silverware and each article of jewelry and fur. It was hoped that these policy forms would appeal to the man of small means inasmuch as the rates for such limited coverage were correspondingly lower than those for the older forms. But these hopes were not realized and it was found that instead of writing new insurance on these forms the companies were being asked by old assureds to cancel their previous policies and replace them by the new form at the lower rates. As a result of this situation the new policy forms have been discontinued.

Recent Developments of Old Age Pensions in the United States

The subject of granting financial assistance to the aged, has occupied the attention of certain European governments since 1850, and at the present time, some twenty-five countries of the world assist their aged citizens either through forms of compulsory contributory insurance or through straight non-contributory old age pensions. The subject of old age pensions has been given consideration by some of the State legislatures in the United States, particularly Massachusetts, during the past twenty years, and in 1915 the territory of Alaska adopted a plan of non-contributory old age pensions. In 1914 a law was passed in Arizona but was declared unconstitutional by the courts, largely on account of the poor form and incompleteness of the law.

In 1923 non-contributory old age pension bills, drafted along the general lines of the laws now in force in New Zealand, Australia and Great Britain, were introduced in twenty-two State legislatures, and were passed by the legislatures of Montana, Nevada and Pennsylvania. These bills also passed the lower house in New Jersey, and the upper house in Texas. The Fraternal Order of Eagles was particularly interested in these bills, and they were supported by members of that order and by members of other fraternal societies.

The old age pension laws of Montana, Nevada and Pennsylvania are drafted along the same general lines, but there are some differences in eligibility qualifications and in methods of administration. In Pennsylvania the Commission administering the law consists of three citizens appointed by the Governor, and in Nevada, of the Governor, Lieutenant-Governor, and Attorney General. In Montana, each board of county commissioners handles the matter for its county. Old age pensions are to be granted upon application, to residents of Montana and Pennsylvania who have lived in the State for fifteen years or more and have attained the age of seventy years. In Pennsylvania and Nevada, a pensioner may have not more than $3,000 of property and a total income, including the old age pension, not to exceed $1.00 per day. In Montana, the income, including pension, is not to exceed $25 per month. The maximum pension in Pennsylvania and Nevada is $1 per day, in Montana $25 per month. The age and residence qualifications in Nevada are lower

than in the other states, as the Nevada law provides for an old age pension to persons sixty years of age who have resided in the State for ten years. All three laws exclude from benefits inmates of correctional institutions and those who have not supported their families for a certain period before making application. Each law contains a provision that a pension shall not be granted to a person who has a child or others responsible for his support and who are able to support him.

Old age pensions were first granted in the fall of 1923 by some of the counties in Montana. On account of the appropriation for the Pennsylvania Old Age Commission being limited to $25,000, and also questions being raised in the courts as to the constitutionality of the law, old age pensions have not been paid as yet in Pennsylvania.* The Montana law has not been in effect long enough to state with authority whether or not it is considered by local officials to be successful as information concerning the workings of the act is conflicting. The Nevada Commission has received several applications, but has not as yet authorized the payment of pensions because of insufficient funds.

In Ohio, a proposed old age pension law similar in general terms to the Pennsylvania law was brought to the attention of the electorate by initiative petition at the State election held on November 6, 1923, but this proposed law was defeated in the referendum by a vote of approximately two to one, over a million votes being cast in all.

The legislatures of Indiana and Massachusetts in 1923 provided for the appointment of commissions to study the subject of old age pensions and to report in 1925.

The Indiana Commission, of which Mr. Frank E. Hering of South Bend, Indiana, is chairman, is directed by law "to make a thorough and complete investigation of the system of caring for dependent citizens in the state, and to investigate the matter of old age pensions and whether that system would not afford a better and less degrading way of caring for our unfortunate citizens who by force of circumstances are compelled to depend on public and private aid for support." The remainder of the concurrent resolution creating this commission directs it to make a special study of the poorhouses, perhaps because the Pennsyl-

*The Pennsylvania law was declared unconstitutional by the Court of Common Pleas on August 4, 1924.

vania Commission in its report in 1919 criticized Pennsylvania poorhouses and reported many matters which the Commission believed required correction.

The resolution creating the Massachusetts Commission, of which Frank H. Hardison, former Insurance Commissioner, is chairman, instructs the Commission to study the entire problem of pensions. The Commission is directed to ascertain for twenty-five years past the total amounts spent by various departments of government in the way of aid and relief, to ascertain the number who would be eligible to pensions under any system the Commission may recommend, and to estimate the cost for a period of twenty-five years, and to determine the effect which the establishment of an old age pension system might have on the amount of funds expended on public and private charity. It is instructed also to suggest methods of taxation necessary to finance an old age pension system. It is also directed to study the present pension systems in force for judges, teachers, and all other public officials and employees. The Commission is securing information concerning pension plans of industrial and mercantile corporations, and public utilities.

The Massachusetts Commission is making a special effort to obtain information from which accurate estimates of the cost of various old age pension plans can be made. Questionnaires and card forms are now being returned by almshouse officials, overseers of the poor, officers of private benevolent homes, and officers of private charitable societies, so that the Commission will obtain information concerning all aged persons assisted by organized charity, either public or private.

Special attention has been given to obtaining information concerning all classes of the population sixty-five years of age and over who are not dependent on public or private charity, although some of these persons are dependent on children and relatives. Investigations of this sort have been made in a few localities by previous commissions in Massachusetts, Wisconsin, Ohio and Pennsylvania. The Massachusetts Commission is endeavoring to secure information as to the condition of the aged population as a whole, including those residing in some of the well-to-do towns as well as those residing in the poorer quarters of the cities, and arranged for the interviewing of 21,000 people, or about one-tenth of the population sixty-five years of

age and over. This work is practically completed. Field agents of the Commission have secured information concerning the ages, conjugal state, condition of health, citizenship, length of residence in Massachusetts, occupations (past and present), causes of lost or impaired earning power, present property holdings (both real and personal), present annual income received, life insurance carried, ability of children to aid if aid is needed, and aid actually given by children or relatives. Both members of a married couple have been interviewed if one member has attained the age of sixty-five years, otherwise the interviewing has been confined to persons sixty-five years of age and over.

After careful study, ten cities and twenty-four towns, located in thirteen counties of Massachusetts, were selected for interviewing. The cities of Salem and Pittsfield were deemed to be particularly representative, and extra attempts were made to interview every resident sixty-five years of age and over. Second calls were made on those not at home when the first call was made, and questionnaries were sent to about 5% of the population who were found out after two or more calls. In the towns selected for interviewing, and also in one of the smaller cities, attempts were made to interview everyone by personal calls.

In the larger cities, such as Boston, Lowell, Brockton, Springfield, Worcester and Fall River, it was impossible for financial reasons, to interview every one of the thousands of aged residents, and considerable thought was given to the problem of obtaining accurate samples. The work of interviewing was first started in the city of Boston, and to try out the card forms, certain election precincts known to contain certain types of population were purposely selected. In the remainder of Boston, a precinct was selected for each ward, the selection of the precinct being by lot.

In Springfield a conference with city officials and others familiar with conditions revealed that two wards were supposed to be typical of the entire city, and the canvass of these wards showed that they contained all classes of the population from the very poor to the extremely wealthy. In other cities, the method used was to interview a percentage of the aged population, usually 20% or 25%; in Worcester, for example, the name of every fifth person, aged sixty-five years or over, on the assessors' lists being checked for interviewing. In Massachusetts cities and larger

towns, the assessors are required by law to print annually a list by election precincts showing the name, age, occupation, and address of each person, male and female, twenty years of age or over, and these lists were of great assistance to the field agents of the Commission in locating aged persons.

The Commission obtained information from thousands of persons who stated they were worth $5,000 or more, but detailed information was not secured in all of these cases, partly because it was doubted if the legislature would consider these persons eligible to old age pensions, and partly because some of this class were difficult to interview and refused to state the exact amount of their wealth, as they said they would never need a pension.

In general, persons interviewed treated the field agents with courtesy, and if the field agent was an out-of-towner, refusals to give information were infrequent. As would be expected, many pathetic and needy cases were found, and also many cases of aged persons in good circumstances. The idea of an old age pension was welcomed by many of the aged, while other persons, some of them eighty years of age and over, expressed extreme opposition. The tabulation of the information will be completed in time to present to the Legislature of 1925.

Personal Notes

Richard H. Cole, formerly Secretary of the Connecticut General Life Insurance Company has been advanced to the position of Vice President of that company.

I. M. Rubinow, who was previously Executive Director of the Jewish Welfare Society in Philadelphia, has established an office as Consulting Statistician and Actuary in that city.

Robert E. Ankers has been advanced from the position of Actuary to that of Secretary and Treasurer of the Continental Life Insurance Company, Washington, D. C.

Bruce D. Mudgett has been advanced from Associate Professor to Professor of Economics in the University of Minnesota.

R. A. McIver formerly Assistant Actuary of the American National Insurance Company, Galveston, has been appointed

Actuary of the United States National Life and Casualty Company of Chicago.

Arthur B. Wood has been honored by election to the Presidency of the Casualty Actuarial Society of America.

S. B. Ackerman has been appointed Assistant Professor of Insurance of the New York University.

Frank A. Fleming has accepted a position as Chief Accountant with the Lumber Mutual Casualty Insurance Company of New York.

OBITUARY

CARL HOOKSTADT

Born, November 29, 1879 Died, March 10, 1924.

The death of Mr. Carl Hookstadt occurred at St. Paul, Minnesota, where he was striken by illness while in the performance of his official duties. Mr. Hookstadt had been a fellow of the Society since November 21, 1919.

Mr. Hookstadt was born in Germany. While he was still very young his parents emigrated to the United States. The family became settled in one of the smaller communities of Southern Wisconsin. His higher education was at the State University of that state from which he graduated with A. B. degree in 1910. He was, therefore, of foreign parentage, of American rearing in middle western rural life, and of Wisconsin University training and inspiration. It is not fanciful, to see the influence upon his career and the characteristic qualities of his work of this background thus meagerly sketched.

Mr. Hookstadt's career may be fairly designated as that of investigator of labor problems on behalf of the public. His first work in this field was with the U. S. Commission on Industrial Relations in 1914 and 1915 as a special agent. Following this he became an expert in the U. S. Bureau of Labor Statistics in September, 1915, and continued with that Bureau until his death. Practically from the start his work here became specialized in the field of workmen's compensation for industrial accidents with which his name has ever since been associated. A long series of reports of investigations in that field will be found in the Bureau's Monthly Labor Review and its Bulletins. It was this work which brought him into a branch of the special field represented in the Casualty Actuarial Society. Of the importance of his work in this line it is perhaps enough to say that it was sufficient to be recognized by this Society by election to Fellowship.

Mr. Hookstadt's work in the Bureau of Labor Statistics acquired an especially practical effectiveness and value by reason of the work which that Bureau has done toward coordination and standardization of compensation practise in the different

states. The Bureau has from the beginning taken an active part in the development and work of the International Association of Industrial Accident Boards and Commissions. This organization of state agencies administering compensation laws affords a means for comparison of practise and development of standards in the different states. The Bureau of Labor Statistics has been an important factor in this Association, the Commissioner in charge of the Bureau being regularly named as secretary of the Association and being practically in the position of its executive officer. As a result the Bureau has rendered very valuable service in the direction of inter-state uniformity and standardization. Mr. Hookstadt, as the Bureau's specialist in this subject, thus became a sort of liaison officer between the Bureau and states for information service and advice. At the time of his death he was engaged in carrying out by negotiations with the various state commissions a plan developed by the Bureau with the advice and counsel of the Committee on Statistics of the Association, of which committee Mr. Hookstadt was secretary, for nation-wide statistics of accidents and compensation experience through compilation in the different states under a standard plan of uniform statistics to be combined ultimately by the Bureau into figures of national scope. Sufficient progress had been made up to the time of his death to give good prospect of final achievement of this exceedingly important aim. Outstanding traits in Mr. Hookstadt were his sincerity, his interest in the welfare of wage-earners not from a class point of view but from that of society as a whole, his industry, and his scientific spirit. Perhaps some of his critics may be inclined to question the last-named as being characteristic. But while his eagerness to point the way by his investigations to better things may have at times led him to be over-positive of results or too hasty in conclusions, those at all closely acquainted with him could scarcely question his full intent always to observe all the facts within reach and fairly interpret their significance. The dominant trait in Mr. Hookstadt, perhaps, was a pioneer spirit pushing always ahead. Making all due allowance for points in it open to criticism his work contributed substantially to progress in the field of workmen's compensation legislation and administration.

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

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ABSTRACT FROM THE MINUTES OF THE MEETING MAY 23, 1924

The semi-annual (twenty-second regular) meeting of the Casualty Actuarial Society was held at the Hotel Pennsylvania, New York, on Friday, May 23, 1924.

President Leslie called the meeting to order at 10:30 A. M. The roll was called showing the following thirty-three Fellows and seventeen Associates present:

FELLOWS

BAILEY	JACKSON, C. W.	OUTWATER
BREIBY	KOPF	PERKINS
BUDLONG	LAIRD	PINNEY
DEKAY	LESLIE	ROEBER
DORWEILER	MCMANUS	RUBINOW
FALLOW	MADDRILL	RYAN
FONDILLER	MAYCRINK	SENIOR
GREENE	MELTZER	SMITH, C. G.
HAMMOND	MICHELBACHER	TARBELL
HARDY	MOORE, G. D.	VAN TUYL
HOBBS	MILLIGAN	WHITNEY

ASSOCIATES

ACKER	GINSBURGH	MONTGOMERY, J. C.
ACKERMAN	GRAHAM, C. M.	PIKE
AULT	HALL	SAWYER
BARBER	HULL	SMITH, A. G.
CONSTABLE	LINDER	STOKE
CORCORAN	MATTHEWS	

President Leslie read his presidential address.

The minutes of the meeting held November 16, 1923 were approved as printed in the *Proceedings*.

The Secretary-Treasurer read the report of the Council and upon motion, it was adopted by the Society. M. Acker, W. M. Corcoran, and W. Van B. Hart had been enrolled as Associates without examination. The memorial notice of Carl Hookstadt appearing in this Number was read.

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

WILLIAM B. BAILEY, Economist, Travelers Insurance Company, Hartford, Conn.

CLARENCE W. HOBBS, Special Representative of National Convention of Insurance Commissioners, National Council on Compensation Insurance, New York.

After ballot, these nominees were declared duly elected Fellows.

Upon the recommendation of the Council the Society authorized the President to appoint a special committee of five members to determine the proper basis for the computation of liability and workmen's compensation loss reserves and to report its findings to the Society.

Messrs. Dublin, Kopf and Whitney will be delegates from the Society to attend the International Mathematical Congress which will be held in August, 1924, at Toronto, Canada.

The papers printed in this Number were read or presented.

Recess was taken until 2:15 P. M.

By invitation of the President, Professor William B. Bailey addressed the Society upon "Impressions of Casualty Insurance from the point of view of an Economist."

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

Upon motion, the meeting adjourned at 5:00 P. M.

REPORT OF EDUCATIONAL COMMITTEE

To the Council:

During the past two years your Committee has had opportunity to revise the recommendations for study, including therein certain of the more recent standard texts and a selection of papers from leading actuarial and insurance periodicals. The Committee has also collected some helpful information on facilities for study, on the trend of professional education in the insurance branches, and on the newer aspects of casualty and allied branches of insurance which bear upon the educational program of a Society such as ours.

Seven Subjects in Technical Insurance Education

The requirements in our syllabus naturally fall under seven subjects or headings. Sometime during the Associateship or Fellowship examinations we try to determine the candidate's proficiency in:

1. Mathematics:
   Associateship: Part I, Section 1; Part II, Section 1.
   Fellowship: Part I, Section 1.

2. Actuarial Principles and Practice:
   Fellowship: Part I, Section 3; Part II, Section 2.

3. Statistics:
   Associateship: Part I, Section 3; Part II, Section 3; Part II, Section 4.
   Fellowship: Part I, Section 2; Part II, Section 1; Part II, Section 3.

4. Accounting:
   Associateship: Part I, Section 2; Part II, Section 4.
   Fellowship: Part II, Section 3.

5. INSURANCE PRINCIPLES, PRACTICE AND SERVICE.
   Associateship: Part II, Section 2.
   Fellowship: Part II, Section 4.

6. INSURANCE LAW:
   Associateship: Part II, Section 5.

7. INSURANCE ECONOMICS, INCLUDING SOCIAL INSURANCE:
   Fellowship: Part I, Section 4.

Your Committee has carefully examined the syllabus and finds that it accords reasonable weight to each of the seven important subjects in which we expect competence on the part of our candidates for membership. These seem to be the elements of a technical education for an actuary or a statistician in the casualty and allied insurance branches.

INSURANCE EDUCATION AT THE UNIVERSITIES

The Society should encourage the formation of classes of instruction in technical insurance subjects at the Universities, where both residence and correspondence study facilities* can be offered. The Committee was unanimous at its last meeting in recommending that the Society discuss and promote the preparation of uniform, up-to-date texts on the underwriting, administrative and rate-making, or actuarial, aspects of the several casualty lines. The texts and readings available to our students are scattered and need to be brought together, both for the convenience of our students and for the guidance of our Examination Committee. Furthermore, certain members of our Committee feel that such condensation of the literature will lead to further progress in codifying existing knowledge in the several applied insurance sciences.

*The student should write for the prospectuses of the Departments of Economics or the Schools of Business of the following Universities: Columbia (N. Y. City); University of Pennsylvania (Philadelphia); Harvard (Cambridge, Mass.); N. Y. University, Washington Square, East (N. Y. City); Michigan (Ann Arbor); California (Berkeley); Minnesota (Minneapolis); Brown (Providence, R. I.)

Progress in Insurance Accounting, Insurance Law and Statistics

Your Committee is directing some of its attention and effort to the following questions:

INSURANCE ACCOUNTING

(1) How can the teaching of insurance accounting be improved by (a) outlining a general theory of accounts *for insurance students primarily*, (b) selecting accounting problems from the insurance field for use in teaching accounting theory and (c) preparing an insurance accounting text*, with laboratory sets, which will give the casualty student a general idea of accounting principles and practice in the life, casualty and property insurance fields? We should endeavor to provide an adequate text out of our study and experience. The Committee earnestly solicits the interest of the Council and members in this work.

INSURANCE LAW

(2) Your Committee wishes to direct your attention also to the lack of suitable text references in the past, preparatory to readings in insurance law. We ought to encourage study of general commercial law, before suggesting a plunge by our students into the insurance law texts recommended in the past. We do not expect to make lawyers out of our students, but we urge that it is reasonable to *prepare* the student for intelligent reading of insurance law. In the "Recommendations for Study" we give a number of references which, we hope, will pave the way for more satisfactory preparation of students in this subject.

INSURANCE STATISTICS

(3) The teaching of statistics and its application to insurance administration has shown remarkable progress since our Society was founded ten years ago. We feel that the references given this year will be more helpful than ever before to students who wish to qualify for the practice of administrative statistics or of economic research in the insurance business, or to apply statistical methods in accounting or actuarial work. Statistics, in the insurance fields, supplements actuarial and accounting

*Professor Kester has been asked by your Committee to include insurance accounting in the revision of his standard work on accounting theory and practice.

work. It is also the intelligence service of the insurance executive. The statistician has become a counselor on public relations, on adequacy of coverage, insurance economics, scientific management and risk elimination.

The Society's Library

The Committee reports that only slight use has been made of the Library and wishes to direct the attention of students to the loan facilities authorized by the Society. Application for a library loan card should be made to the Secretary, Mr. Richard Fondiller, 75 Fulton Street, New York City.

A full list of standard readings is given at the end of the Associateship and Fellowship sections to aid the student in purchasing or borrowing the volumes.

The Committee wishes to acknowledge the assistance of Mr. Richard Fondiller and Mr. S. B. Ackerman in the preparation of materials on law and accounting.

Respectfully submitted,

Educational Committee:

William Breiby	R. J. McManus
R. H. Blanchard	G. D. Moore
E. S. Cogswell	A. H. Mowbray
E. R. Hardy	T. F. Tarbell

E. W. Kopf (*Chairman*)

May 22, 1924.

RECOMMENDATIONS FOR STUDY

NOTE: The number in parenthesis after the title refers to the more complete description of the book in the *Index* at the end of these Recommendations.* The text volumes which should be studied closely are denoted thus: (†).

ASSOCIATESHIP

PART I:

Section 1. Elementary algebra up to and including the binomial theorem and the use of logarithms; compound interest and annuities certain.

This should include the matter in the ordinary college algebra, through the binomial theorem, but excluding exponential and logarithmic series. The practical use of logarithms and the solution of the simpler problems in compound interest and annuities certain is expected.

Text-books Recommended for Study:

(†) *Hall and Knight.* Elementary algebra for schools. (12) to be supplemented by:

(†) *Hall and Knight.* Higher algebra. (13). Chapters I-XVI.

Wells, W. An advanced course in algebra. Chapters I-XXX. The student may omit that portion of Chapter XXIX from section 606 to close of chapter. (28).

Supplementary Reading:

Compound Interest and Annuities Certain:

Skinner, E. B. Mathematical theory of investment. (24).

Section 2. Double Entry Bookkeeping.

The candidate's training in this subject should include a knowledge of the forms and ruling as well as the operation of books of original entry; the ability to draw up ordinary business documents; a knowledge of controlling accounts; entering simple business transactions, posting, taking off trial balances and the preparation of simple financial statements.

*Periodical references are given in full under each section. PROCEEDINGS of the Casualty Actuarial Society are denoted PROC., with the volume and page following.

Text-books Recommended for Study:

(†) *McKinsey, J. O.* Bookkeeping and accounting. (18).

(†) *Kester, R. B.* Accounting, theory and practice. Vol. 1, Chapters I to XXX. (16).

Supplementary Reading:

Cole, W. M. Accounts, their construction and interpretation. Pages 9 to 66. (5).

Hatfield, H. R. Modern accounting. (9).

(†) *Hodge, A. C. and J. O. McKinsey.* Principles of accounting. (10).

Section 3. Elements of statistics, including compilation, tabulation and presentation, but excluding critical mathematical analysis.

Text-books Recommended for Study:

(†) *Mills, F. C.* Statistical methods applied to business and economics. (19).

Karsten, K. Charts and graphs. (15).

Pearl, R. Medical biometry and statistics. (21). Chapters I, IV, V, VI, VII, X, XIII, XIV.

Supplementary Reading:

Bowley, A. L. Elements of statistics. (3). Chapters I, II, IV, V, VII, VIII.

Yule, G. U. Introduction to statistical methods. (30). Chapters I, VI, VII, VIII, IX.

PART II:

Section 1. Elements of the theory of probabilities—Algebraic treatment only.

Text-books Recommended for Study:

(†) *Hall and Knight.* Higher algebra. (13). Chapters XI and XXXII.

The student may omit the geometrical methods following the fourth set of examples (Chapter XXXII) but should not overlook the fifth set of miscellaneous examples which contains many problems of interest and value. A thorough grounding in permutations and combinations (Chapter XI) is essential for an understanding of Chapter XXXII.

Pearl, R. Medical biometry and statistics. (21). Chapters XI and XII.

Section 2. Policy forms and underwriting practice in casualty insurance.

The student should be thoroughly familiar with the policy forms and rate manuals in use in the several divisions of casualty insurance. The analysis of the policy contract and the study of the descriptive matter and rate tables of the manuals will give the student a sound understanding of the various kinds of insurance. The following items require particular attention:

A. The Insuring Clauses of the Contract
- (a) The subject matter of the insurance
- (b) The contingency insured against
- (c) Service in investigations and settlements
- (d) Defense of suits
- (e) Payment of expenses
- (f) Exceptions as to coverage
- (g) Period of insurance
- (h) Conditions relieving insurer of liability

B. The Premium
- (a) Unit on which computed
- (b) When payable
- (c) Methods of adjustment when policy is cancelled by insurer or assured

C. General Provisions
- (a) Inspection of premises or subject of the insurance by the insurer
- (b) Inspection of the assured's books
- (c) Notice of loss
- (d) Subrogation

Text-books Recommended for Study:

(†) *Blanchard, R. H.* Liability and compensation insurance. (2).

(†) *Downey, E.H.* Workmen's Compensation Insurance. (6)

Dunham, H. P. Business of insurance. (7). Chapter LXIII.

(†) *Insurance Society of New York.* Lectures on insurance; Junior, Intermediate and Senior Courses. (1921-1924). *Weekly Underwriter,* 80 Maiden Lane, N. Y. City, $1.00 each.

Insurance Library Association of Boston. Lectures on casualty insurance. 1922. (14).

Lunt, E. C. Surety bonds. (17).

Riegel and Loman. Insurance principles and practices. (23). Chapters XI, XII, XX, XXI, XXII, XXIII.

Readings in Periodical Literature:

Blanchard, R. H. and G. D. Moore. Corporate Bonding. PROC. VII, 23.

Federal Reserve Board. Federal Reserve Bulletin. Final edition. *Credit insurance.* June, 1922. Page 667. Washington, D. C.

Fitch, F. M. Some distinctive features of steam boiler underwriting and their bearing upon the formulation of premium rates. PROC. II, 407.

Laird, J. M. Non-cancellable accident and health insurance problems. PROC. VII, 302.

Michelbacher, G. F. Manufacturers' and contractors' public liability insurance. PROC. IV, 89.

———— Casualty insurance for automobile owners. PROC. V, 213.

Pinney, S. D. Miscellaneous property damage insurance. PROC. X, 33.

Section 3. Simple practical problems relative to compilation and use of statistics of casualty (including social) insurance.

The study of statistical plans in use in connection with casualty and related lines is essential. The "Workmen's Compensation Statistical Plan" may be obtained from the *National Council on Compensation Insurance,* 151 Fifth Avenue, New York City. Plans for several other lines are published by the *National Bureau of Casualty and Surety Underwriters,* 120 West 42nd Street, New York City.

Section 4. Simple practical problems in insurance accounting and statistics, including the preparation of annual statements.

The student should become thoroughly familiar with the Convention Edition of the annual statement blanks for miscellaneous stock and mutual companies, and all schedules therein or supplemental thereto. He should understand the construction of schedules W and Z required by several of the states for compensation business, and of the casualty insurance exhibit required by New York State.

The student will find much useful information in the following pamphlets issued by the *National Council on Compensation Insurance,* 151 Fifth Avenue, New York City.

1. *Hardison, F. H.* Origin and history of Schedule Z in Massachusetts.
2. Instructions for the preparation of Schedule Z, 1924.

Practical experience in the preparation of these schedules is desirable, if obtainable. A knowledge of accounting pro-

cedure involved in the preparation of the statement and schedules is essential. The student should understand that for this purpose an elementary knowledge of the methods required for claim and premium reserve statements is necessary. This does not conflict with Part I, Section I, of the Fellowship Syllabus which deals with the study of principles underlying correct determination of reserves. The following readings are also recommended.

Cammack, E. E. System of analyzing workmen's compensation business by means of perforated cards. PROC. II, 90.

Craig, J. D. Allocation of expenses. PROC. X, 9.

Downey, E. H. Uses and abuses of Schedule Z. PROC. X, 67.

Hull, R. S. Allocation of administrative expense by lines for casualty companies. PROC. IX, 38.

Pinney, S. D. Review of statistical problems of casualty companies. PROC. X, Part II.

Scattergood, Claude E. Cost accounting in casualty insurance. PROC. II, 253.

Tarbell, Thomas F. Determination of acquisition and field supervision cost. PROC. X, Part II.

Van Tuyl, H. O. New experience exhibit for casualty insurance companies. PROC. X, 17.

Wolfe, S. H. The examination of insurance companies. (29).

The provisions of the liability and compensation loss reserve laws in force in New York, Massachusetts, Illinois and other States should be carefully examined.

Section 5. Insurance law and legislation, including the more important statutes of the United States (and Canada, for Canadian candidates) relating to casualty insurance.

The student should have an understanding of the basic principles of law and legislation and of commercial law. These are necessary for a sound grasp of law, legislation and practice applied to insurance in the United States. The following will be found to be useful preparatory texts:

Stone, H. F. Law and its administration. (26).

Spencer, W. H. Law and business. (25)

V. 1 (Introduction)

V. 2 (Law and the market, law and finance)

V. 3 (Law and risk-bearing); law and labor will be of interest to students also.

(†) *Bacon, C. F.* Readings in: contracts (principles and cases); agency and sales; negotiable instruments; partnership; bankruptcy. (1)

A thorough grounding in commercial law will enable the student to understand insurance law and legislation. The following list of references may seem to be formidable; the student is expected only to read the text rather rapidly, grasp the general principles, and examine critically the legal notes and some of the decisions to understand their practical application. Too close reading of the statutes is not recommended since detailed statutory provisions are subject to frequent change.

A. General Insurance Law.

Vance, W. R. Handbook of the law of insurance. (27). *or*

Richards, G. Treatise on the law of insurance. (22).

B. Accident and Employers' Liability Insurance Law.

Fuller, H. B. Law of accident and employers' liability insurance. (8).

C. Current Decisions.

See *Legal Notes* in the PROCEEDINGS, also in the TRANSACTIONS of the Actuarial Society of America. It is hardly necessary to go back more than three years in examining these notes. See also the *Insurance Law Journal* published by The Insurance Law Journal Co., 27 Cedar Street, New York City.

D. Workmen's Compensation Insurance Law.

Bradbury, H. B. Workmen's compensation and state insurance law. (4) *or*

Honnold, A. B. Treatise on the American and English workmen's compensation laws. (11).

E. Current Decisions on Workmen's Compensation.

Reported decisions of administrative commissions, particularly those of Massachusetts, New York, Connecticut and California. These decisions are generally reported in some official publication, such as the *Bulletin* of the New York State Industrial Commission or the *Monthly Review* of the United States Bureau of Labor Statistics.

F. Statute Law Governing Insurance Companies.

The student can generally obtain from the insurance departments of the several states, a pamphlet reprint of the insurance law, and he should be familiar with the laws relating to casualty companies. In some states, as in New York for example, the law cannot be obtained in this way but must be found in a publication such as:

Parker, A. J., Jr. Insurance laws of New York. (An annual, giving the latest text of the law and copious annotations). (20).

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TEXTS FOR ASSOCIATESHIP READINGS

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(1) Bacon, C. F.
Readings in: contracts (principles and cases); agency and sales; negotiable instruments; partnership; bankruptcy. New York. New York University Book Store, Washington Square, East. $6.90 the set.

(2) Blanchard, Ralph Harrub
Liability and compensation insurance; industrial accidents and their prevention, employers' liability, workmen's compensation, insurance of employers' liability. New York. Appleton, 1917, 394 p., $2.00.

(3) Bowley, Arthur Lyon
Elements of statistics. 2 Vols, 4th ed. New York. Scribner, 1921, 474 p., V. 1, $5.25; V. 2, $4.50.

(4) Bradbury, Harry Bower
Bradbury's workmen's compensation law. 3rd ed. New York. Banks Law Publishing Co., 1917, 1285 p., $10.00.

(5) Cole, William Morse
Accounts; their construction and interpretation for business men and students of affairs.
New York, Houghton, 1915, 445 p., $3.60.

(6) Downey, E. H.
Workmen's Compensation. New York, Macmillan. 400 p., $2.00.

(7) Dunham, Howard Peter (editor)
Business of insurance: a text book and reference work covering all kinds of insurance. 3 Vols., New York. Ronald Press. 1912, Buck. $10.00; hf. mor., $12.50.

(8) Fuller, Hubert Bruce
Law of accident and employers' liability insurance. Kansas City, Mo. Vernon Law Book Co., 1913, 563 p., $5.00.

(9) Hatfield, Henry Rand
Modern accounting; its principles and some of its problems.
New York. Appleton, 1909, 367 p., $2.50.

(10) Hodge, Albert C. and J. O. McKinsey
Principles of accounting. Chicago. Univ. of Chicago Press. 1920, 390 p., $3.00.

(11) Honnold, Arthur B.
Treatise on the American and English workmen's compensation laws as interpreted by the courts and tribunals, vested with the power of administering and enforcing same. 2 Vols. Kansas City, Mo. Vernon Law Book Co., 1918, $15.00.

(12) Hall, Harry Sinclair and S. P. Knight
Elementary algebra. New York, Macmillan, $1.10.

(13) ———— Higher algebra. 4th ed. New York, Macmillan, 1919, 557 p., $2.35.

(14) Insurance Library Association of Boston
Lectures on casualty insurance delivered before evening classes in insurance. Boston, *Spectator*, 1922, 200 p., $1.50.

(15) Karsten, Karl G.
Charts and graphs; an introduction to graphic methods in the control and analysis of statistics. New York, Prentice-Hall, 1923, 724 p., $6.00.

(16) Kester, Roy Bernard

Accounting theory and practice. V. 1, 2nd ed. New York. Ronald Press Co., 1922, 625 p., $3.00.

(17) Lunt, Edward Clark

Surety bonds; nature, functions, underwriting requirements. New York, Ronald Press., 1922, 370 p., $2.50.

(18) McKinsey, James Oscar

Bookkeeping and accounting. Cincinnati, South-Western Publishing Co., 1920, 512 p., $2.50.

(19) Mills, Frederick C.

Statistical methods applied to economics and business. New York, Holt., 1924 (In press).

(20) Parker, Amasa Junius, Jr. (editor)

Insurance law of New York, being chapter 28 of the consolidated laws and chapter 33 of 1909 including all amendments of 1921, with notes and annotations. 1922, 506 p., $6.00.

Supplement 1923, including all amendments of 1923 with copious notes and annotations. 1923, 98 p., $2.50. New York, Banks Law Publishing Co.

(21) Pearl, Raymond

Medical biometry and statistics. Philadelphia, Saunders, 1923, 379 p., $5.00.

(22) Richards, George

Treatise on the law of insurance. 3rd ed. New York, Banks Law Publishing Co., 1909, 959 p., $7.50.

(23) Riegel, Robert and Harry J. Loman

Insurance principles and practices. New York, Prentice-Hall, 1921, 514 p., $6.00.

(24) Skinner, Ernest Brown

Mathematical theory of investment. Boston, Ginn, 1913, 245 p., $2.25.

(25) Spencer, William Homer

Law and business. 3 Vols., Chicago, Univ. of Chicago Press, 1921-1922, ea. $4.50. V. 1 Introduction. V. 2 Law and the market, law and finance. V. 3 Law and risk-bearing, law and labor, law and the form of the business unit.

(26) Stone, Harlan F.

Law and its administration. New York, Columbia University Press, 1924, 232 p., $2.00.

(27) Vance, William Reynolds

Handbook of the law of insurance. New York, Spectator, 1904, 683 p., $4.00.

(28) Wells, Webster

Advanced course in algebra. New York, Heath, 1904, 589 p., $2.24.

(29) Wolfe, Samuel Herbert

Examination of insurance companies; series of talks to the members of his office staff. New York, Insurance Press, 1910, 248 p., $3.00.

(30) Yule, G. Udny

An introduction to the theory of statistics. 5th ed. enlarged. London, Griffin, 1919, 398 p., $4.25.

RECOMMENDATIONS FOR STUDY

NOTE: The number in parenthesis after the title refers to the more complete description of the book in the *Index* at the end of these Recommendations.* The text volumes which should be studied closely are denoted thus : (†)

FELLOWSHIP

PART I:

Section 1. Advanced algebra, elementary differential and integral calculus, and elementary calculus of finite differences.

Text-books Recommended for Study:

(†) *Hall and Knight.* Higher algebra. (15). First 24 chapters omitting chapters XVI and XVIII, which have already been covered in the Associateship examinations. It will be helpful, however, to read these chapters again, because of their bearing on the other materials in the book.

Smith, Charles. Treatise on algebra. (31).

(†) *Granville, W. A. and P. F. Smith.* Elements of the differential and integral calculus. (For students who have not previously studied other texts). (12).

Thompson, S. P. Calculus made easy. (33).

Fisher, Irving. Infinitesimal calculus. (11). (These latter two will serve as review texts).

Osgood, W. F. Differential and integral calculus (23).

(†) *Whittaker, E. T. and G. Robinson.* Calculus of observations. (35). Chapters I to IV on Differences are recommended for study; also

Henry, A. Calculus and probability. (19). Chapters I to XX.

Griffin, F. L. Introduction to mathematical analysis. (13). Chapters I to IV and XIV.

*Periodical references are given in full under each section. PROCEEDINGS of the Casualty Actuarial Society are denoted PROC., with the volume and page following.

Section 2. Critical analysis of statistics, including elementary mathematical theory.

Text-books Recommended for Study:

(†) *Glover, J. W. and Harry C. Carver.* Introduction to mathematical statistics. Edwards Brothers, Ann Arbor, Mich., Publishers of mimeographed lectures and notes, 1924.

(†) *Mills, F. C.* Statistics applied to economics and business. (22).

Pearl, R. Medical biometry and statistics. (25). Chapters XV, XVI.

Yule, G. Udny. Introduction to statistics. (36). Chapters I to V, X to XVII.

Supplementary Reading:

Charlier, C. V. L. Vorlesungen über die grundzüge der mathematischen statistik. (4).

Fisher, Arne. Mathematical theory of probabilities. (10). Chapters I to XII.

Pearson, Karl. Grammar of science. (26). Chapters I to V.

(†) *Rietz, H. L.* (editor). Handbook of mathematical statistics. Prepared under the auspices of the National Research Council. (27).

Section 3. Elements of the theory of life contingencies, including the calculation of present values of annuities based upon life contingencies.

(†) *Spurgeon, E. F.* Life contingencies. (32). Chapters I to IV, VII, IX, XI, XII, XIII, XV. (NOTE: this replaces the older Vol. 2 of the Institute of Actuaries Textbook.)

Section 4. Economic theory of insurance, including the theory of social insurance.

(†) *Hardy, C. O.* Risk and risk-bearing. (18). See also: Readings in risk and risk-bearing, by the same author. (17).

(†) *Zartman, L. and W. H. Price.* Yale Readings in Insurance—Personal insurance. (37). Chapters I, II, III, IV.

Huebner, S. S. Property insurance. (20). Chapter I. Although concerned with fire insurance, the ideas in this chapter are applicable to other forms of insurance.

Seager, H. R. Social insurance. (30).

Rubinow, I. M. Social insurance. (29); and Standards of health insurance. (28).

Cohen, J. L. Social insurance unified and other essays (including mothers' pensions). (6). Insurance against unemployment. (5).

Beveridge, W. H. Unemployment. (2).

Berridge, W. A. Cycles of unemployment in the U. S. 1903-1922. (1).

Craig, J. D. Unemployment insurance. TRANSACTIONS of the Actuarial Society of America V. 24, pt. 1, 1923, p. 168.

Halsey, O. S. Unemployment insurance. (16).

Klein, P. The burden of unemployment. A study of unemployment relief measures in fifteen American cities, 1921-22. (21).

PART II:

Section 1. Advanced practical problems in the compilation of statistics relating to casualty (including social) insurance.

(†) *Bureau of Personal Accident and Health Underwriters.* (80 Maiden Lane, New York City).

(1) Non-cancellable accident and health statistical plan.

(2) Personal accident and health statistical plan. (Accident section).

(3) Personal accident and health statistical plan. (Health section).

(4) Classification of occupations for accident and health experience.

(5) Combined health experience on commercial policies. Policy year 1921. ($5.00 for non-member companies or for additional copy to member companies.)

Downey, E. H. Remarriage experience of Pennsylvania compensation insurance carriers. Policy years 1916-1919. PROC. VIII, 201.

Maddrill, J. D. Compensation cost of industrial disease. PROC. II, 208.

Moore, W. F. Plate glass statistical classification codes and information. (80 Maiden Lane, New York City).

National Bureau of Casualty and Surety Underwriters. Burglary insurance statistical plan. (120 West 42nd Street, New York City).

Outwater, O. E. An American accident table. PROC. VII, 57.

Rubinow, I. M. Standard accident table. *American Statistical Association Quarterly.* 14-358, March 1915.

Section 2. Calculation of premiums and reserves for accident, sickness, workmen's compensation and other branches of casualty insurance including consideration of basis of reserve.

(*a*) *Workmen's Compensation Manual Rates.*

Blanchard, R. H. Liability and compensation insurance. (3). Chapters XVII, XVIII and XXI.

Downey, E. H. Classification of industries for workmen's compensation insurance. PROC. II, 10.

Mowbray, A. H. How extensive a payroll is necessary to give a dependable pure premium? PROC. I, 24.

———— Actuarial problems of the 1920 national revision of workmen's compensation insurance rates. PROC. VI, 250.

———— Classification of risks as the basis of insurance rate making. PROC. VIII, 77.

———— Procedure for making rates for workmen's compensation insurance. PROC. IX, 186.

———— Legal limits of weekly compensation in their bearing on ratemaking. PROC. IX, 208.

Michelbacher, G. F. Theory of law differentials. PROC. III, 195.

———— Technique of ratemaking as illustrated by the 1920 national revision of workmen's compensation insurance rates. PROC. VI, 201.

Perkins, S. B. Some observations on the development of manual rates for workmen's compensation insurance. PROC. IX, 269.

———— A suggested system of standard notation for actuarial work in workmen's compensation insurance. PROC. VII, 36.

Rubinow, I. M. Scientific methods of computing compensation rates. PROC. I, 10.

Ryan, H. E. Revision of workmen's compensation rates. PROC. III, 175.

Wilson, W. N. Permanent total disability from accidental causes. PROC. IX, 65.

Woodward, J. H. Fraternal Sickness Insurance, *Proceedings of the Fraternal Actuarial Association*, No. 6, 1923.

(*b*) *Merit Rating.*

Various: Schedule rating in compensation insurance. PROC. I, No. 3. (This whole meeting was devoted to a discussion of schedule rating).

Blanchard, R. H. Liability and compensation insurance. (3). Chapters XIX and XX.

Downey, E. H. Preliminary test of the coal mine rating schedule of the associated companies. PROC. II, 387.

———— Some principles of compensation merit rating. PROC. III, 26.

———— The industrial compensation rating schedule, 1918. PROC. IV, 325.

Michelbacher, G. F. Practice of experience rating. PROC. IV, 293.

Mowbray, A. H. Scheduled experience rating. PROC. III, 14.

Perkins, S. B. and R. A. Wheeler. 1922 revision of the industrial compensation rating schedule. PROC. IX, 11.

Whitney, A. W. Theory of experience rating. PROC. IV, 274.

———— Study of schedule rating. PROC. VII, 225.

Woodward, J. H. Experience rating of workmen's compensation risks. PROC. II, 356.

(*c*) *Loss Reserves for Workmen's Compensation.*

Various: Compensation and liability claim reserves. PROC. I, No. 2. (An entire meeting was devoted to this topic. The several papers should be carefully read).

Blanchard, R. H. Liability and compensation insurance. (3). Chapter XXI.

Fondiller, R. Tables for computing present value of death benefits. PROC. II, 110.

Woodward, J. H. Premiums and reserves of the Swiss Accident Institution. PROC. IV, 45.

———— Valuation of benefit to widows and children provided by New York workmen's compensation law as amended in 1922. TRANSACTIONS of the Actuarial Society of America. XXIV, 414.

Penman, W., Jr. On the valuation of the liabilities of an insurance company under its employers' liability contracts. *Journal of the Institute of Actuaries.* XLV, 101.

(*d*) *For Premiums on Other Casualty Lines.*

Cammack, E. E. Premiums and reserves for non-cancellable accident and health policies. PROC. VII. 267.

Elderton, W. P. and R. C. Fippard. Construction of mortality and sickness tables. (8).

Fallow, E. S. Accident statistics and reserves. Accident and Health Insurance Lectures. Insurance Institute of Hartford. (9).

Hardy, G. F. Friendly Societies. *Journal of the Institute of Actuaries.* XXVII, 245.

Kirkpatrick, A. L. Development of public liability insurance rates for automobiles. PROC. VIII, 35.

Laird, J. M. Non-cancellable accident and health insurance underwriting problems. PROC. VII, 302.

Parks, F. R. Accident and health experience. (24).

Spurgeon, E. F. Life contingencies. (32). Chapters I to IV, VII, IX, XI, XII, XIII, XV. (This replaces the references to Institute of Actuaries Textbook, Vol. 2.)

Watson, A. W. Friendly society finance considered in its actuarial aspects. (34)

———— Some points of interest in the operations of friendly societies. *Journal of the Institute of Actuaries*, XLIV, 168.

Woodwood, J. H. Industrial retirement systems based on the money-purchase principle. PROC. VIII, 13.

Craig, J. D. Health insurance from a theoretical and practical aspect. TRANSACTIONS of the Actuarial Society of America, XV, 271.

King, W. I. Accident and health insurance from an actuarial point of view. PROC. II, 49.

Section 3. Advanced practical problems in insurance accounting and statistics, including the preparation of annual statements and schedules.

The student should endeavor to obtain from practical discussion and close observation, critical reading and original thinking, a facility for the solution of problems which come to the supervising actuary of a casualty and miscellaneous line office.

Section 4. Underwriting problems in casualty insurance, including inspection of risks, adjustment and settlement of claims, etc.

The Committee feels that technical proficiency in these subjects can be developed only by direct discussion with competent underwriters, engineers and adjustors. It is strongly recommended that students seek instruction through these means. The insurance periodicals, and Dunham's "Business of Insurance" (7) contain numerous sidelights on these practical problems in the casualty insurance field.

INDEX TO TEXTS FOR FELLOWSHIP READINGS

INDEX

(1) Berridge, William A.
Cycles of unemployment in the U. S. 1903-1922. Boston, Houghton, 1923, 88 p., $1.25.

(2) Beveridge, William Henry
Unemployment; a problem of industry. 3rd ed. New York, Longmans, 1912, 405 p., $2.80.

(3) Blanchard, Ralph Harrub
Liability and compensation insurance; industrial accidents and their prevention, employers' liability, workmen's compensation, insurance of employers' liability. New York, Appleton, 1917, 394 p., $2.00.

(4) Charlier, C. V. L.
Vorlesungen über die grundzüge der mathematischen statistik. Lund, Verlag Scientia, 1920, 125 p., New York, Stechert, $3.00.

(5) Cohen, Joseph L.
Insurance against unemployment with especial reference to British and American conditions. London, King, 1921, 536 p., 18s.

(6) ———
Social insurance unified and other essays (including mothers' pensions). London, King. 157 p., 5s.

(7) Dunham, Howard Peter (editor)
Business of insurance: a text book and reference work covering all kinds of insurance. 3 Vols., New York, Ronald Press, 1912, Buck., $10.00; hf. mor., $12.50.

(8) Elderton, W. Palin and Richard C. Fippard
Construction of mortality and sickness tables. London, Black, 1914, 120 p. (Baker & Taylor Co., New York, $.67).

(9) Fallow, E. S.
Accident statistics and reserves. (In Insurance Institute of Hartford. Accident and health insurance, 1915), p. 128-136.

(10) Fisher, Arne
Mathematical theory of probabilities and its application to frequency curves and statistical methods. V. 1, 2nd ed. New York, Macmillan, 1922, 239 p., $5.00.

(11) Fisher, Irving
Brief introduction to the infinitesimal calculus. 2nd ed. New York, Macmillan, 1909, 84 p., $.75.

(12) Granville, William Anthony and Percey F. Smith
Elements of the differential and integral calculus. Boston, Ginn, 1911, 463 p., $2.50.

(13) Griffin, Frank Loxley
Introduction to mathematical analysis. New York, Houghton, 1921, 512 p., $2.75.

(14) Hall, Harry Sinclair and S. P. Knight
Elementary algebra. New York, Macmillan, $1.10.

(15) ———— Higher algebra. 4th ed. New York, Macmillan, 1919, 557 p., $2.35.

(16) Halsey, Olga S.
Unemployment insurance. Bulletin of the University Wisconsin, Madison, Nov. 1923. 24 p., 25c.

(17) Hardy, C. O.
Readings in risk and risk-bearing. Chicago, Univ. of Chicago Press, 1924. 368 p., $4.00

(18) ———— Risk and risk-bearing. Chicago, Univ. of Chicago Press, 1923, 400 p., $3.50.

(19) Henry, Alfred
Calculus and probability; for actuarial students. (Institute of Actuaries). London, Layton, 1922, 152 p. (or New York, Spectator) $5.50

(20) Huebner, Solomon S.
Property insurance, comprising fire and marine insurance, automobile insurance, fidelity and surety bonding, title insurance, credit insurance and miscellaneous forms of property insurance. New York, Appleton, 1922, 601 p., $3.00.

(21) Klein, Philip
The burden of unemployment. A study of unemployment relief measures in fifteen American cities, 1921-22. New York, Russell Sage Foundation, 1923.

(22) Mills, Frederick C.
Statistical methods applied to economics and business. New York, Holt, 1924. (In press).

(23) Osgood, William Fogg
First course in differential and integral calculus. New York, Macmillan, 1909, 462 p., $2.00.

(24) Parks, Francis R.
Accident and health experience: an analysis of the experience of the Loyal Protective Insurance Co. Boston, Mass. New York, Spectator, 1911, 14 p., $1.00.

(25) Pearl, Raymond
Medical biometry and statistics. Philadelphia, Saunders, 1923, 379 p., $5.00.

(26) Pearson, Karl
Grammar of science. 3rd ed. Part 1, New York, Macmillan, 1911, 394 p., $1.60.

(27) Rietz, H. L. (editor)
Handbook of mathematical statistics. Prepared under the auspices of the National Research Council. Boston, Houghton, 1924. 221 p., $4.00.

(28) Rubinow, Isaac Max
Standards of health insurance. New York, Holt, 1916, 322 p., $1.50.

(29) ———— Social insurance; with special reference to American conditions. New York, Holt, 1913, 525 p., $3.00.

(30) Seager, Henry Rogers
Social insurance; a program of social reform. New York, Macmillan, 1910, 175 p., $1.00.

(31) Smith, Charles
Treatise on algebra. New York, Macmillan, $1.90.

(32) Spurgeon, E. F.
Life contingencies. Institute of Actuaries. London, Layton, 1922, 477 p. (or New York, Spectator), $13.00

(33) Thompson, Silvanus Phillips
Calculus made easy. 2nd ed. New York, Macmillan, 1919, 265 p., $1.00.

(34) Watson, Alfred William
Friendly society finance considered in its actuarial aspect—a course of lectures. London, Layton, 1912, 132 p., 6s. (or New York, Spectator). $3.00.

(35) Whittaker, E. T. and G. Robinson
Calculus of observations. London, Blackie and Son, 1924, 398 p., 18s.

(36) Yule, G. Udny
An introduction to the theory of statistics. 5th ed. enlarged. London, Griffin, 1919, 398 p., $4.25.

(37) Zartman, Lester W. and W. H. Price, (editors)
Yale Readings in Insurance. Personal insurance; life and accident. New Haven, Yale Univ. Press, 1916.

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1924 YEAR BOOK

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FELLOWS

Those marked (†) were Charter Members at date of organization, November 7, 1914.

Those marked (*) have been admitted as Fellows upon examination by the Society.

Date Admitted	
†	Amerine, W. M., Assistant Secretary, Georgia Casualty Co., Macon, Ga.
†	Benjamin, Roland, Treasurer, Fidelity & Deposit Co., Baltimore, Md.
†	Black, S. Bruce, Vice-President and General Manager, Liberty Mutual Ins. Co., 210 Lincoln St., Boston, Mass.
Apr. 20, 1917	Blanchard, Ralph H., Associate Professor of Insurance, School of Business, Columbia University, New York.
May 24, 1921	Bond, Edward J., First Vice-President, Maryland Casualty Co., Baltimore, Md.
May 19, 1915	Bradshaw, Thomas, General Manager, Massey-Harris Co., Ltd., 915 King St., Toronto, Canada.
†	Breiby, William, Partner in firm of Fackler & Fackler, Consulting Actuaries, 50 Broad St., New York.
*Oct. 31, 1917	Brockway, U. Hayden, Travelers Insurance Co., Hartford, Conn.
Oct. 22, 1915	Brown, Herbert D., Chief of U. S. Efficiency Bureau, Washington, D. C.
Oct. 22, 1915	Brown, William H., Second Vice-President and Secretary, Columbian National Life Insurance Co., Boston, Mass.
†	Buck, George B., Consulting Actuary for Pension Funds, 25 Frankfort St, New York.
May 26, 1916	Bucklin, Walter S., President, Liberty Mutual Insurance Co., 210 Lincoln St., Boston, Mass.
†	Budlong, W. A., Superintendent of Claims, Commercial Travelers Mutual Accident Association, Utica, N. Y.
Apr. 20, 1917	Burhop, W. H., Assistant Secretary, and Actuary, Employers Mutual Liability Insurance Co., Wausau, Wis.
Feb. 19, 1915	Burns, F. Highlands, President, Maryland Casualty Co., Baltimore, Md.
†	Cammack, Edmund E., Actuary, Aetna Life Insurance Co., Hartford, Conn.
†	Carpenter, Raymond V., Actuary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
Feb. 25, 1916	Close, Charles L., Manager, Bureau of Safety, U. S. Steel Corporation, 71 Broadway, New York.
*Nov. 15, 1918	Coates, Barrett N., Assistant Secretary and Actuary, Western States Life Insurance Co., 995 Market St., San Francisco, California.
*Nov. 17, 1922	Coates, Clarence S., Assistant Actuary, Western States Life Insurance Co., 995 Market St., San Francisco, California.

FELLOWS.

Date Admitted	
Oct. 27, 1916	Cogswell, Edmund S., Secretary & Actuary, Commission on Pensions, State House, Boston, Mass.
†	Cole, Richard H., Secretary, Connecticut General Life Insurance Co., Hartford, Conn.
Feb. 19, 1915	Collins, Henry, Assistant Manager, Ocean Accident & Guarantee Corporation, 114 Fifth Avenue, New York.
†	Copeland, John A., Consulting Actuary, Hurt Building, Atlanta, Ga.
†	Cowles, Walter G., Vice-President, Travelers Insurance Co., Hartford, Conn.
†	Craig, James D., Actuary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
†	Dawson, Alfred B., Miles M. Dawson & Son, 36 W. 44th St., New York.
†	Dawson, Miles M., Counsellor at Law and Consulting Actuary, 36 W. 44th St., New York.
†	De Kay, Eckford C., President, De Kay and Co., Insurance Brokers, 51 Maiden Lane, New York.
†	Dearth, Elmer H., President, General Casualty & Surety Co., First National Bank Building, Detroit, Michigan.
May 19, 1915	Deutschberger, Samuel, Chief Examiner of Fire Companies, New York Insurance Department, 165 Broadway, New York.
*Nov. 17, 1920	Dorweiler, Paul, Aetna Life Insurance Co., Hartford, Conn.
†	Dublin, Louis I., Statistician, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
May 19, 1915	Dunlap, Earl O., Assistant Secretary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
†	Egbert, Lester D., Office of Willcox, Peck, Brown & Crosby, Insurance Brokers, 3 S. William St., New York.
*Nov. 17, 1922	Elston, James S., Assistant Actuary, Life Department, Travelers Insurance Co., Hartford, Connecticut.
†	Epsteen, Saul, Hamilton National Bank, Denver, Colo.
†	Fackler, David Parks, Consulting Actuary, 50 Broad St., New York.
†	Fackler, Edward B., Consulting Actuary, 50 Broad St., New York.
†	Fallow, Everett S., Actuary, Accident Department, Travelers Insurance Co., Hartford, Conn.
†	Farrer, Henry, Assistant Secretary, Independence Indemnity Co., Third and Walnut Sts., Philadelphia, Pa.
Feb. 19, 1915	Fellows, C. W., President, Associated Industries Insurance Corporation, Wells Fargo Bldg., San Francisco, Calif.
Feb. 19, 1915	Flanigan, James E., Actuary, Bankers Life Co., Des Moines, Iowa.
†	Flynn, Benedict D., Secretary, Travelers Insurance Co., Hartford, Conn.
Feb. 15, 1915	Fondiller, Richard, Woodward, Fondiller & Ryan, Consulting Actuaries, 75 Fulton St., New York.
†	Forbes, Charles S., Insurance Broker, 68 William St., New York
May 26, 1916	Frankel, Lee K., Second Vice-President, Metropolitan Life Insurance Co., 1 Madison Ave., New York.

FELLOWS.

Date Admitted	
†	Franklin, Charles H., Manager, Casualty Department, Northwestern Casualty & Surety Co., Brumder Building, Milwaukee, Wis.
Feb. 25, 1916	Froggatt, Joseph, President, Joseph Froggatt & Co., Insurance Accountants, 25 Church St., New York.
†	Furze, Harry, Treasurer, Globe Indemnity Co., Washington Park, Newark, N. J.
Feb. 19, 1915	Garrison, Fred S., Assistant Secretary, Travelers Indemnity Co., Hartford, Conn.
†	Gaty, Theodore E., Vice-President and Secretary, Fidelity & Casualty Co., 92 Liberty St., New York.
May 19, 1915	Glover, James W., Professor of Mathematics and Insurance University of Michigan, 620 Oxford Road, Ann Arbor, Mich.
†	Goodwin, Edward S., Goodwin-Beach & Co., Bankers, 720 Main St., Hartford, Conn.
†	Gould, William H., Consulting Actuary, 75 Fulton St., New York.
Oct. 22, 1915	Graham, George, Vice-President, Central States Life Insurance Co., St. Louis, Mo.
Oct. 22, 1915	Graham, Thompson B., Assistant Secretary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
†	Graham, William J., Second Vice-President, Equitable Life Assurance Society, 120 Broadway, New York.
May 25, 1923	Granville, William A., Educational Director, U. S. National Life & Casualty Co., 29 South La Salle St., Chicago, Ill.
†	Greene, Winfield W., Actuary, National Council on Compensation Insurance 151 Fifth Ave., New York.
†	Hamilton, Robert C. L., Comptroller, Hartford Accident & Indemnity Co., Hartford, Conn.
†	Hammond, H. Pierson, Assistant Actuary, Life Department, Travelers Ins. Co., Hartford, Conn.
†	Hansen, Carl M., Vice-President and General Manager, General Re-Insurance Corporation, 80 Maiden Lane, New York.
Oct. 27, 1916	Hardy, Edward R., Assistant Manager, New York Fire Insurance Exchange, 123 William St., New York.
Oct. 22, 1915	Hatch, Leonard W., Manager, State Insurance Fund, 124 E. 28th St., New York.
Nov. 17, 1920	Heath, Charles E., Chief Examiner of Casualty Companies, New York Insurance Department, 165 Broadway, New York.
Nov. 21, 1919	Henderson, Robert, Second Vice-President and Actuary, Equitable Life Assurance Society, 120 Broadway, New York.
May 17, 1922	Heron, David, Secretary & Chief Statistician, London Guarantee & Accident Co., 20 Lincoln's Inn Fields, London, W. C. 2, England.
Oct. 22, 1915	Hess, Herbert, Herbert Hess & Co., Public Insurance Accountants, 120 Broadway, New York.
†	Hillas, Robert J., President, Fidelity & Casualty Co., 92 Liberty St., New York.

FELLOWS.

Date Admitted	
Nov. 15, 1918	Hinsdale, F. W., Secretary, Workmen's Compensation Board, Vancouver, B. C., Canada.
Oct. 22, 1915	Hodgkins, Lemuel G., Secretary, Massachusetts Protective Association, Worcester, Mass.
†	Hoffman, Frederick L., Consulting Statistician, Prudential Insurance Co., and Dean, Advanced Course, Babson Institute, Wellesley Hills, Mass.
Oct. 22, 1915	Holland, Charles H., President, Independence Indemnity Co., Third & Walnut Sts., Philadelphia, Pa.
Nov. 21, 1919	Hookstadt, Carl, Expert, U. S. Bureau of Labor Statistics, Washington, D. C.
†	Hughes, Charles, Auditor and Actuary, New York Insurance Department, 165 Broadway, New York.
†	Hunt, Burritt A., Assistant Secretary, Accident & Liability Department, Aetna Life Insurance Co., Hartford, Conn.
†	Hunter, Arthur, Chief Actuary, New York Life Insurance Co., 346 Broadway, New York.
Nov. 18, 1921	Hutcheson, William A., Second Vice-President and Actuary, Mutual Life Insurance Co., 32 Nassau St., New York.
Feb. 25, 1916	Jackson, Charles W., Actuary, Postal Life Insurance Co., 511 Fifth Ave., New York.
May 19, 1915	Johnson, William C., Vice-President, Massachusetts Protective Association, Worcester, Mass.
*Nov. 18, 1921	Kearney, Thomas P., Manager, State Compensation Insurance Fund, Denver, Colo.
†	King, Walter I., Secretary, Group Insurance Department, Connecticut General Life Insurance Co., Hartford, Conn.
*Nov. 21, 1919	Kirkpatrick, A. L., Casualty Information Clearing House, 208 So. La Salle St., Chicago, Ill.
†	Kopf, Edwin W., Assistant Statistician, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
Feb. 19, 1915	Laird, John M., Actuary, Connecticut General Life Insurance Co., Hartford, Conn.
Feb. 19, 1915	Landis, Abb, Consulting Actuary, 1107 Independent Life Building, Nashville, Tenn.
Nov. 17, 1922	Lawrence, A. R., Special Deputy Commissioner of Banking and Insurance, 92 Washington St., Newark, New Jersey.
†	Leal, J. R., Secretary & Actuary, Interstate Life and Accident Co., Chattanooga, Tenn.
†	Leslie, William, General Manager, National Council on Compensation Insurance, 151 Fifth Ave., New York.
Nov. 18, 1921	Little, James F., Associate Actuary, Prudential Insurance Co., Newark, N. J.
†	Luckett, Daingerfield G., General Manager and Secretary, United States Casualty Co., 80 Maiden Lane, New York.
*Nov. 16, 1923	McClurg, D. Ralph, Secretary and Treasurer, National Equity Life Insurance Company, Little Rock, Ark.
May 23, 1919	McDougald, Alfred, Ellerslie, Beddington Gardens, Wallington Surrey, England.
*Oct. 31, 1917	McManus, Robert J., Travelers Insurance Co., Hartford, Conn.
Feb. 19, 1915	Maddrill, James D., Actuary, Pennsylvania Manufacturers Association Casualty Insurance Co., Finance Building, Philadelphia, Pa.

FELLOWS.

Date Admitted	
†	Magoun, William N., General Manager, Massachusetts Rating & Inspection Bureau, 80 Broad St., Boston, Mass.
May 19, 1915	Maycrink, Emma C., Examiner, New York Insurance Department, 165 Broadway, New York.
Feb. 19, 1915	Mead, Franklin B., Secretary and Actuary, Lincoln National Life Insurance Co., Fort Wayne, Ind.
Apr. 20, 1917	Meltzer, Marcus, Statistician, National Bureau of Casualty & Surety Underwriters, 120 W. 42nd St., New York.
†	Michelbacher, G. F., Secretary-Treasurer, National Bureau of Casualty & Surety Underwriters, 120 W. 42nd St., New York.
†	Miller, David W., Assistant Treasurer, S. W. Straus & Co., Investment Bonds, 565 Fifth Ave., New York.
†	Milligan, Samuel, Assistant Actuary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
†	Mitchell, James F., First Assistant U. S. Manager, General Accident Fire and Life Assurance Corporation, 421 Walnut St., Philadelphia, Pa.
†	Moir, Henry, President, United States Life Insurance Co., 105 Fifth Ave., New York.
*Nov. 18, 1921	Montgomery, Victor, Secretary, Pacific Employers Insurance Company, 724 So. Spring St., Los Angeles, Calif.
†	Moore, George D., Assistant Secretary and Actuary, Royal Indemnity Co., 84 William St., New York.
May 19, 1915	Morris, Edward B., Actuary, Life Department, Travelers Insurance Co., Hartford, Conn.
Nov. 21, 1919	Morrison, Charles E., Vice-President and General Manager, Utilities Mutual Insurance Co., 53 Park Place, New York.
†	Morrison, James, Secretary-Treasurer, Independence Indemnity Co., Third & Walnut Sts., Philadelphia, Pa.
†	Mowbray, Albert H., Professor of Insurance, University of California, 119 South Hall, Berkeley, Calif.
May 20, 1918	Mudgett, Bruce D., Associate Professor of Economics, University of Minnesota, Minneapolis, Minn.
*Nov. 17, 1920	Mueller, Louis H., Actuary-Statistician, Associated Industries Insurance Corporation, Wells Fargo Building, San Francisco, Calif.
†	Mullaney, Frank R., Actuary and Assistant Secretary, American Mutual Liability Insurance Co., 245 State St., Boston, Mass.
May 28, 1920	Murphy, Ray D., Second Vice-President and Associate Actuary, Equitable Life Assurance Society, 120 Broadway, New York.
†	Nicholas, Lewis A., Assistant Secretary, Fidelity & Casualty Co., 92 Liberty St., New York.
†	Olifiers, Edward, Consulting Actuary, Andrades 64, P. O. Box 1817, Rua dos Rio-de-Janeiro, Brazil.
†	Orr, Robert K., President, Michigan Employers Casualty Co., Lansing, Mich.

FELLOWS.

Date Admitted	
†	Otis, Stanley L., Counsellor at Law, 409 Edgecombe Ave., New York.
*Nov. 21, 1919	Outwater, Olive E., Assistant Actuary, National Bureau of Casualty & Surety Underwriters, 120 W. 42nd St., New York.
†	Pallay, Julius J., Secretary, London Guarantee & Accident Co., Ltd., 90 Maiden Lane, New York.
May 26, 1916	Parker, John M., Jr., Secretary, Accident and Liability Department, Aetna Life Insurance Co., Hartford, Conn.
*Nov. 18, 1921	Perkins, Sanford B., Assistant Secretary, Travelers Insurance Co., Hartford, Conn.
Nov. 15, 1918	Perry, W. T., Assistant Manager, Ocean Accident and Guarantee Corporation, 36 Moorgate, London, E. C. 2, England.
*Nov. 17, 1922	Pinney, Sydney D., Travelers Insurance Co., Hartford, Conn.
†	Remington, Charles H., Vice-President, Aetna Life Insurance Co., Hartford, Conn.
May 23, 1919	Richardson, Frederick, U. S. Manager, General Accident Fire and Life Assurance Corporation, 421 Walnut St., Philadelphia, Pa.
May 24, 1921	Riegel, Robert, Professor of Insurance, University of Pennsylvania, Philadelphia, Pa.
*Nov. 16, 1923	Roeber, William F., National Council on Compensation Insurance, 151 Fifth Avenue, New York.
†	Rubinow, I. M., Executive Director, Jewish Welfare Society, 516 N. Fourth St., Philadelphia, Pa.
†	Ryan, Harwood E., Woodward, Fondiller & Ryan, Consulting Actuaries, 75 Fulton St., New York.
†	Scheitlin, E., Assistant Treasurer, Globe Indemnity Co., Washington Park, Newark, N. J.
†	Senior, Leon S., Manager and Secretary, Compensation Inspection Rating Board, 370 Seventh Ave., New York.
†	Smiley, J. W., Actuary and Chief Accountant to the West Virginia State Compensation Commissioner, Charleston, W. Va.
Apr. 20, 1917	Smith, Charles G., Actuary, New York Insurance Department 165 Broadway, New York.
Feb. 25, 1916	Strong, Wendell M., Associate Actuary, Mutual Life Insurance Co., 32 Nassau St., New York.
Oct. 22, 1915	Strong, William Richard, Care of Mr. H. W. Ivory, 131 Derby St., Kew, Melbourne, Australia.
†	Sullivan, Robert J., Vice-President, Travelers Indemnity Co., Hartford, Conn.
*Nov. 17, 1920	Tarbell, Thomas F., Actuary, Accident and Liability Department, Aetna Life Insurance Co., Hartford, Conn.
May 19, 1915	Thiselton, Herbert C., 50 Beulah Hill, Norwood, London, S. E. 19, England.
†	Thompson, John S., Assistant Actuary, Mutual Life Insurance Co., 32 Nassau St., New York.
Nov. 18, 1921	Toja, Guido, Royal Commissioner, Government Institute of Insurance, Rome, Italy.

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Date Admitted	
†	Train, John L., Secretary and General Manager, Utica Mutual Insurance Co., 239 Genesee St., Utica, New York.
Nov. 17, 1922	Traversi, Antonio T., Government Actuary for New Zealand, Wellington, New Zealand.
*Nov. 21, 1919	Van Tuyl, Hiram O., Examiner, New York Insurance Department, 165 Broadway, New York.
*Nov. 17, 1920	Waite, Alan W., Aetna Life Insurance Co., Hartford, Conn.
May 23, 1919	Welch, Archibald A., Vice-President, Phoenix Mutual Life Insurance Co., Hartford, Conn.
†	Whitney, Albert W., Associate General Manager and Actuary, National Bureau of Casualty & Surety Underwriters, 120 West 42nd St., New York.
*Nov. 18, 1921	Wilson, W. Norbert, 208 Farmington Ave., Hartford, Conn.
†	Wolfe, Lee J., Consulting Actuary, 165 Broadway, New York.
†	Wolfe, S. Herbert, Consulting Actuary, 165 Broadway, New York.
May 24, 1921	Wood, Arthur B., Vice-President and Actuary, Sun Life Assurance Company, Montreal, Canada.
†	Woodward, Joseph H., Woodward, Fondiller & Ryan, Consulting Actuaries, 75 Fulton St., New York.
*Nov. 17, 1920	Young, Charles N., Globe Indemnity Co., Washington Park, Newark, N. J.
†	Young, William, Actuary, New York Life Insurance Co., 346 Broadway, New York.

ASSOCIATES

Those marked (*) have been enrolled as Associates upon examination by the Society.

Those marked (1) or (2) have passed Part I or Part II of the Fellowship Examination.

Date Enrolled	
*Nov. 15, 1918	Ackerman, Saul B., New York University, 32 Waverly Place, New York.
Nov. 15, 1918	Ankers, Robert E., Actuary, Continental Life Insurance Co., District National Bank Building, Washington, D. C.
*Nov. 16, 1923	Ault, Gilbert E., Office of Woodward, Fondiller & Ryan, Consulting Actuaries, 75 Fulton Street, New York.
(2)*Nov.17,1920	Barber, Harmon T., Travelers Insurance Co., Hartford, Conn.
*Nov. 17, 1922	Barter, John L., Hartford Accident & Indemnity Co., 430 California St., San Francisco, Calif.
Nov. 17, 1920	Black, Nellas C., Superintendent Statistical Division, Maryland Casualty Co., Baltimore, Md.
*Oct. 31, 1917	Bessey, John M., Nutley, N. J.
*Oct. 22, 1916	Brann, Ralph M., Superintendent Compensation Department, London & Lancanshire Indemnity Company of America, 20 Trinity St., Hartford, Conn.
Nov. 15, 1918	Brooks, LeRoy, Statistician, U. S. Fidelity & Guaranty Company, Baltimore, Md.
*Nov. 15, 1918	Brunnquell, Helmuth G., Actuary, Wisconsin Insurance Department, Madison, Wis.
*Oct. 22, 1915	Buffler, Louis, Assistant to General Manager, Employers Mutual Insurance Co., 50 Church St., New York.
Mar. 31, 1920	Burt, Margaret A., Office of George B. Buck, Consulting Actuary, 25 Frankfort St., New York.
Nov. 17, 1922	Cavanaugh, Leo D., Vice-President and Actuary, Federal Life Insurance Co., 166 N. Michigan Boulevard, Chicago, Ill.
(2)*Nov.17.1920	Comstock, W. Phillips, Statistician, Continental Casualty Co., 910 Michigan Ave., Chicago, Ill.
*Nov. 18, 1921	Constable, William J., Assistant Secretary, National Council on Compensation Insurance, 151 Fifth Ave., New York.
*Nov. 16, 1923	Darkow, Angela C., Independence Indemnity Company, Third and Walnut Streets, Philadelphia, Pa.
*Nov. 16, 1923	Davis, Evelyn M., Statistician, Utilities Mutual Insurance Company, 53 Park Place, New York.
May 25, 1923	Economidy, Harilaus E., Assistant Secretary and Comptroller, American Indemnity Co., Galveston, Texas.
Nov. 15, 1918	Egli, W. H., Statistician, Zurich General Accident & Liability Insurance Co., 431 Insurance Exchange, Chicago, Ill.
*Nov. 16, 1923	Fitz, Leland L., Assistant Actuary, Massachusetts Insurance Department, State House, Boston, Mass.
*Nov. 16, 1923	Fleming, Frank A., Assistant Actuary, State Industrial Commission, 124 East 28th St., New York.
May 23, 1919	Fletcher, Nicholas, Secretary, Workmen's Compensation Board, Winnipeg, Manitoba, Canada.
*Nov. 17, 1922	Gibson, Joseph P., Jr., Actuary, Security Mutual Casualty Co., 3236 So. Michigan Ave., Chicago, Ill.

ASSOCIATES.

Date Enrolled	
*Nov. 16, 1923	Gildea, James. F., Travelers Insurance Co., Hartford, Conn.
*Nov. 17, 1922	Ginsburgh, Harold J., Aetna Life Insurance Co., Hartford, Conn.
*Nov. 17, 1922	Graham, Chas. M., National Council on Compensation Insurance, 151 Fifth Ave., New York.
*Nov. 18, 1921	Haggard, Robert E., Superintendent Permanent Disability Rating Department Industrial Accident Commission, State Building, Civic Center, San Francisco, Calif.
*Nov. 17, 1922	Hall, Hartwell L., Life Actuarial Department, Travelers Insurance Co., Hartford, Conn.
Nov. 21, 1919	Haydon, George F., General Manager, Wisconsin Compensation Rating & Inspection Bureau, 481 Broadway, Milwaukee, Wis.
*Nov. 16, 1923	Haugh, Charles J., Jr., Secretary and Actuary, North Dakota Workmen's Compensation Bureau, Bismarck, N. D.
May 23, 1919	Hoage, Robert J., Chief Statistician, U. S. Employees Compensation Commission, Washington, D. C.
Nov. 18, 1921	Hull, Robert S., Travelers Insurance Co., Hartford, Conn.
*Oct. 31, 1917	Jackson, Edward T., Statistician, General Accident Fire & Life Assurance Corporation, 421 Walnut St., Philadelphia, Pa.
(2)*Nov.18,1921	Jensen, Edward S., Travelers Insurance Co., Hartford, Conn.
*Nov. 21, 1919	Jones, Loring D., Claim Auditor, State Insurance Fund, 124 E. 28th St., New York.
*Nov. 17, 1922	Kirk, Carl L., Zurich General Accident & Liability Insurance Co., 431 Insurance Exchange, Chicago, Ill.
*Nov. 16, 1923	Linder, Joseph, Assistant Actuary, Hartford Accident and Indemnity Company, Hartford, Conn.
*Nov. 16, 1923	Matthews, Arthur N., Travelers Insurance Company, Hartford, Conn.
(1)*Oct.27,1916	McClure, Laurence H., Colt's Patent Fire Arms Manufacturing Co., Hartford, Conn.
*Oct. 22, 1915	McGuire, Vincent G., Assistant Actuary-Auditor, Pension Division, Department of Finance, Municipal Building, New York.
*Nov. 17, 1922	McIver, Rosswell A., Assistant Actuary, American National Insurance Co., Galveston, Texas.
(1)*Nov.17,1922	Michener, Samuel M., American Telephone and Telegraph Co., 195 Broadway, New York.
Nov. 17, 1922	Montgomery, John C., Assistant Treasurer, Utilities Mutual Insurance Co., 53 Park Place, New York.
May 25, 1923	Moore, Joseph P., Vice-President, North American Accident Insurance Company, 275 Craig St. W., Montreal, Canada.
*Nov. 21, 1919	Mothersill, Roland V., Secretary & Actuary, Compensation Insurance Board, State Capitol, St. Paul, Minn.
(1)*Oct.27,1916	Newell, William, Superintendent Compensation & Liability Department, Sun Indemnity Co., 55 Fifth Ave., New York.
May 23, 1919	Otto, Walter E., Treasurer, Michigan Mutual Liability Co., Park Avenue Building, Detroit, Mich.
*Nov. 17, 1920	Pike, Morris, Examiner, New York Insurance Department, 165 Broadway, New York.

ASSOCIATES.

Date Enrolled	
(1)*Nov.17,1922	Poorman, William F., Actuary, Farmers National Life Insurance Co., 3401 Michigan Ave., Chicago, Ill.
(1) Nov. 17, 1922	Powell, John M., Actuary, Columbian National Life Insurance Co., 77 Franklin St., Boston, Mass.
*Nov. 15, 1918	Raywid, Joseph, Vice-President, Underwriters Statistical Bureau, 50 John St., New York.
*Nov. 21, 1919	Robbins, Rainard B., Assistant Actuary, New York Insurance Department, 165 Broadway, New York.
Nov. 16, 1923	Sawyer, Arthur, Actuary, London Guarantee & Accident Co., 134 So. La Salle St., Chicago, Ill.
*Nov. 18, 1921	Shepard, Elmer I., Assistant Professor of Mathematics, William College, Williamstown, Mass.
Nov. 15, 1918	Sibley, John L., Statistician, United States Casualty Co., 80 Maiden Lane, New York.
*Nov. 18, 1921	Smith, Arthur G., Auditor, Compensation Inspection Rating Board, 370 Seventh Ave., New York.
*Nov. 15, 1918	Spencer, Harold S., Aetna Life Insurance Co., Hartford, Conn.
*Nov. 16, 1923	Stoke, Kendrick, National Council on Compensation Insurance, 151 Fifth Ave., New York.
Nov. 15, 1918	Sullivan, Oscar M., Director of Re-education, State Department of Education, St. Paul, Minn.
Mar. 23, 1921	Thompson, Arthur E., Chief Statistician, Globe Indemnity Co., Washington Park, Newark, N. J.
(1)*Nov.21,1919	Trench, Frederick H., Manager, Underwriting Department, Utica Mutual Insurance Co., 239 Genesee St., Utica, New York.
May 25, 1923	Upshur, Arthur B., Actuary, Home Beneficial Association, 900 E. Broad St., Richmond, Va.
May 25, 1923	Vinter, Joseph M., Comptroller, Standard Accident Insurance Co., 640 Temple Ave., Detroit, Mich.
*Nov. 21, 1919	Voogt, Walter G., Comptroller, State Compensation Insurance Fund, State Building, Civic Center, San Francisco, Calif.
(1)*Oct.27,1916	Waite, Harry V., Statistician, Compensation & Liability Department Travelers Insurance Co., Hartford, Conn.
May 23, 1919	Warren, Charles S., Chief Statistician, Ocean Accident & Guarantee Corporation, 114 Fifth Ave., New York.
(1)*Nov.18,1921	Waters, Leland L., Actuary, National Accident Insurance Co., Lincoln, Neb.
Nov. 17, 1920	Watson, James J., Assistant General Manager, Texas Employers' Insurance Association, Dallas, Texas.
*Nov. 17, 1920	Webber, Charles W., Federal Mutual Liability Insurance Co., 142 Berkeley St., Boston, Mass.
*Nov. 18, 1921	Welch, Eugene R., Secretary, Associated Industries Insurance Corporation, Wells Fargo Bldg., San Francisco, Calif.
*Nov. 16, 1923	Wetherald, Dorothy, Pennsylvania Manufacturers Association Casualty Insurance Co., Finance Building, Philadelphia, Pa.
Mar. 23, 1921	Wheeler, Roy A., Vice-President and Actuary, Liberty Mutual Insurance Co., 210 Lincoln St., Boston, Mass.
Nov. 15, 1918	Wilkinson, Albert E., Statistician, Standard Accident Insurance Co., Detroit, Mich.

ASSOCIATES.

Date Enrolled	
*Nov. 17, 1920	Willbach, Harry, Zurich General Accident & Liability Insurance Co., 55 John St., New York.
Sept. 17, 1919	Williams, John F., Actuary, Division of Insurance, State Department of Trade, Springfield, Ill.
*Oct. 22, 1915	Williamson, William R., Assistant Actuary, Life Department, Travelers Insurance Co., Hartford, Conn.
*Oct. 22, 1915	Wood, Donald M., Childs, Young & Wood, General Agents, Independence Indemnity Company, 175 W. Jackson Blvd., Chicago, Ill.
*Oct. 22, 1915	Woodman, Charles E., Comptroller, Ocean Accident & Guarantee Corporation, 114 Fifth Ave., New York.
*Nov. 17, 1922	Young, Floyd E., Instructor in Mathematics, Oregon Agricultural College, Corvallis, Oregon.

SCHEDULE OF MEMBERSHIP, NOVEMBER 16, 1923.

	Fellows	Associates	Total
Membership, Nov. 17, 1922	158	66	224
Deductions:			
By resignation	3	1	4
By withdrawal	3	—	3
By death	—	—	—
	152	65	217
Additions:			
By election, May 25, 1923	1	4	5
By election, Nov. 16, 1923	—	1	1
By 1923 examinations	2	11	13
	155	81	236
Transfers from Associate to Fellow	—	2	2
Membership, November 16, 1923	155	79	234

EX-PRESIDENTS AND EX-VICE-PRESIDENTS

EX-PRESIDENTS

	Term
I. M. Rubinow	1914-1916
James D. Craig	1916-1918
Joseph H. Woodward	1918-1919
Benedict D. Flynn	1919-1920
Albert H. Mowbray	1920-1922
Harwood E. Ryan	1922-1923

EX-VICE-PRESIDENTS

	Term
George D. Moore	1918-1920
William Leslie	1919-1921
Leon S. Senior	1920-1922

DECEASED MEMBERS

All of the following were Fellows with the exception of those marked * who were Associates.

Date of Death	
Feb. 10, 1920	*Baxter, Don. A., Deputy Insurance Commissioner, Michigan Insurance Department, Lansing, Michigan.
Feb. 4, 1920	Case, Gordon, Office of F. J. Haight, Consulting Actuary, Indianapolis, Ind.
July 23, 1921	Conway, Charles T., Vice-President, Liberty Mutual Insurance Co., Boston, Mass.
Jan. 20, 1922	Craig, James McIntosh, Actuary, Metropolitan Life Insurance Co., New York.
Sept. 2, 1921	Crum, Frederick S., Assistant Statistician, Prudential Insurance Co., Newark, N. J.
July 9, 1922	Downey, Ezekiel Hinton, Compensation Actuary, Pennsylvania Insurance Department, Harrisburg, Pa.
Oct. 15, 1918	Kime, Virgil Morrison, Actuary, Casualty Departments, Travelers Insurance Co., Hartford, Conn.
Dec. 20, 1920	Lubin, Harry, Assistant Actuary, State Industrial Commission, New York.
Aug. 20, 1915	Montgomery, William J., State Actuary, Boston, Mass.
July 24, 1915	Phelps, Edward B., Editor, The American Underwriter, New York.
July 30, 1921	Reiter, Charles Grant, Assistant Actuary, Metropolitan Life Insurance Co., New York.
Feb. 26, 1921	Saxton, Arthur F., Chief Examiner of Casualty Companies, New York Insurance Department, New York.
May 9, 1920	Stone, John T., President, Maryland Casualty Co., Baltimore, Md.

STUDENTS

The following candidates for the grade of Associate have passed one of the two Parts of the examination, during the last three years:

Part 1 only.

BJORN, W., Travelers Insurance Co., Hartford, Conn.

BUGBEE, J. M., The Associated Companies, Hartford, Conn.

CAMERON, JOHN L., Travelers Insurance Co., Hartford, Conn.

FAIRBANKS, E. M., Travelers Insurance Co., Hartford, Conn.

HALL, LAWRENCE L., 124 Grant Ave., Jersey City, N. J.

ROBINSON, E. E., National Bureau of Casualty and Surety Underwriters, 120 West 42nd Street, New York.

ROCKWELL, C. P., Assistant Actuary, Great Southern Life Insurance Co., Houston, Texas.

SOMMER, A., 1374 Race St., Denver, Colo.

Part 2 only.

WALKER, C. A., Utica Mutual Insurance Co., Mayro Building, Utica, N. Y.

CONSTITUTION

(As Amended November 17, 1922.)

Article I.—*Name.*

This organization shall be called the Casualty Actuarial Society.

Article II.—*Object.*

The object of the Society shall be the promotion of actuarial and statistical science as applied to the problems of casualty and social insurance by means of personal intercourse, the presentation and discussion of appropriate papers, the collection of a library and such other means as may be found desirable.

The Society shall take no partisan attitude, by resolution or otherwise, upon any question relating to casualty or social insurance.

Article III.—*Membership.*

The membership of the Society shall be composed of two classes, Fellows and Associates. Fellows only shall be eligible to office or have the right to vote.

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

Any person may, upon nomination to the Council by two Fellows of the Society and approval by the Council of such nomination with not more than one negative vote, become enrolled as an Associate of the Society provided that he shall pass such examination as the Council may prescribe. Such examination may be waived in the case of a candidate who for a period of not less than two years has been in responsible charge of the statistical or actuarial department of a casualty insurance organization or has had such other practical experience in casualty or social insurance as in the opinion of the Council renders him qualified for Associateship.

Article IV.—*Officers and Council.*

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

CONSTITUTION.

ARTICLE V.—*Election of Officers and Council.*

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

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

ARTICLE VI.—*Duties of Officers and Council.*

The duties of the officers shall be such as usually appertain to their respective offices or may be specified in the by-laws. The duties of the Council shall be to pass upon candidates for membership, to decide upon papers offered for reading at the meetings, to supervise the examination of candidates and prescribe fees therefor, to call meetings, and, in general, through the appointment of committees and otherwise, to manage the affairs of the Society.

ARTICLE VII.—*Meetings.*

There shall be an annual meeting of the Society on such date in the month of November as may be fixed by the Council in each year, but other meetings may be called by the Council from time to time and shall be called by the President at any time upon the written request of ten Fellows. At least two weeks notice of all meetings shall be given by the Secretary.

ARTICLE VIII.—*Quorum.*

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

ARTICLE IX.—*Expulsion or Suspension of Members.*

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

ARTICLE X.—*Amendments.*

This constitution may be amended by an affirmative vote of two-thirds of the Fellows present at any meeting held at least one month after notice of such proposed amendment shall have been sent to each Fellow by the Secretary.

BY-LAWS

(As Amended October 27, 1916.)

Article I.—*Order of Business.*

At a meeting of the Society the following order of business shall be observed unless the Society votes otherwise for the time being:

1. Calling of the roll.
2. Address or remarks by the President.
3. Minutes of the last meeting.
4. Report by the Council on business transacted by it since the last meeting of the Society.
5. New membership
6. Reports of officers and committees.
7. Election of officers and Council (at annual meetings only.)
8. Unfinished business.
9. New business.
10. Reading of papers.
11. Discussion of papers.

Article II.—*Council Meetings.*

Meetings of the Council shall be called whenever the President or three members of the Council so request, but not without sending notice to each member of the Council seven or more days before the time appointed. Such notice shall state the objects intended to be brought before the meeting, and should other matter be passed upon, any member of the Council shall have the right to re-open the question at the next meeting.

Article III.—*Duties of Officers.*

The President, or, in his absence, one of the Vice-Presidents, shall preside at meetings of the Society and of the Council. At the Society meetings the presiding officer shall vote only in case of a tie, but at the Council meetings he may vote in all cases.

The Secretary-Treasurer shall keep a full and accurate record of the proceedings at the meetings of the Society and of the Council,

send out calls for the said meetings, and, with the approval of the President and Council, carry on the correspondence of the Society. Subject to the direction of the Council, he shall have immediate charge of the office and archives of the Society.

The Secretary-Treasurer shall also send out calls for annual dues and acknowledge receipt of same; pay all bills approved by the President for expenditures authorized by the Council of the Society; keep a detailed account of all receipts and expenditures, and present an abstract of the same at the annual meetings, after it has been audited by a committee of the Council.

The Editor shall, under the general supervision of the Council, have charge of all matters connected with editing and printing the Society's publications. The *Proceedings* shall contain only the proceedings of the meetings, original papers or reviews written by members, discussions on said papers and other matter expressly authorized by the Council.

The Librarian shall, under the general supervision of the Council, have charge of the books, pamphlets, manuscripts and other literary or scientific material collected by the Society.

ARTICLE IV.—*Dues.*

The dues shall be ten dollars for Fellows and five dollars for Associates payable upon entrance and at each annual meeting thereafter, except in the case of Fellows not residing in the United States, Canada, or Mexico, who shall pay five dollars at the times stated.

It shall be the duty of the Secretary-Treasurer to notify by mail any Fellow or Associate whose dues may be six months in arrears, and to accompany such notice by a copy of this article. If such Fellow or Associate shall fail to pay his dues within three months from the date of mailing such notice, his name shall be stricken from the rolls, and he shall thereupon cease to be a Fellow or Associate of the Society. He may, however, be reinstated by vote of the Council, and upon payment of arrears of dues.

ARTICLE V.—*Amendments.*

These by-laws may be amended by an affirmative vote of two-thirds of the Fellows present at any meeting held at least one month after notice of the proposed amendment shall have been sent to each Fellow by the Secretary.

EXAMINATION REQUIREMENTS

RULES REGARDING EXAMINATIONS FOR ADMISSION TO THE SOCIETY

(As Amended November 16, 1923.)

The Council adopted the following rules providing for the examination system of the Society:

1. Examinations will be held on the first Wednesday and Thursday during the month of May in each year in such cities as will be convenient for three or more candidates.

2. Application for admission to examination should be made on the Society's blank form, which may be obtained from the Secretary-Treasurer. No applications will be considered unless received before the first day of March preceding the dates of examination.

3. A fee of $5.00 will be charged for admission to examination. This fee is the same whether the candidate sits for one or two parts and is payable for each year in which the candidate presents himself. Examination fees are payable to the Secretary-Treasurer and must be in his hands before the first day of March preceding the dates of examination.

4. The examination for Associateship consists of two parts. Subject to the provisions of Rule 5 following, no candidate will be permitted to present himself for Part II unless he has previously passed in Part I or takes Parts I and II in the same year. If a candidate takes both parts in the same year and passes in one and fails in the other, he will be given credit for the part passed.

5. In the case of applicants not less than thirty years of age who have had not less than five years' experience in actuarial or statistical work in insurance offices, the Council may, upon receipt of satisfactory evidence of general education, waive the passing of Part I of the Associateship Examination. Such applicants may thereupon become Associates by passing Part II thereof.

6. Admission to Fellowship examinations is granted only to those who are Associates of the Society. The examination for Fellowship is divided into two parts. No candidate will be permitted to present himself for Part II unless he has previously passed in Part I or takes Parts I and II in the same year. If a candidate takes both parts in the same year and passes in one and fails in the other, he will be given credit for the part passed.

EXAMINATION REQUIREMENTS.

7. As an alternative to the passing of Part II of the Fellowship examination, a candidate may elect to present an original thesis on an approved subject relating to casualty or social insurance. Candidates electing this alternative should communicate with the Secretary-Treasurer as to the approval of the subject chosen. All theses must be in the hands of the Secretary-Treasurer before the first Thursday in May of the year in which they are to be considered. Where Part I of the Fellowship examination is not taken during the same year, no examination fee will be required in connection with the presentation of a thesis. All theses submitted are, if accepted, to be the property of the Society and may, with the approval of the Council, be printed in the *Proceedings*.

SYLLABUS.

ASSOCIATESHIP.

Part I.

1. Elementary algebra up to and including the binomial theorem and the use of logarithms, and compound interest and annuities-certain.

NOTE.—Under this topic the student is expected to understand what is presented in the ordinary college algebras through the binomial theorems but excluding exponential and logarithmic series. He is expected to understand the ordinary use of logarithms and to be able to handle the simpler problems in compound interest and annuities-certain as they are presented in the average college algebra, without going into the more intricate problems of bond amortization and similar matters.

2. Double entry bookkeeping.

3. Elements of statistics, including theory of compilation, tabulation and presentation, but excluding critical mathematical analysis.

Part II.

1. Elements of the theory of probabilities—algebraic treatment only.

2. Policy forms and underwriting practice in casualty insurance, viz., personal accident, health, liability, workmen's compensation, fidelity, surety, plate glass, steam boiler, burglary, fly wheel, automobile, workmen's collective, credit.

3. Simple practical problems relative to precedure in compilation and use of statistics relating to casualty (including social) insurance problems.

4. Simple practical problems relating to procedure in insurance accounting and statistics, including the preparation of annual statements and schedules.

NOTE.—As respects items 3 and 4, the student is expected to be prepared to carry through, under instructions, such compilations of statistical data as are usually made in the office of a casualty company and to carry through the usual accounting work, including the preparation of the statement. He should also be prepared to adapt, for the use of his particular company, statistical and accounting methods in general use. It is not expected that the candidate for Associateship should be prepared to work out new plans and methods for developing data and answering intricate questions, facility for coping with the latter type of problems being among the qualifications required for Fellowship.

5. Insurance law, including the more important statutes of the United States and Canada (for Canadian candidates) relating to casualty insurance.

FELLOWSHIP.

Part I.

1. Advanced algebra, elementary differential and integral calculus and elementary calculus of finite differences.

2. Critical analysis of statistics, including elementary mathematical theory.

3. Elements of the theory of life contingencies, including the calculation of present values of annuities based upon life contingencies.

4. Economic theory of insurance, including the theory of social insurance.

Part II.

1. Advanced practical problems in the compilation and use of statistics relating to casualty (including social) insurance problems.

2. Calculation of premiums and reserves for accident, sickness, workmen's compensation and other branches of casualty insurance, including consideration of basis of reserve.

3. Advanced practical problems in insurance accounting and statistics, including the preparation of annual statements and schedules.

4. Underwriting problems in casualty insurance, including inspection of risks, adjustment and settlement of claims, etc.

"Recommendations for Study" is a pamphlet which outlines the course of study to be followed in connection with the above syllabus. Copies of this pamphlet and also past examination questions may be obtained without charge, upon application to the Secretary-Treasurer.

1923 EXAMINATIONS OF THE SOCIETY

EXAMINATION FOR ENROLLMENT AS ASSOCIATE

PART I

1. Solve the equations:

   (a) $x^3 - y^3 = 19$
   $x^2y - xy^2 = 6$

   (b) $\sqrt{x+10} - \sqrt[4]{x+10} = 2$

2. (a) Find the general term in the expansion of
   $$\sqrt[3]{(a^3 - x^3)^2}$$

   (b) The sum of three numbers in geometrical progression is 38 and their product is 1728. Find the numbers.

3. Derive the square root of
   $$1 + 10x^2 + 25x^4 + 16x^6 - 24x^5 - 20x^3 - 4x$$

4. (a) Define and indicate clearly the distinguishing features of checks, promissory notes, money orders and time drafts.

   (b) What is the purpose of amortization? To what class of securities is it applied?

5. An insurance company in one day issued new policies bearing premiums to the amount of $10,000. It cancelled policies bearing premiums to the amount of $800 and charged up earned premiums thereon of $200. Its total premium collections for the day were $8,500 out of which it paid $1,500 commission. It paid a judgment against it of $2,500 arising from a suit under an accident policy and received credit at the bank for $3,000 interest coupons. Make journal entries covering all the above transactions.

6. How do accounts kept on an "incurred" basis differ from those kept on a "cash" basis? Explain how you would keep the account "losses" on an incurred basis in a company transacting plate glass insurance.

7. What are the types of averages commonly used in statistical studies? Discuss them as to their weaknesses and advantages.

8. Name three methods of primary investigation in gathering statistical data. Under what circumstances would each of the above be preferable?

9. Find the middle term of $\left(1-\frac{x^2}{2}\right)^{14}$

10. If the smaller of two numbers is divided by the greater the quotient is 0.21 and the remainder 0.0057; but if the greater is divided by the smaller the quotient is 4 and the remainder 0.742. Find the numbers.

11. A person invests a certain sum in a 6½% bond. If the price had been \$3 less he would have received 1/3% more interest on his money. What price did he pay for the bond?

12. The present value of \$672 due in a certain time is \$126. On the basis of compound interest at 4 1/6% find the time. Given: log 2 = .30103; log 3 = .47712.

13. Wherein does the business, and, therefore, the accounting requirements of a bank and an insurance company correspond? Wherein do they differ?

14. A man, on January 1, 1922, started a retail grocery business with \$5000 borrowed money. At the end of the year his trial balance showed the following:

Sales		\$60,000
Purchases	\$57,000	
Clerk-hire	1,800	
Delivery expenses	1,200	
Rent	1,500	
Cash	1,000	
Accounts receivable	2,500	
Proprietor's drawing account	2,000	
Accounts payable		4,000
Borrowed money		3,000
	\$67,000	\$67,000

The merchandise inventory on December 31, 1922 was valued at $8000. Prepare a profit and loss statement, and a statement of assets and liabilities as of December 31st, 1922.

15. From the following table compute relative price index numbers for the year 1913 based on the prices for the year 1912:

Commodities	1912	1913
Corn, cash, contract grades, per bu.	$ .6855	$ .6251
Cotton, Upland Middling, New York, per lb.	.1150	.1279
Oats, cash, per bu.	.4380	.3758
Hay, Timothy No. 1, per ton.	20.4104	16.0288
Hides, green salted, packers'; heavy native steers, per lb.	.1760	.1839
Cattle, steers, choice to prime, per 100 lbs.	9.3585	8.9288
Hogs, heavy, per 100 lbs.	7.5954	8.3654

16. (a) What is a frequency series?
    (b) Distinguish between and give examples of continuous and discrete series.
    (c) What methods are there for the presentation and comparison of statistical data?
    Give examples to which each of these would best apply.

PART II

1. If on an average, one vessel in every ten is wrecked, find the chance that out of five vessels expected four at least will arrive safely.
2. In each of a set of games it is two to one in favor of the winner of the previous game. What is the chance that the player who wins the first game shall win three at least of the next four?
3. Discuss Schedule Rating and Experience Rating with reference to,
    (a) The definition of each;
    (b) The kind of casualty insurance to which they apply;
    (c) The qualifications necessary before a risk is subject to either or both.

4. Name and briefly describe the coverage under four distinct forms of liability insurance policies.

5. (a) Disregarding states with specific exceptions, what is the general rule regarding coverage furnished under Compensation policies to executive officers? If, and when, coverage is granted, what is the provision for basis of premium?

   (b) What is the justification for inserting in the Compensation Experience Rating plans the rule limiting the charge on account of an accident under "All other, excluding medical" to 20%?

6. Devise two punch cards which will give the necessary data for the preparation of Schedule "Z."

7. Prepare a statement of Assets and Liabilities according to the Convention Edition blank from the following figures:

Book Value of Bonds	$1,395,000
Cash in banks	87,000
Premiums in Course of Collection	87,000
Sundry ledger assets	4,600
Interest accrued	12,700
Reserve for losses	104,000
Unearned premiums	287,000
Other liabilities	55,700
Capital paid in	800,000
Premiums outstanding more than 90 days	10,000
Market value of bonds over book value	1,875

8. (a) Describe fully the supervision exercised by at least two states in connection with rates for Workmen's Compensation insurance.

   (b) What defenses available to an employer under the common law were largely abrogated by the passage of Workmen's Compensation acts?

9. From a bag containing two $10 bills and three $5 bills a person is allowed to draw two bills indiscriminately. What is the value of his expectations?

10. You have counters of n different colors—red, white, blue, etc. In how many ways can you make an arrangement consisting of r counters, supposing that there are at least r of each different color?

11. Under what form of policy would you cover a restaurant owner and caterer against claims brought by the public? Would coverage include claims brought for accidents caused by deleterious food? If not, how would you furnish complete coverage?

12. (a) Discuss briefly the difference in Liability of a company writing a Surety bond and issuing an insurance policy.

    (b) What is covered by the ordinary Fidelity bond; Contract bond; Fiduciary bond? Give the basis of computing the premium on each class.

13. Given a fleet of five Ford delivery automobiles owned by a concern and operated for the purpose of delivering parcels for department stores. In other words, the owner has a contract with three department stores to deliver their parcels. Would the risk be rated at the department store rates or the truckman rates?

14. Outline the statistical investigation which would be required for the establishment of rates for compulsory health insurance among industrial workers.

15. In what particulars does the computation of the reserve for liability losses in Schedule "P" differ from the computation of the reserve for workmen's compensation losses as provided for in the same schedule? What relation does Schedule "Z" bear to the determination of scientific premium rates?

16. An assured under an automobile policy has a serious accident and is sued by the injured party who obtains judgment for $5,000, the limit under the policy. The insurance company defended the case for its assured throughout and is about to pay the judgment when it obtains positive evidence that the assured had stolen the car which had been insured. It refuses to pay the judgment. Is the company legally liable? Discuss.

EXAMINATION FOR ADMISSION AS FELLOW

PART I

1. (a) Solve $x^4 + x^2y^2 + y^4 = 21$
$x^2 - xy + y^2 = 3$

(b) Find the value of $\dfrac{(2^{-3} + 27^{\frac{2}{3}})^{-1}}{\log_{16}(\log_2 16)}$

2. (a) Find the coefficient of x^{100} in the expansion of $\dfrac{3 - 5x}{(1-x)^2}$.

(b) The sum of 2n terms of a geometrical progression whose first term is a and common ratio r is equal to the sum of n terms of a geometrical progression whose first term is b and common ratio r^2. Prove that b is equal to the sum of the first two terms of the first series.

3. (a) Under what conditions is the following series convergent and divergent

$$x + \frac{3}{5}x^2 + \frac{8}{10}x^3 + \frac{15}{17}x^4 + \ldots \frac{n^2-1}{n^2+1}x^n + \ldots$$

(b) What must be the relationship between the coefficients of a quadratic equation if the sum of the reciprocals of its roots equals unity?

4. (a) Solve for x: $21^{x^2-3x} = 9{,}261$.

(b) Sketch roughly the equation $y = (x-1)(x^2 + 3x + 2)$.

5. (a) (1) If $y^3 + x^3 - 3axy = 0$ find $\dfrac{d^2y}{dx^2}$.

(2) If $u = x\log x + \log x^3 + \log^3 x + e^{ax}$ find $\dfrac{du}{dx}$.

(b) Expand e^{-kx} into a power series by the use of Maclauren's series.

6. (a) Find the value of $\int \frac{3x^3 - 5x^2 + 3x + 1}{(x-1)^2(x^2+1)}\,dx$.

(b) If $u = \frac{1}{(nx)^{\frac{n-1}{n}}} + \frac{1}{\sqrt{1-x}} + \frac{x^{n-1}-1}{x^n - nx}$, find $\int u\,dx$.

7. (a) By the use of finite differences find the sum of the squares of the first n natural numbers.

(b) Supply the terms between u_3 and u_{10}, having given $u_0 = 8$, $u_1 = 1$, $u_2 = -1$, $u_3 = -6$, $u_{10} = 43$.

8. (a) Given that $a_{xx} = 16.112$, 15.325, 14.479, 13.491 and 12.355, for x equal to 20, 25, 30, 35 and 40, respectively, find the value of a_{xx} when $x = 27$.

(b) Derive the formula

$$\Delta^n u_0 = u_n - nu_{n-1} + \frac{n(n-1)}{\lfloor 2} u_{n-2} \ldots$$

$$\pm \frac{n(n-1)}{\lfloor 2} u_2 \mp nu_1 \pm u_0 .$$

9. (a) Discuss the advantages of coordinate paper having a logarithmic scale for one variable.

(b) What are the advantages of the standard deviation over other unit measures of variability.

10. (a) Draw frequency curves to illustrate (1) the normal probability curve and (2) one similar but slightly askew and indicate on each the relative position or sizes of the following statistical concepts of the distributions illustrated, (a) the mode, (b) the median, (c) the arithmetic mean, (d) the standard deviation.

(b) Explain the term "skewness" as applied to frequency distributions. Give a method of measuring "skewness."

11. Illustrate how you would investigate the correlation between the values of land and improvements thereon as based upon

the following data. The numerical work need not be carried out only to illustrate clearly the principles:

IMPROVEMENTS: Values in Thousand Dollars	LAND 5	10	15	20	25	30	35	40	45	50	55	60	Frequencies Total
0	..	4	10	1	..	..	1	..	..	..	..	..	16
5	11	8	19	30	5	1	..	..	1	..	..	..	75
10	13	9	23	38	6	1	..	..	..	..	..	..	90
15	11	..	..	14	2	..	..	..	..	..	..	..	27
20	5	..	4	1	2	4	1	..	..	..	..	..	17
25	20	17	2	1	1	..	..	3	1	..	..	..	45
30	2	9	3	..	1	..	..	3	2	..	1	1	22
35	..	..	..	..	1	1	..	1	..	..	..	..	3
40	..	..	..	..	2	..	..	..	..	2	..	..	4
45	..	..	..	..	..	..	..	..	..	..	..	..	0
50	..	..	..	..	..	..	1	..	..	..	..	..	1
Totals	62	47	61	85	20	7	3	7	4	2	1	1	300

12. (a) From first principles derive the expression for a_x in terms of commutation columns. Under what condition does a_x become equal to e_x?
    (b) Distinguish between the rate of mortality and force of mortality. What is Makeham's formula for the law of mortality?
13. If a workmen's compensation law provides a death benefit of 30% of the deceased's wages as long as the widow survives and an additional benefit of 10% of the wages to each child until age 18, express the present value of the benefits at death where the wage was $1,100 per annum and the dependents were a widow age 40 and children 6, 8 and 10, respectively.
14. Find the probabilities:
    (a) That not more than one of lives x and y will live n years.
    (b) That of these lives x will die before the nth year and y will die in that year.
    (c) That if x will die in the nth year, y will live beyond that year.
    (d) That the last survivor of x and y will die in the nth year.
    (e) That one of the lives will die before the nth year and the other in that year.

15. To what extent has unemployment insurance been adopted in Europe? What is the present status in the United States? Discuss briefly its advantages and disadvantages.
16. Discuss the economic services rendered to society by the institution of casualty insurance.

PART II

1. Outline a method, using punch cards, of keeping Workmen's Compensation Loss Experience.
2. Outline the principal features of an Automobile Insurance Experience Rating Plan.
3. Explain the meaning of the terms "theoretical law differential" and "experience law differential" in Workmen's Compensation Insurance. Explain briefly the calculation of either of these differentials for any one state.
4. Give the basis of the legal reserve required for Workmen's Compensation insurance in any one of the following states: California, Massachusetts, New York or Pennsylvania.
5. Discuss the basis and methods of calculating rates for Automobile Public Liability insurance.
6. Explain in detail how you would calculate the reserves necessary for the annual statement on Accident and Health insurance.
7. Discuss the investigation of loss experience under the various classes of Burglary insurance.
8. Discuss briefly compulsory Automobile Public Liability insurance from the standpoint of (a) the public; (b) the insured; (c) the carrier.
9. What is meant by non-ledger and non-admitted assets in the Convention Statement? What items are included in each type? Explain why they are so treated.
10. (a) Given the annual statements of a casualty company for the years ending December 31, 1921, and December 31, 1922, how would you proceed to obtain (1) written premiums, (2) paid premiums, (3) earned premiums, (4) incurred losses.

(b) Explain how a credit balance to suspense should be treated in making up the annual statement of a casualty company. How should a debit balance to suspense be treated?

11. You are asked to propose a basis for allocation of expenses between the different classes of casualty insurance transacted by your company. Discuss the problems involved.

12. What information is needed to quote a premium for Plate Glass insurance on a series of chain stores operating at various locations in the United States.?

13. What minimum information should an underwriter have to pass upon applications for depository bonds covering public funds made by rural or city banks in districts depending for general prosperity chiefly upon returns from either oil, or cotton, or grain crops, or live stock? Mention the elements (1) that reflect favorably and (2) that reflect unfavorably, upon the application.

14. (a) Accident Insurance policies are issued in which the following clause appears:—"Weekly indemnity shall be paid as long as the insured is unable to perform the duties of his occupation." Discuss the moral hazard in this clause and draft one which, in your opinion, would be proper in order to provide life indemnity.

(b) What has been the progressive effect of economic conditions on Workmen's Compensation insurance during the past five years and what do you expect during the remaining portion of 1923 and 1924?

15. (a) What is the coverage under General Liability Policies? What is the premium basis?

(b) Are there any instances in your opinion where a risk might not be insurable for high excess limits under Public Liability insurance and, at the same time, be a desirable risk under standard limits? Describe one or more risks, if such exist.

16. Discuss briefly the various methods whereby carriers transacting Workmen's Compensation and Liability insurance may provide for outside assistance in dealing with prospective losses which they feel may exceed their resources.

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